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**Volume 119 | Number 5 | September/October 2022** **www.msma.org/missouri-medicine**

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# Missouri Medicine

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# Are We Training Our Mid-Level Provider Replacements?

*by Samer W. Cabbabe, MD*

**Given our reliance on Mid-Level Practitioners and the message we have been sending to our patients that "MLPs can take just as good of care of you," it should come as no surprise that patients have accepted the loss of physicians in their medical care and turned to MLPs for care.**

I've been in private practice for 12 years, and during that time, health care has changed faster than I could have ever imagined. Private practice numbers have decreased annually, hospitals have been purchased and merged, and corporate medicine now rules the land. Doctors have lost their independence and now midlevel providers (MLPs) are slowly replacing physicians, driven by the desire to maximize profit margin in corporate medicine. Accordingly, the quality of health care has deteriorated and the patient-physician relationship has changed for the worse.

MLPs have been around for years. Physician Assistants (PAs) began to practice in the mid-20th century and have worked alongside surgeons for years. Nurse Practitioners (NPs) started in the 1960s and their role expanded in 2010 with an Institute of Medicine recommendation. Realizing they could not staff operating rooms with only attendings and recognizing that their profits may increase, anesthesiology practices began to staff surgeries with Certified Registered Nurse



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Anesthetists (CRNAs). Now, many patients who have surgery in hospitals or surgery centers never even see an attending physician anesthesiologist. Due to physician shortages, hospitals have hired increasing numbers of NPs and PAs to help physicians see patients in both the inpatient and outpatient settings. Hospitals even encourage physicians to allow the NPs to see the inpatients for them so that they can focus on outpatients/new patients.

In my opinion, a major turning point—for the worse—in the patient-physician relationship occurred when family doctors stopped seeing patients in the hospital, and hospitalists and MLPs took over the inpatient care of their sick patients. Physicians were essentially telling patients, "I only take care of you when you are healthy." In the outpatient family care setting, MLPs see a significant number of outpatients without physician supervision. The physician message to patients is, "This MLP can do just as good a job as I can."

Given our reliance on MLPs and the message we have been sending to our patients that "MLPs can take just as good of care of you," it should come as no surprise that patients have accepted the loss of physicians in their medical care and turned to MLPs for care.

I foresee a future of health care where MLPs provide the vast majority of inpatient and outpatient services with minimal physician supervision, much like the anesthesia model. This could easily be accomplished in emergency departments, hospital floors, ICUs and clinics, where MLPs could see all the patients, order diagnostics, call consults, and discuss complex care with one or two attending physicians, much like a residency.

The reality is that physicians are training their eventual (MLP) replacements! The first three years of work for a NP is essentially their own "residency." However, compared to physician residencies, they are being compensated handsomely (>$100,000), working less than 80 hours/week and starting without the same medical school debt! Some employed physicians have stepped forward and refused to work with MLPs, and the result has been termination by these corporate hospitals. We are being forced to train our replacements!

Eventually, MLPs will take over surgical practice; they are already performing procedures in emergency departments, outpatient settings, and even in interventional radiology to name a few. They can be trained to do surgery just like any resident.

As long as corporate medicine drives health care, profit margin will be the priority. With the Medicare lump-sum payment model pending, hospitals know they can pay an MLP less than a physician to do the same work and pocket the profit. And, they won't have to deal with "difficult physicians."

What can be done now? Sadly, I can't see any situation where this ends well for physicians. Most states are passing legislation that increases NPs' independent practice. The Accreditation Council for Graduate Medical Education has increased residency positions, but that is too little and too late. Even if we adopted universal Medicare, undoubtedly the government will see value to utilizing MLPs over more expensive physicians.

Unfortunately, the MLP train has already left the station! **MM**





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# Physician Unions and Work-Life Balance

*by George P. Hubbell, MD*

**Maybe unionization is a reasonable approach in discussions to reestablish daily work-life balance in our lives.**

Physician alignment with hospitals and health system corporations has been rapid. Seventy-four percent of practicing physicians are now hospital employees. Just a decade ago 60% of physician practices were independent but they now represent a distinct minority. The transition has accelerated with the consolidation of medical care and the continued growth of large corporate medical complexes, fueled in part by aggressive buyouts and recent COVID pandemic produced opportunity.[1] Physician conflict between hospitals and systems isn't new but avenues have assuredly changed from medical staff and hospital board decision-making of the past to more corporate governance by administrators. Further, this medical amalgamation has created a number of issues that include ethical, compensation, type of specialty services offered, quality improvement, labor law, and billing strategy.[2]

Traditionally, physicians have been autonomous in their own practice and enunciated a sacred doctor-patient relationship as set forth in our Hippocratic oath. With a shift to employment and the alteration of medical governance to corporate administrations, decision-making for the physician and their patient has been altered significantly. Individual physicians in a corporate medical system are now limited as to how they can address or express concerns of their own or their patients', compared to self-employed models of the past.



**George P. Hubbell, MS, MD, FACOG**, is President of the Missouri State Medical Association for 2022-2023. He is a Obstetrician/Gynecologist from Lake Ozark, Missouri.

Organization can be a possible mediator for a unified and effective voice, and physician unions are on the upswing in this country. Doctor unions have claimed to be devoted to physicians and their patients, not primarily the business of medicine. Over the past 40 years, absolute physician numbers have increased only 150% in contrast to healthcare administrators growing at a rate of 3,200% (not a typo). That enunciates the area of growth in consolidation of our health industry.[3]

In a recent inventory survey, six of 10 physicians report feelings of burnout—a combination of emotional and physical exhaustion—affecting performance and work-life balance. Major factors related to physician burnout have included excessive workloads or hours, burdensome electronic health records (EHR), loss of autonomy, and excessive administrative requirements that upset work-life balance.[4] The majority of physicians have asked for keyboard liberation because more time is spent with medical software than directly with patients. A recent report showed in an average 11-hour workday for a family physician, six hours was spent at the keyboard with EHR. Further, it was demonstrated that only 13% of an average physician's day was spent on actual doctor-patient interaction.[5] Our responsibility to patients is paramount to billing and quality documentation. Mayo Clinic recently published a survey of the usability of EHR systems with physicians giving an 'F' grade or 45% to current EHRs using standard metrics versus 93% for Google search in the same survey.[6] Doctors need time to think, listen, bond, and establish trust with their patients.

Over three decades ago as a resident physician, I first encountered a physician union, and frankly can say I was not initially a big fan. Membership was not mandatory but 96% of residents belonged to the House Officer Organization at my training program.

The main tenets of that union were to provide collective bargaining with the university and a contract to guarantee wages, benefits, discipline procedures and disability insurance. An 80-hour work week rule was established and additionally, pregnancy leave, holiday pay, and parking were provided. This union supported and protected 1,200 resident physicians and fellows at the University of Michigan. Today, around 20,000 resident physicians are organized and in unions in this country and the number is growing.[7]

Among actively practicing physicians, approximately 70,000 currently belong to a union, representing 8% of physicians.[8] Three new unions have been established at academic institutions this year for attending physicians. MSMA has championed healthcare advocacy and policy in the state for 172 years, representing organized medicine for all physicians in Missouri. A union is a far more complex legal entity adhering to many legal principles and this article is only to present some of the background that has led to physician union formation in healthcare.

Certainly, we will be unable to undo all of the negative consequences of healthcare consolidation, but unions can offer a voice of retort on addressing modifiable issues that may make our lives less burdensome and more fulfilling. We are true professionals and don't wish to be treated as assembly line workers, stuck behind a computer screen performing pedantic chores. Maybe unionization is a reasonable approach in discussions to reestablish daily work-life balance in our lives. It has been said opportunity seldom rises with blood pressure but further deliberate study on unions in medicine is warranted.

## References


1. The rise and potential of physician unions. D bowling, B Richmond, K Shulman. JAMA August 16, 2022, Vol 328 (7)
2. What doctors wish patients knew about physician burnout. Sarah Berg AMA November 5, 2021.
3. Why doctors should organize. Eric Topol New Yorker August 5, 2019.
4. Factors related to physician burnout and consequences: A review. R Patel, R Bachu, A Aidkey, M Malik and M Shah Behavioral Science November 18, 2018 (1): 98
5. Addressing physician burnout: 3 physician leaders discuss solutions. Richard Payerchin. Medical Economics. August 8, 2022
6. The association between perceived electronic health record usability and professional burnout among US physicians. Mayo Clinic proceedings March 1, 2020. Vol 95(3) P 476- 487.
7. Resident and fellow unions: collective activism to promote well-being for physicians and training. JAMA. August 16, 2022(7)
8. Unionstats.com, accessed 9/2/2022.


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# A Retired Psychiatrist on Retirement: Rejoicing *Jubilatio*

*by Juan C. Corvalan, MD*

**These retirement years can be wonderful.
Now I live every hour, doing my best,
to be good to my family, colleagues, and friends.**

## Introduction

Well into my own retirement, I conclude discussing retirement is not easy. While there are numerous publications, books, programs, diverse opinions, and a body of commonality, each retirement is unique. I hope to offer a unique perspective to physicians at all stages of their careers.

I retired reluctantly after many years of private psychiatry practice, part-time in the Veterans Administration medical system, and the United States Air Force Reserves.

I had to retire due to the illness of a family member that required my complete attention. I was 77. My last 26 years were devoted to care of U.S. military veterans. I had many patients that I followed for years and we shared common experiences. I am a veteran of the Gulf War (8/1990-2/1991) serving in a combat theater. This created a special bond with my military patients. We had a close relationship; we worked in groups; we were like a family. I honed my psychiatric skills learning the special stressors on service members and their families during and after wars.



**Juan C. Corvalan, MD,** Col USAFR, (Ret), is a retired psychiatrist from the St. Louis VA Medical Center and military veteran. He is the Missouri Medicine Editorial Board member for Retired Physicians.

## Perceptions

Retiring was difficult for me. I enjoyed my patients and my practice. I have asked colleagues, some retired, some considering retirement, about their experiences. Some of my colleagues were still quite young, yet couldn't wait to retire. They planned to devote their "free" time to travel, to developing new hobbies, and enjoy life more. Many of these physicians planning early retirement were on the 'burned-out' end of the spectrum, did not derive much pleasure or kinship from their practice, or had other interests. Others were on my end of the spectrum enjoying medicine and interacting with patients. Those already retired with this positive mindset, missed being a physician.

Here are some of these physicians' enlightening comments regarding their sundry experiences:

- *"I am really happy now. The first six months were hard, but now I am taking courses at a university, I am in contact with friends and family locally and abroad, which is the advantage of using Zoom. I am not isolated."*
- *"I play golf every day, and I can travel and go to the best places. I am active all the time."*
- *"I hate slowing down due to age! I can't work as before. Now I practice just a couple of days per week. I hate getting old!"*
- *"I can't do many of the things I used to love to do, like riding my motorcycle, skiing, and much more."*
- *"I was active doing research, mountain climbing, and flying. Now the only thing I can do is write books. I can't hear well. I am losing my muscles, and it is hard to exercise. Yes, old age is hard."*
- *"Now I can read books that I didn't have time to read, I can learn another language, I can develop a hobby, photography, work in the garden, paint, play golf as long as I can, etc. Now I am free."*

Others found that devoting more time to attend church and/or serving as volunteers allowed them to create a vocation of service which gave meaning to their lives.

## Definitions

The word "retirement" in Spanish is *"jubilacion*," related to *jubilo* (joy). "*Jubilar*," the verb, means "to retire" but also means to be fired or dismissed. "*Jubilatio*," in Latin means retirement, gladness, rejoicing. Retirement in Latin also has another word "*decedo*" (depart, retire, cease to be, die). Decessus means retirement, death, vanish, decline, passing. There are more combinations and cross definitions, but all seem embody two main points:

1. The joy of being free.
2. Coming to terms with dying.

Decessus also means death, to vanish. It means the end of one's productive life, In our professional life, people and families need us and depend on our decisions that affect their survival, their very lives. The next day after retirement, we are removed from treating patients in crucial moments where death, pain, happiness, and sometimes cures, can depend on us. Suddenly we are spectators; we are deprived of our professional duties; we may begin to feel irrelevant and not needed.

This new retired status shows us that our life has limitations as one chapter finishes, we open a new one and consequently closer to the end of the book of life. Marcus Aurelius reminded us: "Remember that man lives only in the present, in this fleeting instant…This mortal life is a little thing, lived in a little corner of the earth…"[1] Retirement embodies these two contradictory extremes.

## Effects

Retirement is a time of reflection, a review of our physician career, assessment of our remaining life goals, achievements, failures, mistakes, relationships with family and friends, and how to utilize our remaining time and freedom.

A timeless consideration, Cicero in *Laelius* wrote of old age:

"*The course of life is fixed, and nature admits of it being run but in one way, and only once; and to each part of our life there is something especially seasonable; so that the feebleness of children, as well as the high spirit of youth, the soberness of maturer years, and the ripe wisdom of old age—all have a certain natural advantage which should be secured in its proper season.*"[2]

*"… men, of course, who have no resources in themselves for securing a good and happy life find every age burdensome. But those who look for all happiness from within can never think anything bad which nature makes inevitable. In that category before anything else comes old age, to which all wish to attain, and at which all grumble when attained."*[2]

Cicero reminds us that getting old is not a reason to remain inactive, or disengage from what life asks of us. Cicero's comments are as old as antiquity but hold true today, and likely for all time.

## The Meaning of Life

Retirement will inevitably mean a deeper and more persistent musing on the meaning of life. The importance of finding meaning in our future is stressed by Seligman who states that a "fixed point in the future" allows one to overcome "that sense of emptiness and meaninglessness which so often affects the unemployed."[3]

Viktor Frankl describes the effects of not working.[4] He discussed the physician's condition: "*The medical profession merely provides a framework wherein the doctor finds continual opportunities to fulfill himself through the personal exercise of professional skill. The meaning of the doctor's work lies in what he does beyond his purely medical duties; it is what he brings to his work as a personality, as a human being, which gives the doctor his peculiar role.*"

Not working deprives some physicians of a meaningful life, and in certain cases it manifests as "apathy and emptiness." Thus, retirement may be more difficult for physicians than other professions and occupations.

## The Universals of a Fulfilling Retirement

Cicero, in *Old Age,* has Cato tell us that life continues post retirement and we should remain busy, and physically and mentally active.[1] These again are timeless concepts and concepts proven by time.

Seligman[3] discusses the "Happiness Theory." He posits to be happy is to have "a meaningful life" that consists in belonging and serving others and devotion to causes larger than the self. Examples of these might include: religion, service organizations, political causes, or volunteering at schools, hospitals, retirement centers, conservation, and clean-up groups. The goals are to increase positive emotions, engagement, meaning, satisfying human relationships, and accomplishment.

## Acceptance

Our inner peace and happiness flourish when we accept the changes that our retirement life will experience. Ingmar Bergman in *Wild Strawberries* describes[4] the process wherein a retired physician that is traveling to accept an honorary degree "*is forced to face his past, come to terms with his faults, and make peace with the inevitability of his approaching death.*"

The film presents a clear, uncompromising, and compassionate description of the process of reviewing a physician's life devoted to work, reviewing his errors, and missed opportunities for time with family and others. Ultimately the physician must learn to accept the past and open the heart to the present. All physicians, especially on retirement must learn acceptance. Acceptance is to open ourselves to reality, as is. Acceptance is to develop the ability to see our life, our history, our family, friends, and colleagues, and glean satisfaction and significance from same.

## Love

In retirement we must embrace, enjoy, and enhance love of our friends and families. We must develop joyful projects with our new freedom. We must strengthen our old friendships and develop new ones.

## My Rejoicing Jubilation

After retirement I was busy taking care of my family, so I did not have too much time to think on past events. I realized that my life had changed, and now that my responsibilities were different, I felt some emptiness, missed my patients, my work, and at times I felt that I had abandoned them. It was difficult to accept that their care was not my responsibility anymore.

This journey into medicine started very early in my life, as a child, I used to play in the food elevators of a new hospital that was opened earlier to care for victims of an earthquake. I still can't believe I did that!

Our sixth grade teacher, Ms. Dalmolin, shared and discussed after classes books with us, e.g. *Shannon's Way* by A.J. Cronin, *Microbe Hunters* by Paul De Kruif, and others dealing with medicine and science. She aroused our interest in science and kindled an avocation to be physicians. Years later in a hospital, I again met Ms. Dalmolin. She was then a medical student. God bless her soul!

An important part of being retired is to have time to review our life, all aspects of it. One of the reflective dangers is to be too critical and to aggrandize our errors and to waste time dealing with things that are past. We look at the past as a large and long collage of events and human figures, where some events appear and invite us to reflect. Gradually this narrative takes form and traces a trajectory of our professional and personal life. Hopefully, other physicians will find their narrative as satisfying and fulfilling as mine has been.

Retirement and aging tend to focus our thoughts on the existential questions of life. What have I learned thus far? How can I be a better person in the time I have remaining? How can I enrich, educate, and improve my family, my friends, and the causes I believe in? I have more time to devote to our children and grandchildren and have the privilege to be part of their projects, dreams, their maturing in life, and to share my knowledge and experience. I am there to help, to share experiences, to discuss carefully current events, and to listen to their ideas and dreams. I have rediscovered that above all things love is indispensable to understand and relate to others.

I agree with the "Fox" teaching the Little Prince: "*One sees clearly only with the heart. Anything essential is invisible to the eyes.*"[6]

## We Are All Going to Die

The other aspect of retirement is death. We know that inevitably we must depart this life on earth. Our death changes from a remote concept to a looming reality. I witnessed friends, colleagues, and family members die. I know one day it will be my time. I attended to the necessity of estate planning and discussed with my family. With a friend I went to Jefferson Barracks and asked, if possible, for a burial site facing the Mississippi River.

These retirement years can be wonderful. Now I live every hour, doing my best, to be good to my family, colleagues and friends. It is not always easy to be free from old ideas, memories, and feelings, but is wonderful to see every new day as children live them, fresh, no hard feelings from yesterday, just smiling, and grateful that still I am able to argue.

## Refernces

1. Marcus Aurelius. Meditations. Treatises on Friendship and Old Age. The Folio Society. London.
2. Marcus Tullius Cicero. (Kindle Locations 660-663) Translated by E. S. Shuckburgh.
3. Seligman Martin E.P. Flourish. Free Press. 2011.
4. Frankl VE. The Doctor and the Soul. Second Vintage Book Edition 1986
5. Ingmar Bergman. Wild Strawberries Criterion Collection. 1957. 92 minutes, film black and white.
6. The Little Prince. Antoine de Saint Expert. Harvest Book. 1943

**MM**

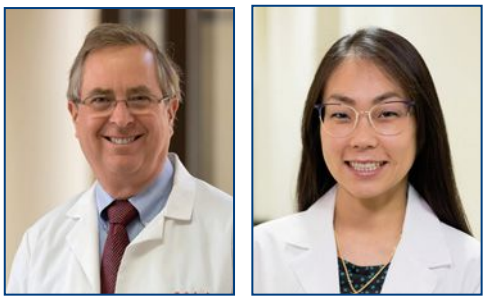
# Death Investigation in the United States: Forensic Pathology

*by Kanayo Tatsumi, MD & Michael Graham, MD*

**Forensic pathology is a unique discipline within medicine that bridges the world of science and law.**

## Introduction

Information and opinions generated by death investigations are not only used in resolving issues about a particular person's death but are also critically important in public health surveillance and epidemiology, as well as community safety. In the United States, death investigation systems vary across the country and are either Medical Examiner systems, Coroner systems, or a combination of both, based on local (usually county or state) jurisdiction. There are approximately 2,400 death investigation systems in the country and approximately 20% of deaths in the U.S. fall under medical examiner/coroner (ME/C) jurisdiction. These deaths include those considered unnatural, sudden and unexpected, violent, traumatic, while in custody of the law, or otherwise suspicious. Suffice to say, if there is any component of the death that is attributed to an unnatural etiology, the ME/C needs to be contacted for proper investigation and certification of the death.



Michael Graham, MD, (left), has been practicing forensic pathology since 1981 and has been the Chief Medical Examiner for the city of Saint Louis since 1989. He is a past president of the National Association of Medical Examiner. Kanayo Tatsumi, MD, (right), has been an assistant medical examiner, serving the city of Saint Louis since 2019. Prior to coming to Saint Louis, she has worked in Medical Examiner offices of New York City, Wisconsin, and Vermont.

In most jurisdictions medical examiners are physicians trained as pathologists, and then some receiving subspecialty training as forensic pathologists who apply their professional principles and medical knowledge to the examination of the deceased for the determination of cause, mechanism, and manner of death. Forensic pathology is a unique discipline within medicine that bridges the world of science and law. A forensic pathologist is a physician who has undergone at least three years of anatomic pathology residency and one year of subspecialty training in forensic pathology. Many forensic pathologists have additional training and expertise in clinical pathology, neuropathology, cardiac pathology, and pediatric pathology. In addition to traditional medicine, forensic pathologists receive training in multiple disciplines within the forensic sciences such as toxicology, firearms, trace evidence and anthropology. Further, we lend our expertise in recognizing, evaluating and explaining pathology issues that arise during the investigation, assessment and adjudication of criminal and civil cases, often providing testimony as expert witnesses.

There are approximately 700 board certified forensic pathologists currently practicing in the U.S., though this is a generous estimate. Based

on the National Association of Medical Examiners (NAME) accreditation workload standards, to serve the U.S. population, more than 1,200 are needed. Efforts to raise awareness of this shortage to state and federal policy makers are ongoing and increased funding and resources are necessary to allow death investigation services to serve our communities. As the opioid epidemic took hold of our country, ME/C caseloads have significantly increased. Further compounded by the pandemic, overdose cases in many jurisdictions have continued to rise on top of an unwavering volume of homicides. The workforce shortage is being felt across the country and we are facing a crisis.

## Death Certification

Nearly all clinicians will be called upon to complete a death certificate in their career, albeit some more often than others, depending on their specialty and patient population. It is the final duty to our patients and their families to certify their deaths accurately and in a timely fashion. That said, death certification is often not taught well, or at all, in medical school and residency training. The importance of accurate death certificate data cannot be overstated. The legal document has multiple applications from providing families with a sense of closure to being required for arrangements of end-of-life legal matters. The data collected via the death certificate is compiled into a national database from which morbidity and mortality statistics are generated. Data are then used for surveillance of health and illness, identifying hazards to safety and trends in injury/illnesses and proper allocation of resources to prevent injury/illness and promote public welfare.

The underlying or the proximate cause of death is the etiologically-specific disease or injury that initiates an unbroken sequence of events that produces the end result of death; without this underlying cause, the death would not have occurred. Immediate causes of death are specific diseases/injuries stemming from the underlying cause that directly precipitate death. In general, the immediate cause of death is the disease/injury that leads to death "today" and the underlying cause of death is the disease/injury leading to the immediate cause. There may be a number of intermediate causes interposed between the immediate cause and the underlying cause.

In contrast to causes of death, mechanisms of death are non-specific pathophysiologic derangements through which the cause of death exerts its lethality. The two most common errors in death certification are 1) the substitution of a mechanism for the cause of death; and 2) identifying the immediate cause of death without identifying the underlying cause. Examples of this principle can be seen with exsanguination and arrhythmia. These are not etiologically specific and are derangements set in motion by the underlying cause. In order to arrive at the underlying cause of death, one must engage in the exercise akin to a toddler incessantly asking "why?" Why did the person exsanguinate? From the transected iliac artery. Why is the iliac artery transected? From the gunshot wound. When the "why?" can no longer be answered, one has reached the underlying etiology as cause of death. Similarly, if death is consequent to an arrhythmia such a ventricular fibrillation (VF), it must be recognized that many illnesses, injuries, and toxic agents can manifest as the VF (the mechanism of death) and that the disease, injury, or illness responsible for the development of the episode of VF is the "cause of death."

The circumstances surrounding the death, known as the "manner of death," fall into five categories. A natural manner is due exclusively to natural disease processes. Therefore, if an injury, physical and/or chemical, contributes to death, the death cannot be classified as natural. Violent deaths are classified as homicide, suicide, or accident. In circumstances where the cause and/or manner cannot be reliably determined following investigation, examination, and ancillary studies, or there are several equally plausible possible circumstances, an undetermined cause/manner of death may be utilized. In some jurisdictions, therapeutic complication is a distinct manner that is applied when the fatality arises from known potential complications of diagnostic or therapeutic procedures, whether the complications are expected or predictable. Death certificates cannot be certified by

non-ME/C authorized individuals if the death involves anything other than natural disease in a natural (innocuous) setting. For example, death consequent to either a cardiac dysrhythmia or acute myocardial infarct due to coronary artery atherosclerosis seems to merit a natural manner until one considers that the terminal cardiac event was precipitated by emotional and/or physical stress incurred during an armed robbery attempt. In such a circumstance, the manner of death would be certified as "homicide." Physical and emotional stresses encountered during activities such as arguments, shoveling snow, and cutting the grass in hot weather are considered as components of "normal" daily life and do not warrant a non-natural manner of death. In short, determination of cause of death rests heavily on medical principle while determination of manner of death rests heavily on circumstance investigation.

In most cases, the need to report the death to a ME/C, is obvious: the trauma patient that comes in with multiple gunshot wounds or the sudden and unexpected death of an infant. All would agree that these cases require ME/C notification and that these deaths fall under medico-legal jurisdiction. Others however, may not be as obvious unless the right questions are asked.

Take the case of the elderly patient you have had on your service for months as she struggled with congestive heart failure exacerbation and blood pressure control, as well as complications of bronchopneumonia and urinary tract infection. Without asking the right questions, one would not be faulted for thinking this would be a natural disease etiology and not necessary for reporting. Though, upon further review, one may discover that her initial presentation was after tripping over the dog and sustaining a fall from which she had a femoral fracture that required surgical repair. After orthopedic intervention, she never returned to baseline. If not for the fall, the patient would not have had the sequence of events that led to her demise. As such, it can be agreed upon that this death, at the least, requires a notification to the ME/C. Depending on jurisdiction and office capability, the decedent may not need to be brought to the office for examination, and review of records may suffice for certification by the ME/C, as an accidental manner, attributing to the trauma she sustained from a fall.

Another section of the death certificate that is often misunderstood is the "other significant conditions" section. Reading the fine print on the death certificate pertinent to this section further indicates that these "significant conditions" played some contributory role, although not causal, in death. Thus, diabetes mellitus or chronic hypertension would be listed as significant contributory factors to someone whose cause of death was arteriosclerotic cardiovascular disease. The fact that the patient may have had a successfully excised non-melanotic skin cancer 15 years prior or had an incidental 10 mm renal cell carcinoma detected during an autopsy may be interesting or had been significant at one time does not warrant its being listed as an "other significant condition" because it did not contribute to the patient's death.

Our principle role as forensic pathologists functioning as medical examiners or coroner's pathologists is in determining cause and manner of death. If ever there is a question, reach out to your local ME/C office and we can guide you. Training and instruction materials can also be found through the CDC and the National Vital Statistics System.

## No Single Finding is Interpreted in a Vacuum

The approach to a case for a forensic pathologist is not very different from that of a clinician evaluating a living patient. Though our format differs, the history of present illness (HPI) of a case is paramount. Our patients being unable to provide said history, we rely on the investigation, which includes accounts given by family/friends and witnesses, law enforcement evaluation, and most importantly, inspection of the scene. Information gathered from the scene, together with past medical and social history, guide our differential diagnoses. Our physical exam often starts at the scene by our death investigators and does not conclude until the results of the autopsy, histology, toxicology, and other ancillary studies have come to completion. In cases where the decedent had survived for



Image A
Gunshot wound with typical entrance features including round tissue loss and abrasion collar, with soot deposition and stippling of adjacent skin. Range of fire in this gunshot wound is intermediate.



Image B
Sharp force injury with clean tissue edges with subsequent internal examination disclosing deep penetration of wound through adjacent rib and lung. Features of stab wound are suggestive of a single edged, non-serrated knife.



Image C
"Tram-track" contusion characterized by a pale central area flanked on either side by linear contusion due to impacts with elongated rigid objects



Image D
Sharp force injuries on the left palm and volar aspect of the fingers, suggestive of defensive posturing of the decedent attempting to grab the implement

a period of time in a medical care facility prior to death, the admission physical examination provides us with important information. As in clinical medicine, no finding or laboratory value is interpreted in a vacuum. We interpret particular findings in the context of all available pertinent information when generating our opinions on the cause and manner of an individual's death.

The investigation of the death/injury scene is critical in making medicolegal decisions. Every scene has the potential for all manners to be considered and underlying cause to be discovered. Take a case of an individual who is found deceased alone at a hotel room. Was the room locked and secured? Where was the individual found? Does anything at the scene look out of place or suggestive? Is there a tentative identification on the deceased and can we obtain pertinent medical and social history? Our differential diagnoses in a case of an individual found in a locked and secured room with a cut straw and white powder residue is going to be different from that of an elderly individual found dead in bed in a sleeping pose, though in both scenarios, the suspicion of foul play can be lowered as the room is secured. Similarly, if the said individual is found with multiple empty bottles of prescription medication, this may guide our autopsy to include gastric content testing for consideration of ingestional suicide, in addition to standard specimens for toxicology.

Similar to the clinicians' recognition of metaphyseal lesions being critical to raise concern for abuse or non-accidental trauma in children, our unique knowledge in wound characteristics and wound mechanics allow us to be important partners to law enforcement for their investigative direction.

Injury interpretation, in general, involves three steps: 1) recognition of the features of the particular wound (gunshot, stab, blunt force, etc.); 2) recognizing if a particular injury has a pattern (e.g., gunshot entrance or exit, range of fire, etc.); and 3) recognizing patterns of injury due to the constellation of injuries including their numbers and locations (e.g., defensive wounds, pattern of fall versus assault). Recognizing soot and stippling pattern adjacent to a gunshot entrance wound (Image A) can give guidance as to approximate range of fire. A stab wound (Image B) with clean tissue edges, an angulated end with a squared off opposing end is suggestive of a single edged blade. Whereas, abrasion/contusion (Image C) characteristics can provide information about the instrument or incident (e.g., minimum number of strikes, evidence of defensive posturing, etc.), such as those depicted in Image C that are typical of contusions caused by being struck with a rod-like object leaving a tram-track appearance on the skin surface. Further, the location of the wounds and its characteristics such as those on the palmar aspect of the hand as depicted in Image D can be suggestive of defensive posturing of the decedent attempting to grab the implement. Relaying this information appropriately to law enforcement can ensure proper seizure of objects that may have been used as a weapon and which can then be further analyzed for trace evidence in the crime laboratories.

## Duty to Educate

Though the primary role of the forensic pathologist when acting as the Medical Examiner or Coroner's pathologist is in the determination of cause and manner of death, in large part, we are educators. We educate the families and the loved ones left behind with questions as to why and how their loved ones have died and whether other family members may be at risk; we educate law enforcement and other investigative personnel about pathology issues to help guide their investigations; we educate judges and jurors on our findings and conclusions so they can make the dutiful difficult decisions of guilt or innocence; we educate clinicians on what more they could or could not have done; and we educate the public on injurious and fatal trends we are seeing in our communities such as the opioid epidemic.

## Conclusion

Forensic pathology is a unique field of medicine that is intimately intertwined with law and public health. We see tragedies daily and are in the shadows of the triumphs generated from the work we do, but it is one that is incredibly rewarding. To quote Giovanni Morgagni: "*Hic locus est ubi mors gaudet succurrere vitae*." [This is the place where death delights to help the living.] **MM**

# Pause Before Posting: Avoiding Copyright Litigation and Content Takedowns

*by Sydney Forsander, JD & Kathleen Rheintgen, JD*

## Overview

Social media and the internet can often seem like a place where you can share and reshare third party content, blogs, posts, and music without worrying about the consequences. After all, the worst that can happen is the shared content is removed or a temporary ban placed on the account, right? Unfortunately, no. Copyright infringement is a serious matter and can result in lawsuits and damages, in addition to the risks of platform bans and harm to your business' reputation. The following article outlines (1) an overview of music copyright as it relates to social media and digital advertising, (2) copyright risks associated with digital advertising, (3) licensing and development of an advertising strategy, and (4) some recommended practices to avoid copyright infringement.[1]





Kathleen Rheintgen, JD (left), senior counsel, and Sydney Forsander, PE, JD (right), an intellectual property associate, both from the Chicago office of Husch Blackwell, wrote this article. Husch Blackwell represents a full spectrum of healthcare providers and other businesses in developing compliance strategies, filing copyright registrations, preliminary enforcement measures, and litigation matters. 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 encouraged to consult their attorney concerning specific situations and specific legal questions.

## Music Copyright Overview

### *What is copyright? Is music copyright different?*

Copyright is an intellectual property right that protects original works of authorship having a minimal degree of creativity created by a human author and fixed in a tangible form of expression.[2] "Music" has several components that are protected by their own copyright right. Each copyright may be owned by separate individuals or entities. These components include the composition (sheet music); lyrics; recordings of the musical and vocal performances; and mixing or other postproduction effects added to the recording.

### *Who Owns the Copyright Rights?*

Initially, by statute, the author is the copyright owner.[3] The author is the person or entity who created and fixed (or authorized fixation) of the original work. There can be multiple author/creators, and this is especially true in music where there is often a team of songwriters, composers, recording artists, sound engineers, and producers. Copyright rights are often transferred to a single artist, to a music company, or can be split between different individuals and entities.

The author can be an entity if the work is a "*work made for hire.*"[4] A "work made for hire" is created by an employee for their employer, during the normal course of their employment. The author is the employer, not the employee. A "work made for hire" also exists if "specially ordered or commissioned" for use in one of nine categories listed in the statute.[5] Sound recordings do *not* fall within these categories. However, if a music composition or performance is specially commissioned to be part of an audiovisual work (including a commercial or advertisement), then it may be a work made for hire, if a proper agreement is in place.[6]

If you have commissioned original music for business use, including advertisements, it is important that proper contracts be in place to confirm proper ownership of the end product.

### *What Rights Does Copyright Provide?*

Copyright owners have six exclusive rights:[7]

1. Reproduce the copyrighted work
2. Display the work publicly
3. Distribute copies to the public
4. Perform the work publicly
5. Perform the work publicly through digital audio transmission
6. Prepare derivative works

Copyright owners may license these rights to generate fees and royalties, providing one example of how artists can monetize their creative works.

## Copyright Risks Associated with Music Copyright in Healthcare

Music is everywhere and is a strong force in society, business, advertising, and especially in the healthcare setting as it relates to certain therapies and medical treatments. Studies also show that utilizing music in healthcare settings can have positive emotional and physiological impacts on patients within those settings.[8] Music is also used as soothing background music, in elevators, in advertisements and corporate training videos, in social media posts, and in podcasts of healthcare entities and their employees. A basic understanding of copyright law and music licensing can help healthcare entities avoid common risks associated with copyright and stay compliant when making decisions related to the soundscape of their environment.

### *Copyright Infringement*

Put simply, when a third party exercises one of the six exclusive rights without permission, there is copyright infringement.[9] This most frequently occurs when music is distributed and/or played publicly without securing the proper license (e.g., music is played in a medical office, lobby or elevator, telephone on-hold music; a song or a portion of a song is used as part of an advertisement or podcast; or a band/DJ is hired to play at an event).

Copyright infringement claims can be embarrassing, blemish your reputation, and have financial impact. Even if an infringement suit is not brought, you may still need to remove the content, causing lost production costs and incurring additional costs to produce new content. You may lose traction in a new market if ads are removed or lose donations if the infringement affects a fundraiser.

If a lawsuit is filed, there is the potential for having to pay actual damages, any profits you made attributable to the infringement, or statutory damages, and attorney fees.[10] Statutory damages are specified in the Copyright Act for *each* copyrighted work infringed: not less than $750 or more than $30,000 as the court considers just; increased statutory damages of up to $150,000, if the infringement is willful; a reduction of statutory damages to as little as $200 if the infringer "was not aware and had no reason to believe that his or her acts constituted an infringement of copyright."[11]

### *Common Misconceptions*

Common misconceptions include the assumption that certain uses are exempt from copyright protection. For example, a fitness center hosting a Singo™ night for "members only" may think this is private, not public use (it's not). Or an instructional video has a "teaching exemption" (it doesn't). All use by a not-for-profit is fair use (no). Licensing is required. You may think no one will notice. However, there are businesses that do nothing other than crawl the internet looking for improper copyright usage. Because of the risk to reputation and the availability of statutory damages, we recommend aiming for a path to compliance.

## Music Licensing as Part of Your Advertising Strategy

Whether your advertising department is considering including music in your next ad campaign or to enhance your podcast about diabetes, you should assume that *all published music* is protected by copyright, until you determine otherwise. Even not-for-profit entities, non-commercial projects, and fundraising events require permission to use copyrighted material. So, you need a license... How hard can that be?

Unfortunately, it's not as simple as calling the record company or artist ("Hello, Ms. Swift?") and negotiating a license. First, you may need multiple licenses, from more than one entity. The recording is likely owned by the record company whereas the composition and lyrics by the songwriter(s). To use a sound recording, you will need a license for (1) the recording, and (2) the music and lyrics.[12] These can be owned by the same person (Taylor Swift's version?) but usually not (hello, Big Machine Records...). The type of use also factors into the license(s) you will need. As discussed below, there are six distinct license types, and

you should have all your licenses in place *before* the project starts. Many times, the biggest hurdle is getting the copyright owner to respond to your inquiry.

### *The Six Types of Music Licenses*

1. **Synchronization License** or "sync" license is obtained from the owner of the composition and lyrics and is needed whenever using a recording of a song in video format. A sync license covers the original and "cover" versions of a song.
2. **Master License** allows use of the "original" recorded version of a song (the "master recording"). The "master right" is usually owned by the record company. A sync license is also needed if the original recording is used in a video.
3. **Mechanical License** allows use of the composition and lyrics in an audio-only format (audio streams, digital downloads, podcasts, CDs, vinyl). It covers either the original version (master license needed) or a cover version.[13] Synchronization, mechanical, and master licenses are negotiated with the copyright holder(s) and can be complex, expensive and time consuming.
4. **Public Performance License** is needed to publicly perform music. This includes background, hold, and elevator music, jukeboxes, and hired live bands. Performing Rights Organizations (PROs) such as BMI, SESAC, and ASCAP manage public performance licenses keeping track of and paying music royalties to artists on a per-use basis. While sometimes more expensive, this may be the simplest license to obtain as you generally do not have to deal directly with the rights owner.
5. **Print Rights License** allows printing or reproducing sheet music or lyrics for any purpose, in any format. Print licenses are obtained directly from the owner of the rights.
6. **Theatrical License** is required any time a copyrighted work is performed on-stage in a dramatic work in front of an audience.

### *Examples of Music Used in Healthcare and the Licenses Required:*

- Music used in medical office building lobbies, elevators and for telephone on-hold music requires a performance license.
- Music in advertisements or social media posts requires a sync and master license (for video) or a mechanical and master license (for audio).
- A senior citizen center hosting "karaoke night" needs a performance license for the songs provided. There are karaoke-based subscriptions available that provide licensed karaoke tracks if this is something done frequently.
- A blog or podcast sponsored by the facility (or employee-driven) that includes music, links to resources, and thumbnails to encourage engagement may require different types of licenses depending on if they can be downloaded or hosted on a private website. Even if primarily informational, the music, images, and content created by others should only be used and shared with proper permissions.

### *Privacy Risks*

Although not the focus of this article, it is worth mentioning that posting content involving private medical information and/or patient-identifying information can pose significant privacy issues, particularly if providers or staff are posting personal content (e.g. day-in-the-life, TikTok filmed at the facility) in which other people may be visible. This could cause right of privacy concerns on top of serious medical and data privacy risks.

### *Is There an Easier Way?*

It can be a lot of time, effort, and expense to locate the copyright holders and obtain the appropriate licenses. Depending on the music, you may need extensive lead time to ensure you can contact individual owners and get a response. There are companies (i.e., music agencies) that will research and track down the copyright owners and start the licensing process for you, for a price. These companies may also own music rights and offer licenses or offer to create original music for your use.

Budgeting for music licenses is also important. A license for the latest summer anthem may be cost prohibitive, even if it's perfect for your podcast about avoiding skin cancer from sun exposure and the copyright holders are responsive to your request. So where can you easily find inexpensive music to license that also fulfills your advertising vision?

Table 1. Commercial and Non-Commercial Use Licenses

| Commercial Use Allowed | Non-Commercial Only | License Terms |
|---|---|---|
|  Attribution CC BY |  Attribution-NonCommercial CC BY-NC | Allows others to use and make derivative works if credit (attribution) is given to the author. This is the least restrictive CC license.[20] |
|  Attribution-ShareAlike CC BY-SA |  Attribution-NonCommercial-ShareAlike CC BY-NC-SA | Allows others to use and make derivative works if they provide attribution and *license the new work under identical terms*. Any ad created using ShareAlike music must also be made available under all the same license terms.[21] |
|  Attribution-NoDerivs CC BY-ND |  Attribution-NonCommercial-NoDerivs CC BY-NC-ND | Allows others to use the original works if they provide attribution; however, the work cannot be modified in any way.[22] |

### *Royalty-Free Music*

There are companies that offer subscription licenses to music libraries they control. These licenses generally only cover performance licenses and are referred to as "royalty free" because you pay a flat fee and are not required to track your usage. These include the big PRO's (BMI, ASCAP etc.) and smaller companies with niche libraries.

There are also companies that own complete rights to songs in a music library, and they provide all types of licenses for these works. These libraries often include "sound-a-like" recordings and are grouped by genre or mood. A license to this type of library can be an affordable and time-saving alternative to obtaining licenses for individual popular songs. You still need to verify that your current use is covered by the license. While these types of libraries can be cost effective, they do not usually allow access to the latest music or artists.

If you are posting on a social media platform it may include access to specific music libraries for your use, for example: YouTube Audio Library,[14] Facebook and Instagram Sound Collection,[15] and Twitch.tv Soundtrack.[16] Music in these libraries is free to use, but only on the specific platform and must be used in accordance with the platform's terms and conditions.

### *Creative Commons*

Creative Commons ("CC") provides licenses that copyright owners can use to provide access to their works. The copyright owner agrees to make their work available, free of cost, to anyone *who follows the terms* of the specific CC license identified. CC licenses provide for both commercial and non-commercial use. A non-commercial license will preclude use of the work for most advertising and business purposes, even by a not-for-profit company.[17]

Additional CC license restrictions are shown in Table 1. The type of license will be shown on the main link for the work, for example:

> All Lofi music here is by "Nightingale Lofi" and under a "Creative Commons Attribution-ShareAlike 4.0 International[18]

Non-commercial licenses are identified by using "NC" in the abbreviation and with this icon:[19]



Failure to follow all license terms results in automatic termination of the CC license and may result in an infringement claim with potential

damages. In general, businesses looking for music for advertisements should use music covered by an Attribution-Commercial use license:



Requirements for proper attribution are flexible and depend on the medium used for the work. Attribution requirements can be satisfied by providing a link to the attribution information.[23]

Resources available for finding works covered by CC licenses, include:

- Images: Openverse[24] or Google Advanced Search[25]
- Music: SoundCloud,[26] Audionautix[27] and others

### *Public Domain Music*

Music in the public domain does not require a license. This includes: old music (music and lyrics from 1926 or earlier); old recordings (released in 1922 or earlier); and recordings that did not comply with certain prior Copyright Act requirements. This does not include new recordings of old music.

Music or recordings can also be dedicated to the public domain, which means the author has disclaimed her rights in the work, and it is available for use by all.

## Practical Pointers for Compliance

1. Plan/budget for licensing costs and the time needed to obtain necessary licenses for normal business advertising, marketing and fundraising campaigns, or special events.
2. Create a copyright compliance checklist including steps to determine if third-party creative works were used, how to obtain the required licenses, and identifying licensed libraries.
3. Provide internal training to a broad range of employees.
4. Verify proper licensing is in place before publishing.
5. Respond promptly to claims of infringement and takedown notices.
6. Enforce your own rights.

## Conclusion

Music can be a powerful tool in business and advertising, especially in the healthcare space. However, due to copyright law and the complex details surrounding music licensing, healthcare providers and employees should use caution when using music for business purposes and when developing online or other content. Avoid unauthorized use and take affirmative steps to develop a robust compliance strategy.

## References

1. This article focuses only on U.S. law, except where noted otherwise, and is not dispositive as to all the potential issues, details, and considerations associated with each topic.
2.17 U.S.C. §101, *Feist Publications, Inc., v. Rural Tel. Serv. Co.* 499 U.S. 340, 362 (the requisite level of creativity is extremely low; even a slight amount will suffice.). Fixed means captured (either by or under the authority of an author) in a sufficiently permanent medium such that the work can be perceived, reproduced, or communicated for more than a short time.
3.17 U.S.C. §201
4.17 U.S.C. §101
5. *Id.*
6. *Id.* The analysis of whether the work falls within the scope of "work made for hire" can be quite complex. *See* U.S. Copyright Office, Circular 9: Works Made for Hire 1 (Sept. 2012), http://copyright.gov/circs/circ09.pdf.
7. 17 U.S.C. §106
8. *See, e.g., https://pubmed.ncbi.nlm.nih.gov/27611092/#:~:text=Music%20psychology%20studies%20have%20also,patients%20feel%20comfortable%20and%20secure; https://pubmed.ncbi.nlm.nih.gov/26008135/; https://pubmed.ncbi.nlm.nih.gov/29122270/; https://pubmed.ncbi.nlm.nih.gov/21631813/*
9. Fair use is a *defense* to copyright infringement that the user has the burden of proving. Fair Use will not be discussed here.
10. Actual damages are damages accrued by the copyright owner. Statutory damages are only available in certain cases. There is also a new Copyright Claims Board (CCB), created by the United States Copyright Office, that acts as a small claims court to adjudicate certain copyright claims. Unlike federal court, claims before the CCB are capped at $30,000 total.
11. 17 U.S.C. §504
12. This includes receiving permission from each recording artist, songwriter, and composer on the track.
13. For cover versions you can obtain a compulsory mechanical license, if all the proper steps are followed.
14. https://www.youtube.com/c/AudioLibraryFreeMusic/channels
15. https://business.facebook.com/creatorstudio/fm_sound_collection?reference=redirect_from_sound_collection
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25. https://creativecommons.org/2009/07/09/google-image-search-implements-cc-license-filtering/; https://www.google.com/advanced_image_search
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# MSMA Members in the News

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

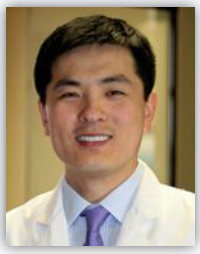
Congratulations to our pro-medicine advocates! Get to know your colleagues running in the November 8 election.

MSMA Past President **George Hruza, MD**, a dermatologist in St. Louis County, is running for the Senate's 24th district, which includes several of St. Louis' western suburbs, including Maryland Heights, Kirkwood, Creve Coeur, Des Peres, Fenton, Sunset Hills, and Valley Park.



If elected to his first term in the general election, Dr. Hruza, an MSMA member since 1989, would be the only physician in the Senate. He does have an opponent in November. Dr. Hruza will be a strong physician advocate, so be sure to vote pro-medicine if you live in the 24th district.

General surgeon and incumbent Representative **Jonathan Patterson, MD**, ran unopposed in his House primary for District 30, which includes parts of Lee's Summit, Independence, and Blue Springs.



An MSMA member since 2011, this would be his third two-year term in the House. Dr. Patterson has completed surgical mission trips around the world, including to the Dominican Republic, Jamaica, and Jordan.

Incumbent Representative **Lisa Thomas, MD**, District 124, which includes portions of Camden and Miller Counties, is a psychiatrist in Lake Ozark. She will begin her second two-year term in the House as she will not have an opponent in the general election.



An MSMA member since 2005 and current District 5 Councilor, she currently serves as the medical director of the Missouri Physicians Health Program.



**Farzana Hoque, MD, MRCP (UK), FACP** is the recipient of the "2022 Clinical Awards - Physician of the Year." Dr. Hoque is the only physician who received this award from the St. Louis region at the 2022 SSM Health Annual Clinical Symposium. She is an Assistant Professor of Medicine at Saint Louis University School of Medicine and President of the Society of Hospital Medicine St. Louis Chapter.

Congratulations to **Peter Koopman, MD, FAAFP**, on being selected as chair of the American Academy of Family Physicians (AAFP) Commission on Federal and State Policy. He will serve in this capacity for one year. Dr. Koopman practices Family Medicine at MU Health Care in Columbia.





**Laine Young-Walker, MD**, an MU School of Medicine researcher, is the principal investigator for a $6.6 million grant from the Missouri Department of Elementary and Secondary Education. The grant, funded through the American Rescue Plan Act, will support a statewide training program to coach child care professionals on how to support the social and emotional development of children. Dr. Young-Walker oversees the Center for Excellence in Child Well-Being in Columbia.

**Christine Livek, MD**, is the physician honored by Lake Regional Health System in its 2022 True Blue Awards. The award recognizes those who "… connect to each other, encourage excellence, and care more than expected." Dr. Livek practices Family Medicine at the Lake of the Ozarks.



MM




# NEW MSMA MEMBERS!

Jarrett Dawson, MD – Family/ Preventative Medicine - St. Louis

Richard Price, MD – Unspecified – Harrisonville, MO

Rachel Dickerson, MD – Internal Medicine/Pediatrics – Ballwin

Michael Ellis, MD – Ophthalmology – Lenexa

Jeremy Katcher, MD – Allergy & Immunology – St. Louis

Vu Le, MD – Psychiatry – Springfield

Murphy Mastin, MD – Dermatology – Bolivar

Heather Russell, MD – Family Practice – Nevada

Jason Snyder, MD – Surgical Critical Care – St. Louis

Ella Speichinger, MD – Obstetrics & Gynecology – Columbia

Vishnu Subramani, MD – Internal Medicine – Cape Girardeau

Stephen Albrecht, MD – Pediatrics/Pathology – Lenexa

Christina Hodgson, MD – Anatomic/Clinical Pathology – Lenexa

**Scan/Renew Your MSMA Membership Today!**

## *Missouri Medicine* Annual Statement of Ownership, Management & Circulation

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# Correspondence

## Monkeypox, A New Public Health Threat

After an exhausting pandemic of COVID-19, the United States is now facing a monkeypox outbreak. As of September 4, more than 53,027 cases have been confirmed worldwide, and 19,962 are from the U.S. At the time of this writing, CDC confirmed 55 cases in Missouri.[1] Our neighbor, Illinois has reported 1,087 cases of monkeypox.[1] New York, Florida and Texas are facing a remarkably high number of cases.

The intimate skin-to-skin or skin-to-mouth contact with an infected patient's lesions, and respiratory droplets through kissing or coughing can transmit this disease. In addition, contact objects used by an infected person like clothing, bedding, or sex toys can spread monkeypox.[2] Monkeypox is currently more prevalent among men who have sex with men (MSM). However, there have been some reported cases of monkeypox among children, females, and pregnant patients. HIV, immunocompromised persons, children, adolescents, and pregnant or breastfeeding women may be at risk for increased disease severity and adverse health outcomes. Rash is quite common in these patients. In MSM, the most common site for rash is the anogenital area (73%) and any unusual skin lesion in that area should be investigated. The rash could be painful or itchy and could go through several stages (i.e., papules, vesicles, pustules, and crusts) before healing.[3] The other common symptoms include anorectal pain and proctitis. The incubation period for monkeypox is three to 17 days from point of contact, though CDC suggests monitoring for 21 days from exposure."

CDC's orthopoxvirus polymerase chain reaction test from the skin lesion to detect monkeypox can take three to four days to get results from the time of testing in many hospitals in Missouri. Tecovirimat (TPOXX) has been approved (both oral and intravenous routes) to treat monkeypox via an expanded access Investigational New Drug (EA-IND) protocol. Two types of vaccines, JYNNEOS and ACAM2000 are now available for prevention and post-exposure prophylaxis. There are no data on the clinical efficacy of these vaccines in the current outbreak but based on experiences in Africa, it is estimated that these vaccines are at least 85% effective to prevent monkeypox.[4] JYNNEOS is a non-replicating vaccinia vaccine and ACAM 2000 is a replicating vaccinia, hence ACAM 2000 is contraindicated in immunocompromised patients. It is critical to remember that vaccination within four days following exposure can prevent the onset of the disease. CDC advises that if the vaccine is given within four to 14 days after the exposure, vaccination may reduce the severity of the disease, not the disease onset.[4] Patients need counseling and space to isolate until all symptoms have resolved including full healing of the rash with the formation of a fresh layer of skin. We support the Missouri Department of Health and Senior Services decision to mandate reporting of newly detected monkeypox cases to state or local health authorities within one day of detection. Monkeypox has been detected in anorectal swabs from asymptomatic MSM in a sexually transmitted infection screening program in Paris, France.[5] However, the importance of asymptomatic or subclinical infections in spreading the virus in the current outbreak is not known yet.

Under the FDA-issued Emergency Use Authorization (EAU), the JYNNEOS vaccine can be given through intradermal injection to 18 years or older patients. This dose-sparing strategy is expected to increase the vaccine dose availability up to fivefold compared to the usual subcutaneous route. Local health professionals need the training to administer the intradermal injection properly to make sure the vaccine dose is effective. The U.S. administration will provide 50,000 monkeypox vaccine doses for large events with high attendance by gay and bisexual men to better reach the most at-risk community. We need fact-based awareness to avoid stigma around our LGBTQ+ community and health education to avoid behaviors that increase the risk of this emerging public health threat.

## References

1. Centers for Disease Control and Prevention. 2022 U.S. Map & Case Count. Accessed September 4, 2022. https://www.cdc.gov/poxvirus/monkeypox/response/2022/us-map.html

2. Guarner J, Del Rio C, Malani PN. Monkeypox in 2022: what clinicians need to know. JAMA. 2022; 328(2):139-140. http://jamanetwork.com/article.aspx?doi=10.1001/jama.2022.14857
3. Centers for Disease Control and Prevention. Monkeypox signs & symptoms. Accessed September 4, 2022. https://www.cdc.gov/poxvirus/monkeypox/symptoms.html
4. Centers for Disease Control and Prevention. Monkeypox and smallpox vaccine guidance. Accessed September 4, 2022. https://www.cdc.gov/poxvirus/monkeypox/clinicians/smallpox-vaccine.html
5. Valentine Marie Ferré, PharmD, Antoine Bachelard, MD, Meryem Zaidi, BSc. Detection of Monkeypox Virus in Anorectal Swabs from Asymptomatic Men Who Have Sex with Men in a Sexually Transmitted Infection Screening Program in Paris, France. Ann. Intern. Med. 2022; https://doi.org/10.7326/M22-2183

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## Errata

In the July/August 2022 issue of *Missouri Medicine* on page 361 of the article, "Preexisting Thyroid Disease in Pregnancy: A Brief Overview" by Devika Maulik, MD, Valerie Chuy, MD and Shruti Kumar, MD, the following sentence should be amended to read:

"If data regarding a specific practice location or similar patient population is not available, both ACOG and the ATA recommends the following adjustments: 1) subtracting 0.4 mU/I from the lower threshold for nonpregnant range for TSH; 2) subtracting 0.5mU/I from the upper threshold for nonpregnant TSH range; and 3) upper range of T3 and T4 increased by 50% after 16 weeks gestation. Regarding the upper range of TSH, the target range with the subtraction of 0.5 mU/l is equivalent to around 4 mU/l for most centers and above original recommendations of 2.5 mU/l or 3.0 mU/l.[1,4.]

**MM**



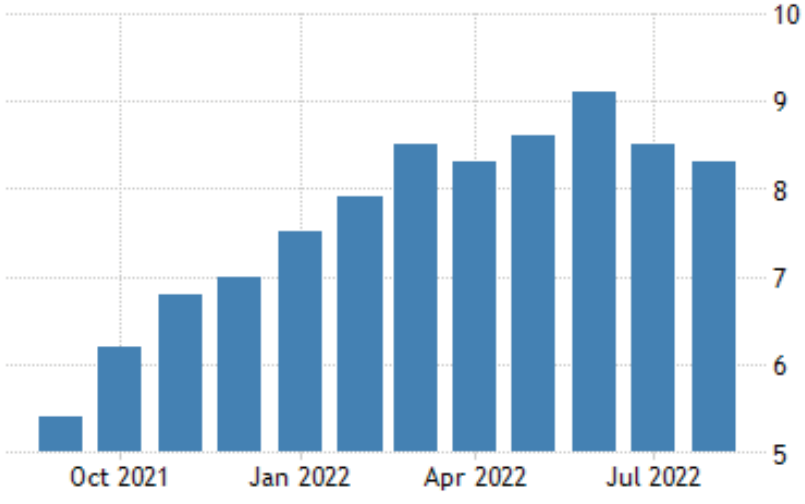
## Letters to the Editor

Submissions reflect readers' opinions and may be edited for length. Use in subject line: "Letter to Editor."

Email
- drjhagan3@gmail.com
- lfleenor@msma.org

## 1 PICTURE = 1,000 WORDS

### United States Inflation Rate 2021-22



# Meeting Challenges through Physician Leadership

*by David Nowack*

The lingering presence of the COVID-19 pandemic over the past two and a half years has continued to challenge the practice of medicine in many new and unexpected ways. Through it all, the St. Louis Metropolitan Medical Society (SLMMS) has had to remain responsive to the needs of its members and the St. Louis community while remaining focused on its mission, vision and purpose. Thanks to the commitment of strong leaders and a supportive membership, SLMMS finds itself emerging as an organization solidified in sharing scientific information and keeping physicians at the center of the health care team.

In 2021, **Jennifer L. Page, MD**, a physical medicine specialist and medical director of the Acute Rehab Program at Mercy Hospital South in St. Louis, served as president of the Society. Dr. Page became only the fourth female president in the Society's long history, yet the second in three years. She also noted that she had the rare honor of being the first to serve their complete term remotely during a pandemic!



2021 SLMMS President Jennifer Page, MD

"My goal as president was to leverage the trust physicians have earned through their years of education and experience to advocate for our patients and all people in our region. SLMMS focused on providing education and support for public policies that protect the health and welfare of our community," she stated.

"Physicians are trusted by their patients and the public, and with that trust comes much responsibility," she continued. "The pandemic has shown the importance of disseminating factual information to the public. Physicians play a key role in steering public health policy and advocating for our patients to receive the best care possible – it's our responsibility to build confidence in science and the sound studies behind it."

## Leadership Positions on Key Issues

During the pandemic, SLMMS adopted positions and issued statements to help protect the public, some of which drew the attention of the St. Louis media.

In March 2021, the Medical Society joined MSMA in opposing legislation aimed at limiting the authority of public health agencies to make public health rulings, citing the bills as unnecessarily restrictive and not in the best interest of patients.

Also in March 2021, following studies that concluded that COVID-19 vaccines at the outset were harder to obtain in Missouri's more highly populated urban areas, SLMMS called for making equity a priority in the allocation of vaccines, and that eligible residents should not have to travel long distances to clinics in rural parts of the state where supplies at the time were more readily available.

SLMMS issued statements in support of mask-wearing and vaccines during the pandemic, and addressed vaccine hesitancy and misinformation in a guest editorial contribution to the *St. Louis Business Journal*.

As the battle continued in Jefferson City over the past two years, SLMMS continued to voice support for Medicaid expansion in Missouri and the critical role it plays in ensuring access to care for all.

## Making a Virtual Transition

Like most organizations, SLMMS was forced to adapt during the pandemic and transition to virtual meetings and events. The Medical Society's Council and committees continued their work over the past two years by meeting virtually. SLMMS has also supported its members by hosting a number of virtual continuing

medical education programs such as Human Trafficking in Healthcare; an Economic Outlook for the Healthcare Industry; and a Cyber Security Update.

In June 2022 we returned to in-person events with a hybrid educational program co-sponsored with the Missouri Academy of Healthcare Executives examining the use of artificial intelligence in health care. As we transition back to more in-person activities, virtual meetings and events will continue due to their increasing popularity and more efficient use of a physician's available time.




Panelists at the artificial intelligence seminar, from left: moderator Kirsten Dunn, MD, SLMMS vice president; Thomas Hale, MD, PhD; and Damon Broyles, MD, FAAFP.

## *St. Louis Metropolitan Medicine*

SLMMS continues to publish and position its bi-monthly member magazine, *St. Louis Metropolitan Medicine,* as a resource for its members and the health care community. Each issue addresses a specific theme, and over the past two years it has provided a platform for discussions on improving chronic disease care, telemedicine post-COVID, clinical trials in St. Louis, physician wellness, and health equity. The magazine also encourages regular commentary contributions from SLMMS members and recently launched a Physician Perspective column. Also, both in 2021 and 2022, SLMMS surveyed its membership on the impact of the pandemic on their medical practices, and summarized the findings in the magazine. Full issues of *St. Louis Metropolitan Medicine* are available to readers online at slmms.org.

## A Unified Voice

**Erin S. Gardner, MD**, a dermatologist and Mohs surgeon in private practice with Dermatology Specialists of St. Louis, became the 2022 SLMMS president earlier this year. Among the objectives he has established for his term are medicine adjusting to living with an endemic COVID-19 going forward, physician payment reform, and empowering organized medicine through improved engagement and membership.

"Physicians need to be present and leading the discussion on many policy issues," said Dr. Gardner. "We need to make our voices heard. But, unfortunately, over the past two decades organized medicine has continued to struggle with membership challenges and losing its all-important voice. Younger colleagues have not always joined with our mission, and more seasoned colleagues grapple with the everyday challenges of practice. As a result, our medical associations have sometimes had to work to garner the support of the broader medical community."



2022 SLMMS President Erin Gardner, MD

"Organized medicine is the strong unified voice that allows physicians to get more involved, and ensures they play an active role in shaping future policy," he continued.

## Maintaining a Community Focus

SLMMS continues to connect with medical students and residents, with student liaisons from both Saint Louis University School of Medicine and Washington University School of Medicine participating as voting members on the SLMMS Council. The Medical Society has also hosted



Health care heroes at SSM Health St. Mary's Hospital were the grateful recipients of 250 Hungry Heroes gift bags made by the SLMMS Alliance and presented on November 30, 2021. Representatives of the hospital emergency department, EMS, ICU and security were on hand to receive the donations. Alliance members at left are Jo-Ellyn Ryall, MD, and Sandra Murdock; at far right are Sue Ann Greco, Gill Waltman and Angela Zylka. The Alliance previously presented Hungry Heroes donations at Missouri Baptist Medical Center and St. Luke's Hospital in an effort to thank those continuing to work on the front lines against COVID-19.

information sessions to introduce organized medicine and our mission to students on both campuses.

While its activities have been limited somewhat during the pandemic, the St. Louis Society for Medical and Scientific Education (SLSMSE), the Society's charitable foundation, has continued to support educational and community activities such as scholarship awards for the Greater St. Louis Science Fair, the annual SLU Primary Care Symposium, and the important work of the Missouri Physicians Health Program (MPHP). During COVID-19, the Medical Society partnered with MPHP to provide strategies for physicians to avoid burnout and manage their own mental well-being while also caring for patients.

The SLMMS Alliance continues to play a key role in fulfilling the Society's mission through community projects and service. The group recently received a 2002 AMA Alliance Health Awareness Promotion Award during the AMA Annual Meeting in June recognizing their "Hungry Heroes" project through which the Alliance prepared and distributed hundreds of gift bags to frontline workers at St. Louis area hospitals during the pandemic.

In June 2021, SLMMS Alliance member Sue Ann Greco, a past president of both the SLMMS and MSMA Alliances, completed her term as 2020-21 president of the American Medical Association Alliance. A virtual celebration was held in honor of her "virtual year" with more than 70 friends and family members participating to acknowledge her service.

## Empowering Organized Medicine

Moving forward, the practice of medicine has no doubt been forever changed by the pandemic and the events of the past two years. With many valuable lessons learned, organized medicine moves forward a bit wiser, with the emphasis on advocacy more important than ever.

"As SLMMS has reported regularly, advocating for our profession cannot be someone else's problem," said Dr. Gardner. "History tells us that the successes of organized medicine have resulted from strong, unified efforts, thus underscoring the importance of a healthy local medical society that will help preserve our voice and cultivate future leaders. I urge all physicians to engage with us to learn how you will benefit your practice and ultimately help your patients." **MM**

Washington University in St. Louis
School of Medicine

# Investing in the Advancement of Science

*by David H. Perlmutter, MD*

**At Washington University School of Medicine, we are always asking:**

1. **How we can have more impact on our community and improve the health of our neighbors, urban and rural?**
2. **How can we improve the economy in our region, since we know that economic status plays such an important role in health outcomes?**

As this issue of *Missouri Medicine* makes clear, emergency medicine plays an essential role in responding to an array of often life-threatening health concerns and never more so than during the ongoing COVID-19 global health crisis.

Recognizing the growing complexity of this specialty, Washington University School of Medicine announced in 2020 that it was elevating its Division of Emergency Medicine to a full-fledged academic department to be headed by Opeolu M. Adeoye, MD, a leader in emergency medicine and a physician-scientist whose research focuses on improving outcomes for patients who have suffered strokes or other injuries to the brain.

The new department aims to attract and recruit the nation's top physicians, raise the bar on undergraduate and graduate medical education, and greatly expand clinical research with a goal of improving how patient care is delivered at the earliest possible moment of illness or injury.



**David H. Perlmutter, MD**, is Dean of the Washington University School of Medicine in St. Louis, Missouri. He is a Pediatric Gastroenterologist.

Washington University emergency physicians provide urgently needed medical care to more than 150,000 patients annually at Barnes-Jewish and St. Louis Children's hospitals, and because these interactions take place in the context of an academic research and teaching institution, the benefits extend far beyond the care provided.

Each year, a new class of residents and fellows comes to Washington University to gain knowledge and cutting-edge skills in emergency medicine. Each year, graduates filter out into the world to bring these skills to patients. All the while, our faculty physicians and trainees conduct critical research and share this knowledge with peers, to the benefit of patients everywhere.

## COVID-19 Developments

Looking back on more than two years of pandemic challenges, it's hard to imagine a time when the unique paradigm and capabilities of academic medicine have been more important to society.

Because of the nation's long-standing investment in basic medical research and training, our medical communities have the skills, tools, and infrastructure in place to respond to new and little-understood global health threats. Through innovation and often improvisation, we're finding ways to get patients the care they need while also contributing to the development of new and effective testing techniques, vaccines, antiviral drugs and antibodies.

For example, the world's first nasal vaccine for COVID-19 – based on technology licensed from Washington University – was approved in September 2022 in India for emergency use. Because the vaccine is delivered via the nose, right where the virus enters the body, it has the potential to block infection entirely and break the cycle of transmission. Our scientists developed the nasal vaccine in collaboration with Bharat Biotech International Limited in India.

While injectable COVID-19 vaccines have been shown to elicit protection against severe disease, this route of administration is thought to be less effective at preventing infection and possibly transmission. Our early studies showed that nasal vaccine delivery creates a strong immune response throughout the body, especially in the nose and respiratory tract. This promising development reflects Washington University's commitment to translating our ground-breaking science and bringing more of it to the bedside.

Also, early in the pandemic, Washington University emergency department physicians and staff played a pivotal role in clinical trials investigating the accuracy of COVID-19 diagnostic tests, which were in short supply at the time. Because the school already had a strong infrastructure for conducting clinical trials, our staff was in an ideal position to enroll large numbers of study participants, providing a pipeline of valuable data that helped the Food and Drug Administration quickly approve the most effective COVID-19 tests. A more recent trial is investigating a combination test administered by health-care workers that detects the presence of SARS-CoV-2, influenza A and influenza B.

Another example of the symbiotic relationship between clinical and research work at Washington University is a centralized biorepository set up early in the pandemic to store and manage blood, urine, and saliva specimens provided by COVID-19 patients who consent to participate in research studies involving the virus. The streamlined collection process has allowed emergency room staff to provide thousands of samples to more than 20 Washington University labs working to understand the basic biology of the infection as they seek ways to prevent or treat it.

## Grants and Donations Spur Research

That these things were possible to mobilize amid the pandemic's chaos and fear is due in large part to the important work being done every day at university-based medical research and teaching institutions, work that is generously supported by a range of federal grants and private donations.

In federal fiscal year 2021, researchers at our school were awarded nearly $576 million in funding from the National Institutes of Health (NIH), an all-time high for the school and an increase of nearly $88 million over federal fiscal year 2020. With this sixth consecutive year of growth in NIH grant awards, the school now ranks fourth among U.S. medical schools in NIH funding.

Research grants to the school from all sources — including foundations, donors, and government agencies such as the Department of Defense and the Centers for Disease Control and Prevention — totaled nearly $750 million in fiscal year 2021. Together with increased institutional support, the total annual investment in research has reached well over $1 billion.

While research funding is important to the university, it also makes critical contributions to regional and state economic growth. Our NIH research portfolio now supports an estimated 12,000 jobs in the region, and we expect that funding to grow by as much as 30% over the next five years. As the state's perennial powerhouse for attracting outside biomedical research funding, the school has become a magnet for health-minded entrepreneurial pursuits, serving as founding anchor of the 200-acre Cortex Innovation Community, one of the fastest-growing business and technology hubs in the United States. By spurring development of new medical services and technologies, the medical school continues to lure new companies to the St. Louis business community, infusing more private investment, money, and jobs into the state's economy.

## Investing in the Advancement of Science

We invest these funds in education and research to bring improvements to clinical care, better outcomes for patients and better health for the community. Our goal is not to get grants per se. Our goal is advancing science. Our goal is curing diseases through our discovery capabilities, and these discoveries lead to new therapies and innovations that improve patient care.

This is the "virtuous cycle" of academic medicine that underpins the school's ongoing growth and success.

At Washington University, we know patients benefit when front-line care providers have the opportunity to work side by side with leading researchers. Our clinicians help researchers identify important areas for study. Our researchers get a chance to tailor new treatments to the unique needs of individual patients, ushering in the promise of a new era of personalized medicine.

Even during a pandemic, the wonderful minds at our institution are always considering what we can

do to advance health care and science. Among our newest initiatives, the School of Medicine and BJC HealthCare have partnered with CuriMeta, a new company that will accelerate life-saving research in the fight against chronic and acute diseases that impact our communities. We're engaging in this venture to bring sophisticated data sets in support of research that seeks to predict, prevent, and cure a broad variety of diseases, using advanced, state-of-the-art technologies to protect patient privacy and confidentiality.

CuriMeta has specialized expertise in managing "real-world" data collections, which hold great promise in terms of making research faster and more efficient. CuriMeta will create a secure platform to share such real-world data sets with life science companies whose research goals align with those of the School of Medicine and BJC HealthCare, all while ensuring that patients' identities are kept private.

Via another new collaboration — between Siteman Cancer Center and the University of Missouri Health Care's Ellis Fischel Cancer Center in Columbia — cancer research will get a boost in Missouri. Siteman is based at Barnes-Jewish Hospital and the School of Medicine.

The ultimate goal of this new relationship is to maximize the research capabilities at both cancer centers and improve cancer care throughout Missouri. A major focus of the collaboration involves scientists at both institutions working together on research projects and jointly pursuing competitively funded research grants, including those supported by the National Cancer Institute (NCI) of the National Institutes of Health (NIH). The collaboration also will enhance efforts in cancer prevention so that the general public can be better informed about cancer risk and about access to resources for cancer prevention and screening.

## Construction in Personalized Medicine, Aging, and Mental Health

Allowing us to expand our mission and goals are construction projects underway on our campus, three of which will be buildings specifically designed to bring researchers and clinicians closer together to better meet the needs of patients. These projects will support our efforts to establish international centers of excellence in three key areas: personalized medicine, aging and mental health.

### *Neuroscience*

One of the largest neuroscience research buildings in the country is being built on campus adjacent to St. Louis' rapidly expanding Cortex technology hub. Designed to advance world-leading neuroscience research into mysteries of the brain and nervous system, the 11-story facility will bring together more than 100 research teams, including some 875 researchers from areas such as neurology, neuroscience, neurosurgery, psychiatry and anesthesiology. It is scheduled to open in 2023.

### *Cancer*

Our Siteman Cancer Center, a National Cancer Institute-designated comprehensive cancer center, is planning a nine-story, 659,000-square-foot facility dedicated solely to outpatient cancer care. The facility will provide a central home for nearly all aspects of advanced cancer care, providing more personalized care for patients and a more comforting experience for their families. This is scheduled to open in 2024.

### *Research Laboratories*

Construction is underway on a major expansion of medical research laboratory space in the Steven & Susan Lipstein BJC Institute of Health building. The $150 million expansion will add six floors and 160,000 square feet of laboratory space to an existing 11-story research building. The project includes a biologic core facility to provide innovative cellular therapies for cancer and a high-containment, biosafety laboratory for research on SARS-CoV-2 and other infectious viruses.

## Growth for the Future

This impressive growth is a reflection of the remarkable depth and breadth of our faculty, staff and students and their willingness to rise to new challenges and perform at high levels to achieve our mission: caring for patients to the highest standards today, while also doing the research that will allow us to enhance that care in the future.

At Washington University School of Medicine, we are always asking: How we can have more impact on our community and improve the health of our neighbors, urban and rural? How can we improve the economy in our region, since we know that economic status plays such an important role in health outcomes?

As always, we invite you to share suggestions on how our school might work in partnership with the state's fine medical institutions and physicians to better serve the state of Missouri. For more on our school's initiatives, please visit http://medicine.wustl.edu. **MM**

# The Tip of the Spear: Emergency Medicine and Missouri's Response to the COVID-19 Pandemic

*by Christopher Sampson, MD & Stephen Y. Liang, MD*

Washington University in St. Louis
School of Medicine

**The specialty of emergency medicine has played a pivotal role in Missouri throughout the course of the pandemic.**



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## Abstract

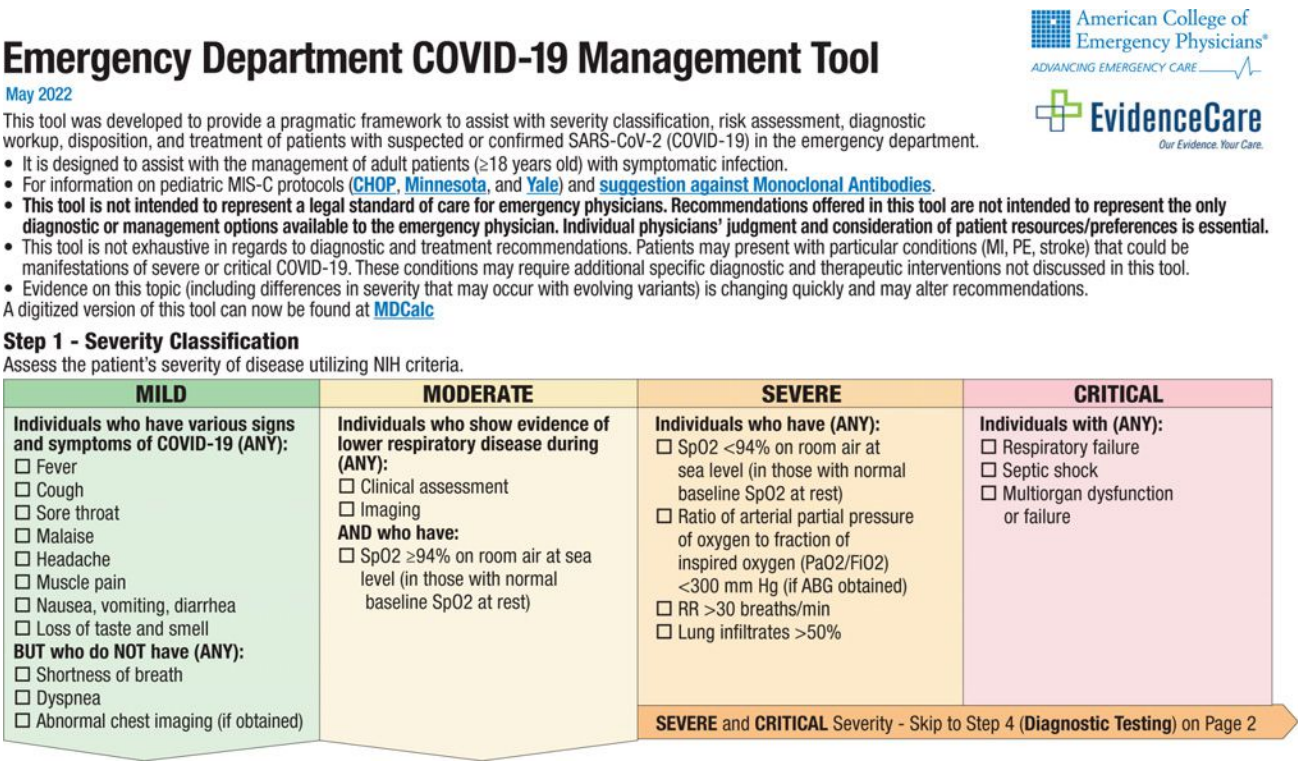
**The COVID-19 pandemic provided the specialty of emergency medicine the opportunity to showcase what many knew all along: emergency physicians (EP) are well suited to deal with the unknown and can quickly adapt even with incomplete or limited information and resources. Emergency physicians in Missouri served in integral positions locally, nationally and internationally. Missouri EPs published numerous manuscripts on topics from basic science to clinical care. Device innovation also occurred with the development of protective devices for health care workers.**

**As we approach the three-year mark of the COVID-19 pandemic, the burden of clinical care still weighs heavily on EPs. Each wave of the pandemic has brought challenges and spurred EPs to innovate in new ways. As Michigan EP Brian Zink, MD once said "Anyone, Anything, Anytime". These words correctly sum up emergency medicine. When others hesitated to care for COVID-19 patients, EPs stepped up despite uncertainty and risks to their own health. Emergency medicine has led the way and continues to innovate and push the envelope of emergency care.**

## Introduction

Each wave of the COVID-19 pandemic has and continues to present unique challenges. During the first wave in early 2020, uncertainty about an easily transmissible novel coronavirus combined with supply chain issues limiting access to personal protective equipment were significant obstacles to overcome. Innovation focused on synthesizing rapidly evolving data and creating solutions to safely manage patients with COVID-19 while protecting health care professionals.

The second wave in the summer of 2020 was marked by a lack of intensive care unit (ICU) beds to care for critically-ill COVID-19 and other patients. This scarcity magnified the sadly familiar concept of boarding patients in the Emergency Department (ED), a practice well-associated with increased morbidity and mortality. Up to the task and despite long and difficult days, EPs contributed some of the early research describing how to diagnose and manage suspected COVID-19, borne out of necessity due to patients boarding in the ED for hours to days.[1, 2] The critical shortages of hospital staff across the United States during a new wave of the pandemic at



# Emergency Department COVID-19 Management Tool

May 2022

American College of Emergency Physicians® ADVANCING EMERGENCY CARE

EvidenceCare Our Evidence. Your Care.

This tool was developed to provide a pragmatic framework to assist with severity classification, risk assessment, diagnostic workup, disposition, and treatment of patients with suspected or confirmed SARS-CoV-2 (COVID-19) in the emergency department.

- It is designed to assist with the management of adult patients (≥18 years old) with symptomatic infection.
- For information on pediatric MIS-C protocols (CHOP, Minnesota, and Yale) and suggestion against Monoclonal Antibodies.
- **This tool is not intended to represent a legal standard of care for emergency physicians. Recommendations offered in this tool are not intended to represent the only diagnostic or management options available to the emergency physician. Individual physicians' judgment and consideration of patient resources/preferences is essential.**
- This tool is not exhaustive in regards to diagnostic and treatment recommendations. Patients may present with particular conditions (MI, PE, stroke) that could be manifestations of severe or critical COVID-19. These conditions may require additional specific diagnostic and therapeutic interventions not discussed in this tool.
- Evidence on this topic (including differences in severity that may occur with evolving variants) is changing quickly and may alter recommendations.

A digitized version of this tool can now be found at MDCalc

**Step 1 - Severity Classification**

Assess the patient's severity of disease utilizing NIH criteria.

| MILD | MODERATE | SEVERE | CRITICAL |
|---|---|---|---|
| **Individuals who have various signs and symptoms of COVID-19 (ANY):**<br>☐ Fever<br>☐ Cough<br>☐ Sore throat<br>☐ Malaise<br>☐ Headache<br>☐ Muscle pain<br>☐ Nausea, vomiting, diarrhea<br>☐ Loss of taste and smell<br>**BUT who do NOT have (ANY):**<br>☐ Shortness of breath<br>☐ Dyspnea<br>☐ Abnormal chest imaging (if obtained) | **Individuals who show evidence of lower respiratory disease during (ANY):**<br>☐ Clinical assessment<br>☐ Imaging<br>**AND who have:**<br>☐ SpO2 ≥94% on room air at sea level (in those with normal baseline SpO2 at rest) | **Individuals who have (ANY):**<br>☐ SpO2 <94% on room air at sea level (in those with normal baseline SpO2 at rest)<br>☐ Ratio of arterial partial pressure of oxygen to fraction of inspired oxygen (PaO2/FiO2) <300 mm Hg (if ABG obtained)<br>☐ RR >30 breaths/min<br>☐ Lung infiltrates >50% | **Individuals with (ANY):**<br>☐ Respiratory failure<br>☐ Septic shock<br>☐ Multiorgan dysfunction or failure |

**SEVERE** and **CRITICAL** Severity - Skip to Step 4 (**Diagnostic Testing**) on Page 2

Figure 1. Part of the American Colleges of Emergency Medicine/EvidenceCare Emergency Department Covid-19 Management Tool

the end of 2021 again demonstrated the fragility of the healthcare system. Once more, EPs adapted and overcame multiple barriers associated with limited resources.[3] Lack of adequate COVID-19 testing capacity nationwide further compounded healthcare system issues such as staffing shortages. This led many mildly ill or asymptomatic but exposed patients to seek COVID-19 testing in EDs, further stretching an overcrowded system. Situated on the frontlines of healthcare, EPs have made invaluable contributions to COVID-19 pandemic response worldwide.

The specialty of emergency medicine has played a pivotal role in Missouri throughout the course of the pandemic. There are over 600 board-certified EPs in the state of Missouri. This number does not include the almost 200 EM residents who train at five sites across the state (Columbia, Joplin, Kansas City, and two in St. Louis). Emergency physicians not only serve as frontline clinicians within EDs but as emergency medical services directors, guiding urban and rural prehospital care throughout the state. Many of Missouri's EPs are also national and international leaders in innovation, research and information dissemination.

## Electronic Resources/Information Dissemination

Rapid communication to all health care personnel caring for COVID-19 patients was essential. In the early part of the pandemic, rarely did a day pass without the release of a new publication about COVID-19 transmission, management, or prognosis. In an unprecedented move, many non-peer reviewed or preliminary studies were uploaded to preprint repositories such as medRxiv.org in order for those on the frontlines to access the latest data. Unfortunately, lack of peer review opened opportunities for poorly designed studies with inaccurate conclusions to garner attention, leading to the dissemination of incorrect information that challenged the precepts of evidence-based medicine. Worse, this information was frequently discussed and further disseminated by news organizations.[4]

Early on, the American College of Emergency Physicians (ACEP) stepped up to help provide clinicians with guidelines to summarize and interpret the enormous amount of rapidly changing data. The ACEP COVID-19 Field Guide was released electronically in the spring of 2020. Harnessing the knowledge of its membership, this seventeen-

chapter guide provided extensive information on the diagnosis and treatment of COVID-19 in both prehospital and ED settings [https://www.acep.org/corona/covid-19-field-guide/cover-page] Missouri emergency physicians authored chapters in the guide. This living on-line document was updated continuously through the summer of 2021. Contents were comprehensive and thoroughly vetted, including recommendations on home safety when returning from work, vaccinations, treatment, and personal well-being. As of February 2022, the ACEP COVID-19 Field Guide has received over 200,000 page views from over 60,000 unique visitors and is referenced by over 180 agencies. Not content to stop there, ACEP partnered with EvidenceCare to create the COVID-19 ED Management Tool[5] (Figure 1)[https://www.acep.org/corona/COVID-19-alert/covid-19-articles/covid-19-ED-management-tool-now-available]. Missouri EPs, Christopher Sampson, MD and Christopher Carpenter, MD, MSC, participated in this work as part of a national coalition of expert physicians including representation from the NIH and Department of Veteran Affairs. This management tool provides an easy-to-use electronic algorithm to guide the diagnostic, prognostic, pharmacologic, and non-pharmacologic management approach to COVID-19 patients presenting to the ED stratified by disease severity and is updated monthly.

In February 2022, Missouri EPs Phillip Mudd, MD, PhD, and Dr. Carpenter led the Society for Academic Emergency Medicine COVID-19 Education Task Force in the creation of the COVID-19 Provider Toolkit [https://www.saem.org/education/saem-online-academic-resources/covid-19-provider-toolkit] in response to the need for resources to guide conversations with ED patients about vaccination concerns, facemasks, and emerging COVID-19 therapeutics. This resource was made available by an unrestricted grant from GlaxoSmithKline and included both patient-facing and physician-facing videos, handouts, and hyperlinks for additional information available in English, Spanish, and German.

COVID-19 Extension for Community Healthcare Outcomes (ECHO) is another resource that has been made available to clinicians across Missouri [https://showmeecho.org/clinics/covid-19]. Breaking the mold, COVID-19 ECHO provides a video conferencing solution to link health care professionals across the state disseminating best practice learning through case based discussions. The expert hub panel consists of specialists (Infectious Disease, Community Health, Emergency Medicine) from all areas of the state. Since its inception in spring of 2020, the weekly video conference has seen over 100 attendees each session.

## Barrier Devices

Given the early uncertainty regarding both mode and ease of transmission of SARS-CoV-2 to healthcare personnel and whether the virus could be aerosolized during emergency care, EM innovators began to work immediately on solutions to provide patient care safely. With many patients arriving in severe respiratory distress, endotracheal intubation was frequently performed early on. Considered an aerosol-generating procedure, ideas for use of barrier enclosures during endotracheal intubation surfaced quickly in an effort to protect healthcare personnel, some receiving publication.[6] Cost was a concern with some devices produced at manufacturing sites closed down in the early phase of lockdown.

In Missouri, EP Adam Beckett, DO, created a low-cost barrier device easily adapted to prehospital and hospital settings.[7,8] Using readily-available supplies such as PVC pipes and auto warp, he created a box that could be placed over patients to contain aerosols generated during airway management and hopefully mitigate viral transmission in the ED. In Branson, Missouri, EPs led by Richard Blubaugh, DO created a barrier device, the SafER [https://safermedicalproducts.com] portable negative-pressure system, that could suction away exhaled respiratory aerosols, preventing their release into the healthcare environment (Figure 2).

Other innovations included reconfiguring pre-existing areas within the ED to provide COVID-19 care. One innovation used the hospital decontamination room as a COVID-19 cardiac arrest management area.[9] Potentially infectious patients entered the ED decontamination room using an outside door; following treatment, the room could be rapidly disinfected. Given visitor limitations during the pandemic, this innovation also enabled family to remain close to their loved one during cardiopulmonary resuscitation.

## Missouri EPs' COVID-19 Original Research

The COVID-19 pandemic has led to a fountain of research from Missouri EM researchers, spanning from basic sciences to clinical care. A Missouri EP was part of a workgroup that reviewed the evidence and authored an Infectious Diseases Society of America guideline discussing health care personnel infection prevention.[10] Clinical research by Missouri EPs have addressed stroke care and barriers to care among patients who inject drugs during the pandemic.[11,12] In addition, Missouri EPs provided



Figure 2. SafER Portable Negative Pressure System

some of the earliest evidence-based guidance around the diagnosis of COVID-19 based on history, physical examination, laboratory testing, and imaging along with a proposal for an acceptable criterion standard for COVID-19.[2] Missouri EPs also participated in a registry of 116 hospitals across 25 states to derive and validate a clinical prediction rule to diagnose COVID-19 using clinical data while awaiting confirmatory laboratory results.[13] In addition, Missouri EPs with expertise in geriatric emergency medicine synthesized best practices for the management of COVID-19 in older adults, including two consensus conferences funded by the National Institute of Aging through the Geriatric Emergency Care Applied Research Network [https://gearnetwork.org/] as well as a series of webinars via the Geriatric Emergency Department Collaborative [https://gedcollaborative.com/].[14,15] Amidst the stresses of inadequate personal protective equipment supplies coupled with vaccine uncertainty, healthcare personnel wellness was also prioritized.[16] Given early concerns regarding the transmissibility of SARS-CoV-2, clinical research by Missouri EPs also addressed personal protective equipment as well as its disinfection and reuse given limited supplies.[17, 18]

Basic science manuscripts from Missouri EPs covered such diverse topics as pathogenesis, host immune response, kidney physiology, and biomarkers for disease severity and prognosis in COVID-19.[19-29] Other Missouri researchers evaluated potential therapeutics for COVID-19 including interleukin-6 receptor blockers and caspase inhibitors as well as factors differentiating COVID-19 from influenza.[23, 30-34]

The rapid pace of COVID-19 research during the pandemic created demand for trustworthy evidence reviews and the implications for patients and clinicians.[35] One such resource was Brief-19 [www.brief19.com]. For more than a year, this website provided daily updates of COVID-19-related research and policy from EPs on the frontlines. Led by EP Jeremy Faust, MD, MS, of Harvard Medical School, the writing team included multiple Missouri EPs and a future Missouri EM resident. Under the leadership of Deputy Editor and Missouri EP Dr. Christopher Carpenter, Academic Emergency Medicine aggregated all articles published on COVID-19 by the journal in a readily-accessible web resource to streamline access for key stakeholders.[36]

## Summary

As Missouri approaches the three-year mark of the COVID-19 pandemic, the burden of clinical care still weighs heavily on EPs. Each wave of the pandemic has presented challenges and spurred EPs to innovate. Michigan EP Dr. Brian Zink's words, "Anyone, Anything, Anytime," continue to capture the essence of emergency medicine. When others hesitated to care for COVID-19 patients, EPs stepped up despite great uncertainty and risk to their own health. Emergency medicine has not only contributed around-the-clock clinical care during the pandemic, but also led research designed to contain, manage, and ultimately overcome the era of COVID-19.

## References

1. Caputo ND, Strayer RJ, Levitan R. Early Self-Proning in Awake, Non-intubated Patients in the Emergency Department: A Single ED's Experience During the COVID-19 Pandemic. Acad Emerg Med. 2020 May;27(5):375-378.
2. Carpenter CR, Mudd PA, West CP, Wilber E, Wilber ST. Diagnosing COVID-19 in the Emergency Department: A Scoping Review of Clinical Examinations, Laboratory Tests, Imaging Accuracy, and Biases. Acad Emerg Med. 2020 Aug;27(8):653-670
3. https://www.stltoday.com/lifestyles/health-med-fit/coronavirus/patients-wait-in-ers-for-days-as-covid-19-patients-overwhelm-st-louis-area-hospitals/article_e402c8ba-89fb-5942-9d32-d93ff7934bf2.html#tracking-source=home-top-story
4. Kaiser Family Foundation. (2021, Nov 8) COVID-19 Misinformation is Ubiquitous:78% of the Piblic Believes or is Unsure About At Least One False Statement, and Nearly a Third Believe At Least Four of Eight False Statements Tested. https://www.kff.org/coronavirus-covid-19/press-release/covid-19-misinformation-is-ubiquitous-78-of-the-public-believes-or-is-unsure-about-at-least-one-false-statement-and-nearly-at-third-believe-at-least-four-of-eight-false-statements-tested/
5. Steel PAD, Carpenter CR, Fengler B, Cantrill S, Schneider S. Calculated decisions: ACEP ED COVID-19 management tool. Emerg Med Pract. 2021 Jul 15;23(Suppl 7):CD1-CD6. PMID: 34260192.
6. Canelli R, Connor Connor, CW CW, Gonzalez M. Barrier enclosure during endotracheal intubation. New Eng J Med. 2020;382:1957–1958.
7. Sampson CS, Beckett A. Novel, Inexpensive Portable Respiratory Protection Unit. Clinical Practice and Cases in Emergency Medicine. 2020; 4(2).
8. Sampson C, Beckett A. A Novel, Inexpensive Portable Respiratory Protection Unit for Prehospital Use: A Technical Note. Cureus 12(5): e7954. May 4, 2020.
9. Sampson CS. Adaptation of the Emergency Department Decontamination Room for Airway Management During COVID-19. American Journal of Emergency Medicine. epub April 2020.
10. Lynch JB, Davitkov P, Anderson DJ, Bhimraj A, Cheng VC, Guzman-Cottrill J, et al. Infectious Diseases Society of America Guidelines on Infection Prevention for Healthcare Personnel Caring for Patients with Suspected or Known COVID-19. Clin Infect Dis. 2021 Nov 15:ciab953.
11. Pandian JD, Panagos PD, Sebastian IA, Sampaio Silva G, Furie KL, Liu L, et al. Maintaining stroke care during the COVID-19 pandemic in lower- and middle-income countries: World Stroke Organization Position Statement endorsed by American Stroke Association and American Heart Association. Int J Stroke. 2022 Jan;17(1):9-17.
12. Gleason E, Nolan NS, Marks LR, Habrock T, Liang SY, Durkin MJ. Barriers to Care Experienced by Patients Who Inject Drugs During the COVID-19 Pandemic: A Qualitative Analysis. J Addict Med. 2021 Apr 8:10.1097
13. Kline JA, Camargo CA Jr, Courtney DM, Kabrhel C, Nordenholz KE, Aufderheide T, et al. Clinical prediction rule for SARS-CoV-2 infection from 116 U.S. emergency departments 2-22-2021. J.PLoS One. 2021 Mar 10;16(3):e0248438.
14. Burkett E, Carpenter CR, Hullick C, Arendts G, Ouslander JG. It's time: Delivering optimal emergency care of residents of aged care facilities in the era of COVID-19. Emerg Med Australas. 2021 Feb;33(1):131-137. doi: 10.1111/1742-6723.13683
15. Chary AN, Castilla-Ojo N, Joshi C, Santangelo I, Carpenter CR, Ouchi K, Naik AD, Liu SW, Kennedy M. Evaluating older adults with cognitive dysfunction: A qualitative study with emergency clinicians. J Am Geriatr Soc. 2022 Feb;70(2):341-351.
16. Lewis LM, Carpenter CR, Jotte R, Schwarz E. Healthcare Provider Wellness in the Time of COVID and Beyond..Mo Med. 2021 Jan-Feb;118(1):13-17.
17. Ballard DH, Dang AJ, Kumfer BM, Weisensee PB, Meacham JM, Scott AR, et al. Protection levels of N95-level respirator substitutes proposed during the COVID-19 pandemic: safety concerns and quantitative evaluation procedures. BMJ Open. 2021 Sep 2;11(9):e045557.
18. Grossman J, Pierce A, Mody J, Gagne J, Sykora C, Sayood S, et al. Institution of a Novel Process for N95 Respirator Disinfection with Vaporized Hydrogen Peroxide in the Setting of the COVID-19 Pandemic at a Large Academic Medical Center. J Am Coll Surg. 2020 Aug;231(2):275-280.
19. Kim W, Zhou JQ, Sturtz AJ, Horvath SC, Schmitz AJ, Lei T, et al. Germinal centre-driven maturation of B cell response to SARS-CoV-2 vaccination. bioRxiv. 2021 Nov 2:2021.10.31.466651.
20. Ye Y, Swensen AC, Wang Y, Kaushal M, Salamon D, Knoten A, et al. A Pilot Study of Urine Proteomics in COVID-19-Associated Acute Kidney Injury. Kidney Int Rep. 2021 Dec;6(12):3064-3069.
21. Sindelar M, Stancliffe E, Schwaiger-Haber M, Anbukumar DS, Adkins-Travis K, Goss CW, et al. Longitudinal metabolomics of human plasma reveals prognostic markers of COVID-19 disease severity. Cell Rep Med. 2021 Aug 17;2(8):100369.
22. Dhindsa S, Zhang N, McPhaul MJ, Wu Z, Ghoshal AK, Erlich EC, et al. Association of Circulating Sex Hormones With Inflammation and Disease Severity in Patients With COVID-19. JAMA Netw Open. 2021 May 3;4(5):e2111398.
23. Reynolds D, Vazquez Guillamet C, Day A, Borcherding N, Vazquez Guillamet R, Choreño-Parra JA, et al. Comprehensive Immunologic Evaluation of Bronchoalveolar Lavage Samples from Human Patients with Moderate and Severe Seasonal Influenza and Severe COVID-19. J Immunol. 2021 Sep 1;207(5):1229-1238.
24. Corley MJ, Pang APS, Dody K, Mudd PA, Patterson BK, Seethamraju H, et al. Genome-wide DNA methylation profiling of peripheral blood reveals an epigenetic signature associated with severe COVID-19. J Leukoc Biol. 2021 Jul;110(1):21-26
25. Patterson BK, Seethamraju H, Dhody K, Corley MJ, Kazempour K, Lalezari J, et al. CCR5 inhibition in critical COVID-19 patients decreases inflammatory cytokines, increases CD8 T-cells, and decreases SARS-CoV2 RNA in plasma by day 14. Int J Infect Dis. 2021 Feb;103:25-32.
26. DeKosky ST, Kochanek PM, Valadka AB, Clark RSB, Chou SH, Au AK, et al. Blood Biomarkers for Detection of Brain Injury in COVID-19 Patients. J Neurotrauma. 2021 Jan 1;38(1):1-43.
27. Remy KE, Mazer M, Striker DA, Ellebedy AH, Walton AH, Unsinger J, et al. Severe immunosuppression and not a cytokine storm characterizes COVID-19 infections. JCI Insight. 2020 Sep 3;5(17):e140329.
28. Chang K, Kallogjeri D, Piccirillo J, House SL, Turner J, Schneider J, et al. Nasal inflammatory profile in patients with COVID-19 Olfactory Dysfunction. Int Forum Allergy Rhinol. 2021 Dec 10.
29. Scozzi D, Cano M, Ma L, Zhou D, Zhu JH, O'Halloran JA, et al. Circulating mitochondrial DNA is an early indicator of severe illness and mortality from COVID-19. JCI Insight. 2021 Feb 22;6(4):e143299.
30. Vazquez Guillamet MC, Kulkarni HS, Montes K, Samant M, Shaikh PA, Betthauser K, et al. Interleukin-6 Trajectory and Secondary Infections in Mechanically Ventilated Patients With Coronavirus Disease 2019 Acute Respiratory Distress Syndrome Treated With Interleukin-6 Receptor Blocker. Crit Care Explor. 2021 Feb 3;3(2):e0343.
31. Plassmeyer M, Alpan O, Corley MJ, Premeaux TA, Lillard K, Coatney P, et al. Caspases and therapeutic potential of caspase inhibitors in moderate-severe SARS-CoV-2 infection and long COVID. Allergy. 2022 Jan;77(1):118-129.
32. Choreño-Parra JA, Jiménez-Álvarez LA, Ramírez-Martínez G, Cruz-Lagunas A, Thapa M, Fernández-López LA, et al. Expression of Surfactant Protein D Distinguishes Severe Pandemic Influenza A(H1N1) from Coronavirus Disease 2019. J Infect Dis. 2021 Jul 2;224(1):21-30.
33. Mudd PA, Crawford JC, Turner JS, Souquette A, Reynolds D, Bender D, et al. Distinct inflammatory profiles distinguish COVID-19 from influenza with limited contributions from cytokine storm. Sci Adv. 2020 Dec 9;6(50):eabe3024.
34. Mudd PA, Crawford JC, Turner JS, Souquette A, Reynolds D, Bender D, et al. Targeted Immunosuppression Distinguishes COVID-19 from Influenza in Moderate and Severe Disease. .medRxiv. 2020 May 30:2020.05.28.20115667.
35. Carpenter CR. Rapid antigen and molecular tests had varied sensitivity and ≥97% specificity for detecting SARS-CoV-2 infection. Ann Intern Med. 2020 Dec 15;173(12):JC69
36. https://onlinelibrary-wiley-com.proxy.mul.missouri.edu/journal/15532712/covid19

## Disclosure

None reported.

MM

# Emergency Department Management of Suicidal Ideation: Challenges, Misperceptions, and Hope

*by Kamal Gursahani, MD, Douglas Char, MD, Michael P. Wilson, MD, PhD & Robert F. Poirier, Jr., MD*

**Despite many challenges in regards to behavioral health care both nationally and in Missouri, efforts are underway statewide to improve care coordination along with resources available.**



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## Abstract

**Behavioral crises continue to escalate across the United States. Our country has one of the highest suicide rates amongst developed nations. More than 45,000 U.S. citizens are dying annually now from suicide. Many with suicidal ideation seek care in Emergency Departments in hospital systems under resourced to handle this growing public health crisis. Evidenced-based screening, risk stratification, and treatment continues to evolve and is not standardized. Improved suicide education needs to be more broadly applied across healthcare and society. Missouri as a state is making concentrated efforts to improve resources and care for those with suicidal ideation. Many challenges need to be overcome and time will tell if new statewide initiatives will reduce Missouri's high rate of suicide.**

## Background

Emergency medicine aims to harness evidence-based medicine for the highest impact on meaningful outcomes for time critical diagnoses while also serving as the safety net discipline across the nation.[1,2,3] Accordingly, emergency care of patients with stroke, myocardial infarction, trauma, sepsis, and a variety of other clinical conditions is often standardized in the form of protocols. Multidisciplinary healthcare teams are trained (and rewarded) to identify patients with these anatomic or physiological time-dependent conditions who are likely to benefit from interventions that provide the right care at the right time. Unfortunately, despite the fact that patients often seek care in the emergency department (ED) for behavioral emergencies such as acute suicidality, agitation, psychosis, and complications of substance use, similar protocols, and treatment standards are underdeveloped.[4] In fact, an entire decade has passed since Mental Health Access to Care was last explored by Shoyinka and Lauriello in *Missouri Medicine*.[5]

## Missouri Suicide Statistics

Missouri has one of the highest suicide rates in the nation[6] (Figure 1). The American Foundation for Suicide Prevention using Centers for Disease Control

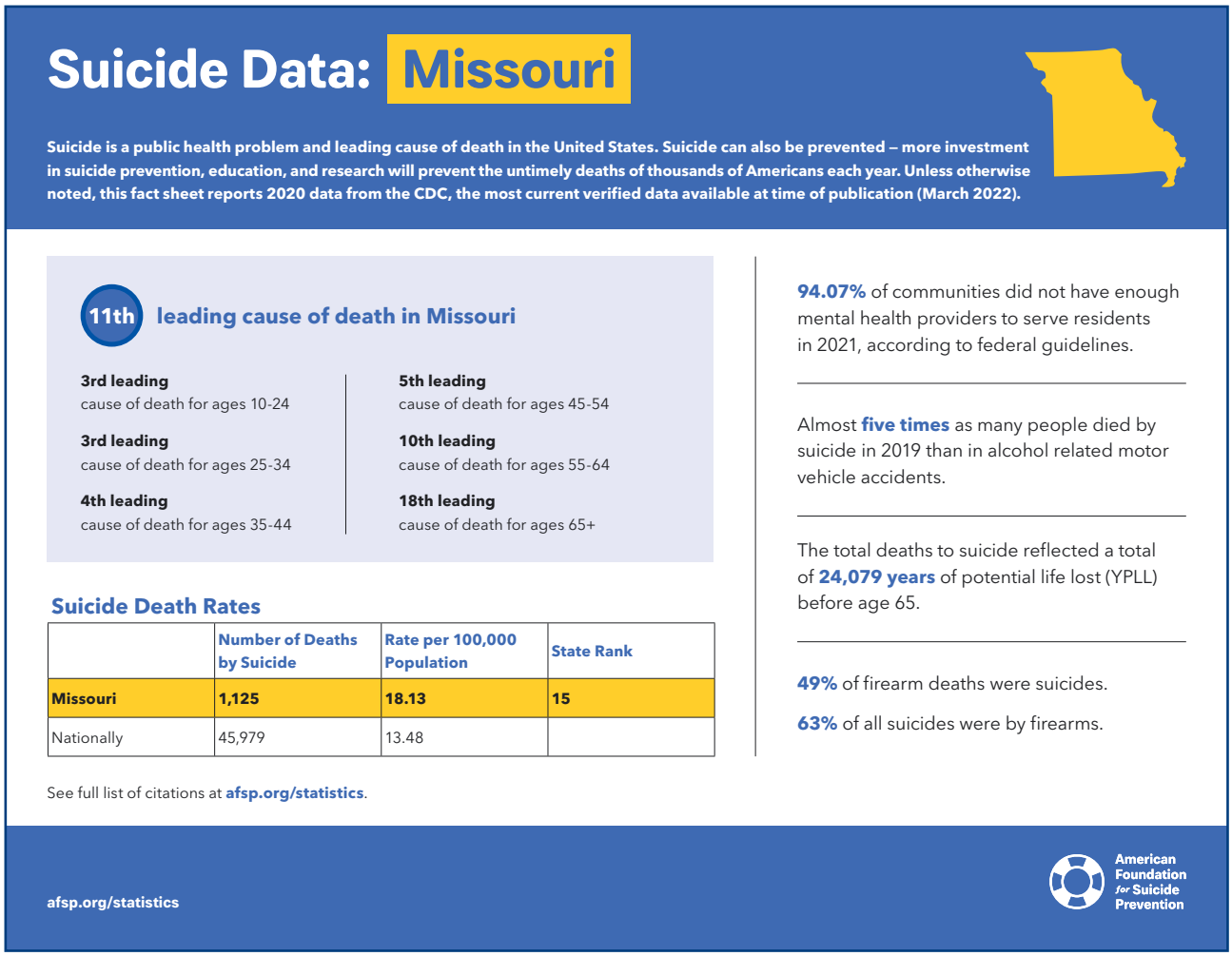



Figure 1. Missouri Suicide Facts, American Foundation for Suicide Prevention[7]

*American Foundation for Suicide Prevention website. https://afsp.org/facts/missouri. Published February 4, 2022. Accessed May 29, 2022.*

(CDC) data reported in 2020 suicide was the overall 11th leading cause of death in Missouri with one person dying by suicide every seven hours.[7] Compared to the rest of the United States, Missouri ranked 15th with 18.1 suicides per 100,000 population, which is approximately one-third higher than the national average of 13.5. There were 1,125 deaths by suicides in Missouri in 2020, and it is estimated that suicide attempts are more than 30 times the number of suicide deaths.[8] Sixty-three percent of all suicides in Missouri were by firearms, while half of all firearm deaths were because of suicide.[7] Despite these alarming public health statistics, 94% percent of Missouri communities reported they were lacking adequate behavioral health providers necessary to provide care to their citizens in 2021.[7] National suicide statistics are also concerning and convey the immensity of this public health burden (Figure 2).

## Emergency Department Statistics

Deinstitutionalization and moving from an inpatient hospital-based behavioral health care paradigm to a community-based one over the past 50 years has resulted in many more behavioral health patients seeking care in Emergency Departments.[9] Between 2015 and 2019, EDs nationwide saw more than 381,000 patients annually for non-fatal suicide attempts resulting in over 200,000 hospital admissions each year.[10]

Utilization of emergency services for suicidal

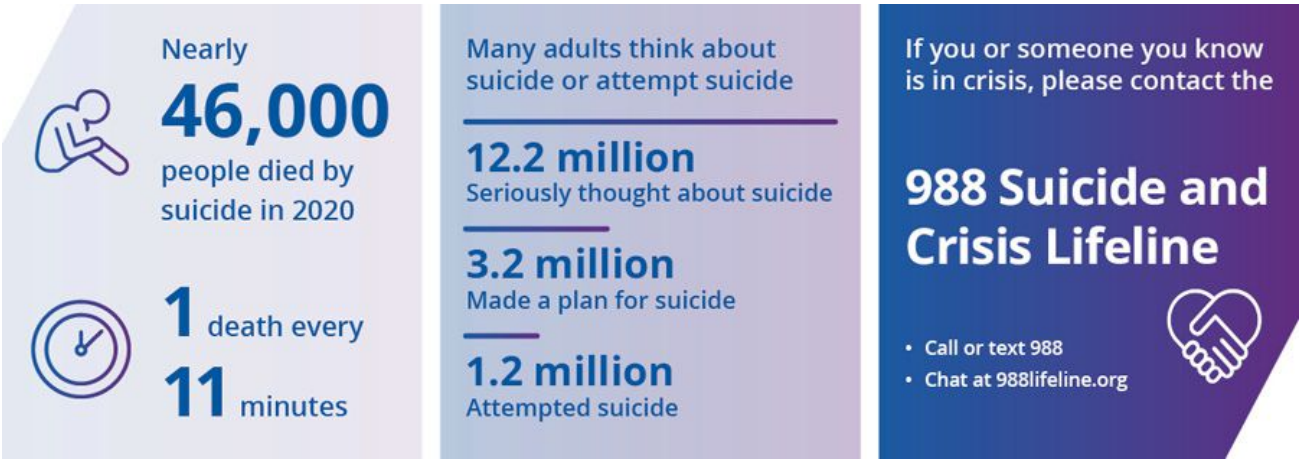



Figure 2. Centers for Disease Control National Suicide Statistics
*Source:* https://www.cdc.gov/suicide/facts/index.html

ideation and attempts has increased steadily for both adult and pediatric populations in the U.S. over the past two decades and even more so for children and adolescents, especially during the COVID-19 pandemic.[10] In 2017 there were 1.5 million ED visits in the U.S. coded with a diagnosis of suicidal ideation or suicide attempt for patients five years old and above. Of these, 34.6% were discharged from the ED after evaluation. In contrast, of the 134 million ED visits in 2017 for non-behavioral health primary diagnoses, 80% of patients were discharged home. ED patients who are admitted to inpatient psychiatric units often wait long periods of time, sometimes days to weeks for a bed at the primary hospital or another facility with behavioral health resources.[9]

Despite the increasing incidence of ED utilization for behavioral emergencies, emergency management of suicidal patients remains woefully underfunded and underexamined in the literature.[11] Since 1970, the number of inpatient psychiatric hospital beds has plummeted. One recent analysis estimates the number of psychiatric patients being treated inpatient has dropped 64% and when adjusted for population growth the decrease is actually 77%.[12] Furthermore, most EDs are not properly designed, equipped or structured to handle psychiatric emergencies in a patient-centered manner. EDs are typically loud and chaotic, and thus often ill-equipped to de-escalate behavioral health crises. Retrofitting EDs to handle behavioral health and suicidal patients is prohibitively expensive for many hospitals, but even if funded, psychiatric patients often endure more stigma and bias in emergency care, are often forced to undress and communicate without privacy, and face extended ED boarding times.[9] During this boarding, ED patients often receive little therapeutic treatment. Even basic necessities such as showering, brushing teeth, using the phone, and eating are difficult for boarding psychiatric patients. Even worse, boarding of psychiatric patients waiting for admission placement is associated with increased morbidity and mortality [10,13]

## Emergency Department Challenges

Compounding the problem is the lack of a standard curriculum for emergency psychiatry training within emergency medicine or pediatric emergency medicine residency training. Directors of training programs report reliance mainly on "on the job" training to support acquisition of these skills.[14,15] ED staff likewise often lack training in how to respond best to mental health and substance use disorders. Due

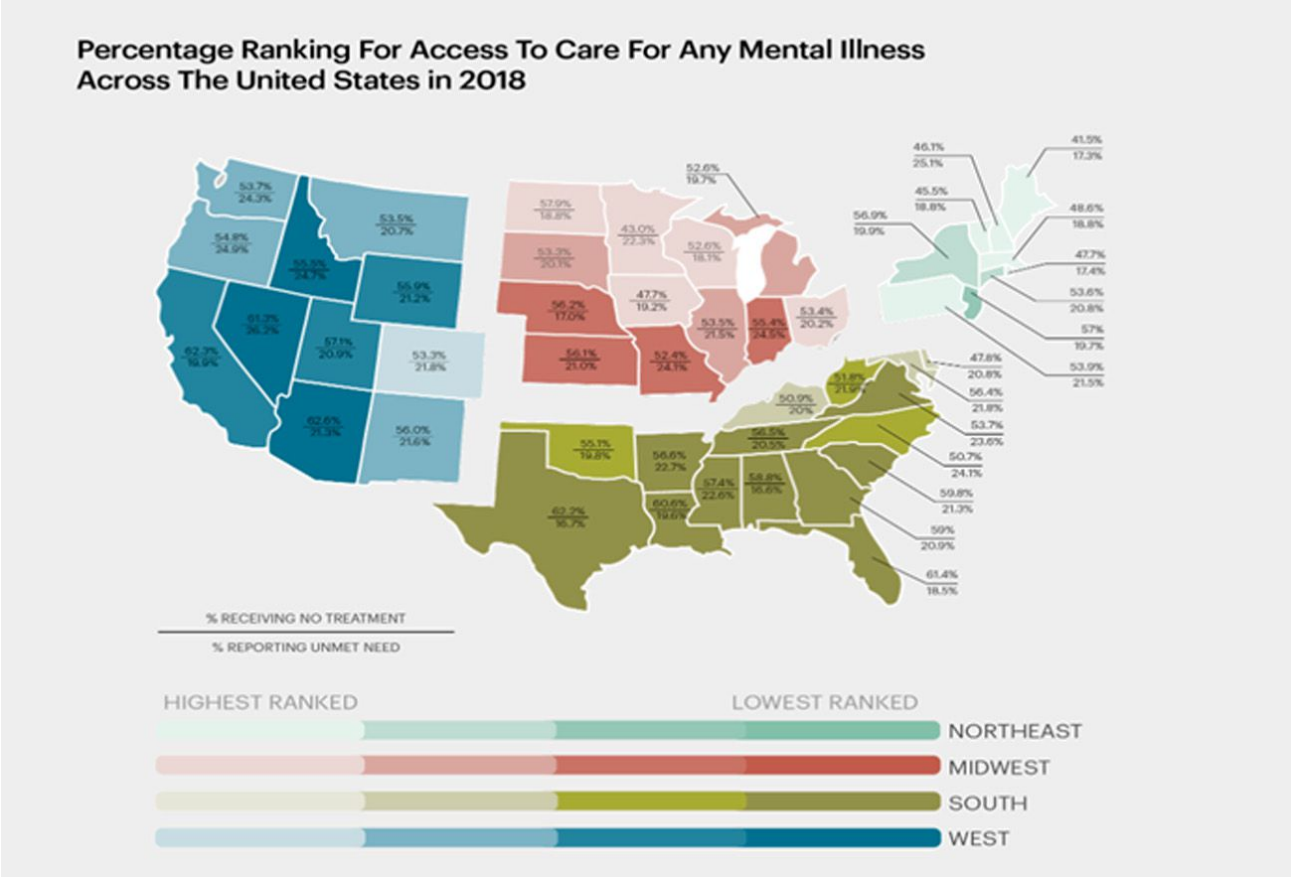



Figure 3. Access measures include access to insurance, treatment, special education, quality and cost of insurance, and workforce availability. Higher access ranking indicates that a state provides relatively more access to insurance and mental health treatment.

*GRAPHIC ADAPTED FROM: Hellebuyck, M., Halpern, M., Nguyen, T., Fritze, D. (2018). The State of Mental Health in America 2019. Alexandria, VA. Mental Health America.*

to this gap in mental health training, ED staff often implement restrictive interventions. For example, agitated patients in crisis are often met with restraints and/or seclusion in the ED, which may be perceived as confrontational and induce adverse psychological outcomes for those under their care.[16]

A number of societal factors make caring for individuals with mental health and substance use disorders challenging in the ED. Research demonstrates a higher utilization of EDs for mental health complaints in rural areas, despite similar overall prevalence in rural and urban settings.[17] This stems from shortages in mental health professionals, greater stigma against mental illness, greater socioeconomic disadvantages, and access to means of self-harm in rural regions. ED staff perceive deficiencies in the availability of mental health expertise, de-escalation, and referral pathways as major barriers to effective patient management.[17] Social determinants of health such as drug and alcohol use, housing instability, food insecurity, and poverty often exacerbate mental health care by hobbling the clinician's ability to implement effective interventions. The challenges of chronic drug addiction and homelessness are not themselves mental health conditions, but are nonetheless often lumped together with depression and psychosis. Furthermore, the community has an expectation that "something be done with these individuals" which is often code for "get them off the street." In response, sometimes patients enter the justice system before or after entering

Table 1. Current Missouri Statewide Efforts

1. Missouri participation in a 988 nationwide mental health hotline that went live July 16, 2022 for anyone and everyone experiencing behavioral health crises (mental health, suicide, and/or substance use). Callers are expected to be connected to local mental health team members approximately 90% of the time (non-local 10% of the time) who will provide 24/7 availability to crisis services via call, chat, or text.
2. Missouri Foundation for Health funding provides support for two full-time positions with MSPN focused on suicide prevention.
3. Zero Suicide in Health Systems grant awarded to Missouri by the Federal Government. Zero Suicide training Academies have been setup providing training to over 45 organizations throughout the state.
4. Governor Mike Parsons signed in September 2020 the "PREVENTS" State Proclamation Pledge prioritizing suicide prevention for Veterans and all Missourians.
5. Statewide campaigns promoting the National Suicide Prevention Lifeline and National Crisis Text Line.
6. Missouri Suicide Prevention Advocacy Network created in 2020 to boost public awareness of the significance of suicide as a statewide public health crisis.
7. MO Ask Listen Refer (MOALR) Training Program designed for all Missouri residents to teach how to identify people at risk for suicide and how to get help for those at risk.

*Source: 2021-2024 Missouri Suicide Prevention Plan. Missouri Suicide Prevention Network Website. https://www.mospn.org/_files/ugd/6dadf9_8477825e74ec4279845a8ac69a3179d4.pdf . Accessed May 29, 2022.*

the healthcare system. Even those with resources and access to the health system (patients and providers alike) have unrealistic expectations about what can be accomplished during a relatively short stay in the ED.

## Misperceptions

There are a number of misperceptions regarding what the ED and hospital can do for patients in crisis, especially those expressing suicidal ideation. Patients and families come to the ED seeking psychiatric care because they perceive or experience barriers when accessing outpatient care urgently. One of the drivers of increased ED mental health visits is the presence of significant barriers to outpatient care (access to providers and timeliness of appointments) (Figure 3).[9]

Most patients presenting to the ED with depression, suicidal ideation, hallucinations, and psychosis are initially managed by emergency providers, not psychiatrists. Emergency providers may have access to consultation services with mental health specialists. Mental health specialists besides physicians include qualified mental health professionals (QMHPs), who are licensed social workers, nurses, or psychologists.[18] Mental health specialists can be challenging to access across the care continuum, especially in non-urban areas where there are few mental health providers in the community. While the advent of telehealth and virtual visits has increased the availability QMHP services for some ED patients, many facilities (both urban and rural) do not have access to these services 24/7/365.[9]

The focus of the ED mental health evaluation is not to initiate or provide even short-term mental health care, but to assess an individual's risk of self-harm.[18] The risk assessment only focuses on need for admission or suitability for discharge, and does not often include recommendations for actual treatment. Particularly for patients with suicidal ideation, risk assessments are universally utilized despite the fact that standardized commonly promoted assessment tools are unreliable (discussed in more detail below). Brief interventions in the ED, on the other hand, recently have demonstrated great promise in reducing deaths by suicide[19] but currently are not well known and underused.

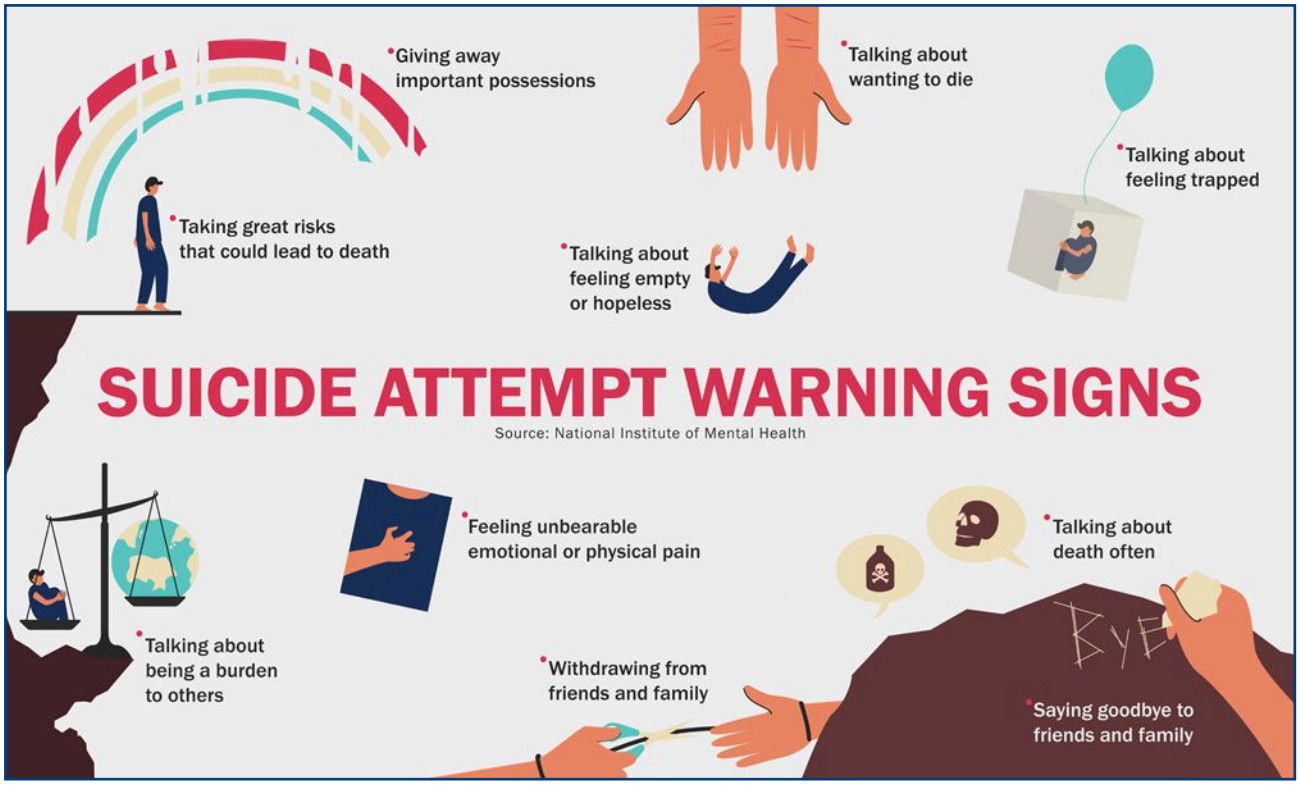



Figure 4. General suicide attempt warning signs for the public.

In many EDs, the decision to admit for a more comprehensive psychiatric evaluation is a common pathway. Admission may be decided based for presumed patient safety or provider liability concerns. The inability to adequately address being unhoused or housing insecurity, substance use disorder or disruptive public behavior may more often result in an admission decision for the patient. Individuals who are admitted may be boarded in the ED for days waiting for an inpatient bed to become available. One study showed 41% of individuals initially admitted to inpatient psychiatry are ultimately released from the ED following a psychiatric specialist's more comprehensive mental health assessment.[14]

Acute inpatient mental health admissions may be counterproductive and undermine efforts to address chronic psychiatric and non-medical needs. A question that often should be addressed before admission is "what is the real short-term risk of self-harm and how will an admission reduce this risk?" Not all patients expressing suicidal ideation benefit from hospitalization, and existing literature has shown little – if any – benefit from inpatient hospitalization.[20]

## Hope

Despite many challenges in regards to behavioral health care both nationally and in Missouri, efforts are underway statewide to improve care coordination along with resources available. Various suicide prevention initiatives are housed within and are being put forth by the Missouri Department of Mental Health (DMH) and Department of Health and Senior Services (DHSS). The Missouri Suicide Prevention Network (MSPN) formed in 2018 is made up of various organizations and stakeholders focused on reducing suicide through statewide planning efforts. MSPN in partnership with the DMH and Missouri Coalition for Community Behavioral Healthcare recently published the 2021-2024 Missouri Suicide Prevention Plan. Suicide prevention requires a highly coordinated multidisciplinary strategic

approach. Hospitalization alone does not "cure" suicidal ideation and suicidal ideation often remains significantly elevated after discharge.[21] In the U.S. one out of seven patients who commit suicide received treatment from inpatient behavioral health services within the previous year.[22] Societal conditions that result in feelings of hopelessness are major contributors to suicidality risk. As reported in the Missouri Suicide Prevention State Plan, "success…ultimately rests with the individuals and communities across the state." Three strategies are outlined in the plan: 1) fully embrace a public health approach; 2) establish Missouri as a Zero Suicide Healthcare State; and 3) establish a robust data collection and reporting system.[21]

To embrace the public health approach, Missouri has identified all stakeholders as including but not limited to, families and friends of people who have died by suicide, the general public, law enforcement, the courts, providers of health and behavioral health services, teachers, and higher education. Missouri is currently working on seven statewide efforts to attempt to reduce suicides (Table 1).

September is Suicide Prevention Awareness Month. Anyone and everyone can learn the warning signs of suicide risk (Figure 4).

## References

1. Irvin CB, Fox JM, Pothoven K. Financial impact on emergency physicians for nonreimbursed care for the uninsured. Ann Emerg Med. 2003;42(4):571-576.
2. Watts SH, David Bryan E, Tarwater PM. Changes in insurance status and emergency department visits after the 2008 economic downturn. Acad Emerg Med. 2015;22(1):73-80.
3. Zink, BJ. Anyone, anything, anytime: A history of emergency medicine, 2nd edition. Biblio Website. https://www.biblio.com/book/anyone-anything-anytime-history-emergency-medicine/d/1384932192. Published January 2018. Accessed May 29, 2022.
4. Laderman, M. Is culture the key to improving behavioral health care and staff experience in the emergency department? Institute for Healthcare Improvement Wesite. http://www.ihi.org/communities/blogs/is-culture-the-key-to-improving-behavioral-health-care-and-staff-experience-in-the-emergency-department. Published March 4, 2020. Accessed May 29, 2022.
5. Shoyinka S, Lauriello J. Mental Health Access to Care in Missouri. Missouri Medicine, 2012. 109:6 470-474.
6. National Institute of Mental Health Website. https://www.nimh.nih.gov/health/statistics/suicide. Accessed June 15, 2022.
7. Missouri State Facts. American Foundation for Suicide Prevention website. https://afsp.org/facts/missouri. Published February 4, 2022. Accessed May 29, 2022.
8. Han B, Kott PS, Hughes A, McKeon R, Blanco C, Compton WM. Estimating the rates of deaths by suicide among adults who attempt suicide in the United States. J Psychiatr Res. 2016;77:125-133.
9. Nordstrom K, Berlin JS, Nash SS, Shah SB, Schmelzer NA, Worley LLM. Boarding of Mentally Ill Patients in Emergency Departments: American Psychiatric Association Resource Document. West J Emerg Med. 2019;20(5):690-695. Published 2019 Jul 22.
10. Ivey-Stephenson AZ, Crosby AE, Hoenig JM, Gyawali S, Park-Lee E, Hedden SL. Suicidal Thoughts and Behaviors Among Adults Aged ≥18 Years - United States, 2015-2019. MMWR Surveill Summ. 2022;71(1):1-19.
11. Chung DT, Ryan CJ, Hadzi-Pavlovic D, Singh SP, Stanton C, Large MM. Suicide Rates After Discharge From Psychiatric Facilities: A Systematic Review and Meta-analysis. JAMA Psychiatry. 2017;74(7):694-702.
12. Ahmedani BK, Simon GE, Stewart C, et al. Health care contacts in the year before suicide death. J Gen Intern Med. 2014;29(6):870-877.
13. Emergency Department Visits Related to Suicidal Ideation or Suicide Attempt 2008-2017. Healthcare Cost & Utilization Support Statistical Brief #263. Agency for Healthcare Research and Quality Website. https://www.hcup-us.ahrq.gov/reports/statbriefs/sb263-Suicide-ED-Visits-2008-2017.jsp. Published September 2020. Accessed May 29, 2022.
14. Santucci KA, Sather J, Baker MD. Emergency medicine training programs' educational requirements in the management of psychiatric emergencies: current perspective. Pediatr Emerg Care. 2003;19(3):154-156.
15. Bode A, Jackson JS. The current emergency medicine residency curriculum: Missing psychiatry. Am J Emerg Med. 2017;35(11):1771-1772.
16. Hall A, McKenna B, Dearie V, et al. Educating emergency department nurses about trauma informed care for people presenting with mental health crisis: a pilot study. Nursing. 2016;15(21): 23–30.
17. Pawaskar R, Mahajan N, Wangoo E, Khan W, Bailey J, Vines R. Staff perceptions of the management of mental health presentations to the emergency department of a rural Australian hospital: qualitative study. BMC Health Serv Res. 2022;22(1):87. Published 2022 Jan 18.
18. Wiler, JL, Brown, NA, Chanmugam, AS, Enguidanos, ER, Farley, HL, Greenberg, RD, et al. Care of the Psychiatric Patient in the Emergency Department- A Review of the Literature. American College of Emergency Physicians website. https://www.acep.org/globalassets/uploads/uploaded-files/acep/clinical-and-practice-management/resources/mental-health-and-substance-abuse/psychiatric-patient-care-in-the-ed-2014.pdf. Published October 2014. Accessed June 21, 2022.
19. Wilson MP, Moutier C, Wolf L, Nordstrom K, Schulz T, Betz ME. ED recommendations for suicide prevention in adults: The ICAR(2)E mnemonic and a systematic review of the literature. Am J Emerg Med. 2020;38(3):571-581.
20. Goldman-Mellor SJ, Bhat HS, Allen MH, Schoenbaum M. Suicide Risk Among Hospitalized Versus Discharged Deliberate Self-Harm Patients: Generalized Random Forest Analysis Using a Large Claims Data Set. Am J Prev Med. 2022;62(4):558-566.
21. 2021-2024 Missouri Suicide Prevention Plan. Missouri Suicide Prevention Network website. https://www.mospn.org/_files/ugd/6dadf9_8477825e74ec4279845a8ac69a3179d4.pdf. Accessed May 29, 2022.
22. Boudreaux ED, Jaques ML, Brady KM, Matson A, Allen MH. The patient safety screener: validation of a brief suicide risk screener for emergency department settings. Arch Suicide Res. 2015;19(2):151-160.

## Disclosure

None reported.

**MM**

# Geriatric Emergency Medicine: Providing Older Missourians with the Care They Need and Deserve

*by Samuel A. Ockner, MD & Edward L. Fieg, DO*

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***"One of the paradoxes of the 2020 presidential campaign is that while many of the candidates are in their eighth decade of life, fundamental issues associated with the increasing age of American society are still receiving relatively little attention from the public, the press, and the politicians themselves. In 2031, the oldest baby boomers will turn 85, entering the land of the 'old old,' and facing exponentially higher risks for dementia, serious physical disabilities, and long-term dependency."***

***-Susan Jacoby, NY Times December 23, 2019***



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## Abstract

**Emergency care of older adults evolved in an effort to meet the needs of our aging population. The pace of improving the quality and cost-effectiveness of emergency department (ED) care for older adults is accelerating with the development of Geriatric Emergency Department Accreditation (GEDA) and research initiatives forged by the Center for Leading Innovation and Collaboration (CLIC) and Geriatric Emergency care Applied Research (GEAR). The innovations of two Missouri EDs are highlighted, including how each approached fall risk and quality improvement efforts for aging populations with multimorbidity. Additional work is needed to accommodate this growing population and implement sustainable solutions.**

## Introduction

It is estimated that 10,000 baby boomers turn 65 every day, including a significant proportion in Missouri. According to the census bureau, in 2018 there were 52 million Americans 65 years of age or older, representing 16% of the U.S. population. By 2060 there will be 95 million ≥ 65 years old, or 23% of the population. From 2002 to 2012 the number of geriatric ED visits increased by 42%.[1] In 2012 there were 43 million geriatric ED visits, with an estimated growth to 83 million visits by 2050.[2] In their last month of life, approximately half of American adults ≥ 65 are seen in the ED, with 75% visiting an ED in their final six months.[3] As previously detailed in this journal, the foresight and innovation of Missouri physicians are central to the story of geriatric emergency medicine.[4]

Because of increasing life expectancy and the growth of our older adult population, the American Geriatric Society (AGS) was founded in 1942.[5] Geriatrics emerged as a subspecialty of Internal Medicine and Family Medicine, but it was not until 1988 that geriatric board certification was implemented. Geriatric practice included distinguishing between normal aging and disease, as well as recognizing that those over 65 are often more vulnerable to acute injury, at a greater risk of falling, at higher risk for polypharmacy and medication interactions, more likely to experience delirium, and often present with non-specific symptoms.[6] It is important to keep in mind that the ED is

often the first point of contact for older adults. For some, the ED might be their only resource for receiving healthcare. Benefits of developing a geriatric ED are multifactorial, and include screening for geriatric syndromes, concurrent management of the acute illness or injury, and prioritization of shared decision-making, assuring alignment with the patient's goals.[6]

## Adapting Graduate Medical Education for an Aging World

In order to improve care for those over 65, medical student competencies were developed by transdisciplinary stakeholders in 2009, identifying 26 requisite areas.[7] Consequently, medical school curricula evolved to include "The Geriatric 5Ms" (Mind, Mobility, Medications, Multicomplexity, and Matters Most),[8] which were reviewed and updated in 2021 (Association of Directors of Geriatric Academic Programs, accessed January 23, 2022). In 2010, geriatric competencies for emergency medicine residents were derived by the American Medical Association, AGS, American College of Emergency Physicians (ACEP), Society for Academic Emergency Medicine (SAEM), Council of Residency Directors, Emergency Medical Residents' Association, and American Board of Emergency Medicine.[9] These emergency medicine training requirements specified eight domains and 26 competencies for which the graduating emergency medicine (EM) resident is responsible (Table 1). The table is a guideline for competency-based training, requiring that EM residents go beyond didactics, and develop practices appropriate for each scenario. After a visit to the bedside with a trainee, the table can be used to reinforce relevant teaching points.

Subsequent assessments of a geriatric education curricula for EM residents demonstrated improvement in knowledge and decision making after a series of six lectures and seven simulations that included all eight domains noted in Table 1. Most notable was an improvement in scores on a 35-question multiple choice test, with less dramatic changes in frequency of chemical sedation and placement of urinary catheters. The study included 29 residents at a single EM residency program.[10]

## The Geriatric Emergency Department Collaborative (GEDC)

The GEDC [https://gedcollaborative.com] is a transdisciplinary, comprehensive, and free resource for geriatric emergency medicine and research, and peer-mentorship for EDs worldwide undergoing similar older adult process improvement efforts. In addition, GEDC provides "Implementation Toolkits" to catalyze and accelerate geriatric ED initiatives. GEDC's website features a resource library and the open access J*ournal of Geriatric Emergency Medicin*e, as well as access to continuing medical education (CME), blogs, podcasts, and on-demand webinars [for CME see https://geri-em.com and https://geriatric-ed.com]. A visit to the GEDC website featured articles on pain management in older adults, elder abuse and neglect, and clinical tips in the assessment of GU emergencies in older adults (Figure 1).

## The Geriatric Emergency Department

Recognizing the need for a paradigm shift in the care of the older adult prompted more than 100 self-designated geriatric EDs to open in less than a decade.[11,12] Aware of the lack of rigor, evidence-basis, outcome assessment, or cost-effectiveness underlying these initial geriatric EDs, SAEM, ACEP, and AGS published consensus-based Geriatric ED guidelines in 2014.[13,14] Subsequently guidelines created by ACEP were used to officially designate EDs as GEDA (see Table 2).[15] Similar to trauma-center designations, the accreditation consists of a three-tiered system of Gold, Silver, Bronze, or 1, 2, and 3. Level 1 GEDA sites must demonstrate 20 or more ongoing geriatric ED quality improvement (QI) efforts and have a local team of geriatric champions, including an ED nurse and physician, a pharmacist, physiotherapist, social worker, and a hospital administrator who meet regularly to review projects and outcomes. Level 2 GEDA sites must demonstrate 10 QI efforts. Level 3 GEDA sites require only one such geriatric quality improvement effort as well as a single nurse and physician champion with the vision and commitment to begin "geriatricizing" the care within likely smaller or geographically isolated hospitals.

The ultimate goal is to provide the best care possible for the older adult. ACEP's keen and forward-thinking interest in this sphere promotes a "triple aim" of healthcare: Improving patient experience, reducing per capita costs, and improving the health

of populations overall. Hospitals and health systems can be significantly impacted when providing poorly coordinated, inefficient care. "Unnecessary" readmissions of Medicare patients can result in up to a 3% reduction of federal Medicare payments for standard fee-for-service Medicare. Managed Medicare may deny Inpatient Levels of reimbursement for repeat hospital admissions deemed unnecessary, denying payment completely, or recommending Observation Level of Care with substantially reduced reimbursement. In addition, many hospitals and health systems participate in or manage Accountable Care Organizations. Such arrangements, as well as bundled payment contracts and value-based payment arrangements, often share financial risks for avoidable care with the hospital and health system. Hospital Presidents and Chief Financial Officers will be familiar with such single-line items in their budgets, but often lack detailed understanding of causes at a clinical granular level as to how to improve such financial impacts. ED physicians caring for dizzy patients on 20 or more medications, or needing assistance walking to the bathroom or with activities of daily living, yet live independently, can provide insight. Partnership between such ED physicians and C-Suite executives is essential to provide resources to such older adults, both

Table 1 - The graduating EM resident, in the context of a specific older patient scenario (real or simulated), must be able to:

| Domain | Competency |
|---|---|
| I. Atypical presentation of disease | 1. Generate an age-specific differential diagnosis for elder patients presenting to the Ed with general weakness, dizziness, falls or altered mental status. |
| | 2. Generate a differential diagnosis recognizing that signs and symptoms such as pain and fever may be absent of less prominent in elders with acute coronary syndromes, acute abdomens, o infectious processes. |
| | 3. Document consideration of adverse reactions to medications, including drug-drug and drug-disease interactions, as part of the initial differential diagnosis. |
| II. Trauma inducing falls | 4. In patients who have fallen, evaluate for precipitating causes of falls such as medications, alcohol use/abuse, gait or balance instability, medical illness, and/or deterioration of medical condition. |
| | 5. Assess for gait instability in all ambulatory fallers; if present, ensure appropriate disposition and follow-up including attempt to reach primary care provider. |
| | 6. Demonstrate ability to recognize patterns of trauma (physical/sexual, psychological, neglect/abandonment) that are consistent with elder abuse. Manage the abused patient in accordance with the rules of the state and institution. |
| | 7. Institute appropriate early morning monitoring and testing with the understanding that elders may present with muted signs and symptoms (e.g., absent pain and neurologic changes) and are at risk for occult shock. |
| III. Cognitive and behavioral disorders | 8. Assess whether an elder is able to give an accurate history, participate in determining the plan of care, and understand discharge instructions. |
| | 9. Assess and document current mental status and any change from baseline in every elder, with special attention to determining if delirium exists or has been superimposed on dementia. |
| | 10. Emergently evaluate and formulate an age-specific differential diagnosis for elders with new cognitive or behavioral impairment, including self-neglect; initiate a diagnostic workup to determine the etiology; and initiate treatment. |
| | 11. Assess and correct (if appropriate) causative factors in agitated elders such as untreated pain, hypoxia, hypoglycemia, use of irritating tethers (defined as monitor leads, blood pressure cuff, pulse oximetry, intravenous access, and Foley catheter), environmental factors (light, temperature), and disorientation. |
| IV. Emergency intervention modifications | 12. Recommend therapy based on the actual benefit to risk ratio, including but not limited to acute myocardial infarction, stroke, and sepsis, so that age alone does not exclude elders from any therapy. |
| | 13. Identify and implement measures that protect elders from developing iatrogenic complications common to the ED including invasive bladder catheterization, spinal immobilization, and central line placement. |
| V. Medication management | 14. Prescribe appropriate drugs and dosages considering the current medication, acute and chronic diagnosis, functional status, and knowledge of age-related physiologic changes (renal function, central nervous system sensitivity). |
| | 15. Search for interactions and document reasons for use when prescribing drugs that present high risk either alone or in drug-drug or drug-disease interactions (e.g., benzodiazepines, digoxin, insulin, NSAIDs, opioids, and warfarin). |
| | 16. Explain all newly prescribed drugs to elders and caregivers at discharge, assuring that they understand how and why the drug should be taken, the possible side effect, and how and when the drug should be stopped. |
| VI. Transitions of care | 17. Document history obtained from skilled nursing or extended care facilities of the acute events necessitating ED transfer including goals of visit, medical history, medications, allergies, cognitive and functional status, advance care plan, and responsible PCP. |
| | 18. Provide skilled nursing or extended care facilities and/or PCP with ED visit summary and plan of care, including follow-up written appropriate. |
| | 19. With recognition of unique vulnerabilities in elders, assess and document sustainability for discharge considering the ED diagnosis, including cognitive function, the ability in ambulatory patents to ambulate safely, availability of appropriate nutrition/social support, and the availability of access to appropriate follow-up therapies. |
| | 20. Select and document the rationale for the most appropriate available disposition (home, extended care facility, hospital) with the least risk of the many complications commonly occurring in elders during inpatient hospitalizations. |
| | 21. Rapidly establish and document an elder's goals of care for those with a serious or life-threatening condition and manage accordingly. |
| | 22. Assess and provide ED management for pain and key nonpain symptoms based on the patient's goals of care. |
| | 23. Know how to access hospice care and how to manage elders in hospice care while in the ED. |
| VII. Effect of comorbid conditions | 24. Assess and document the presence of comorbid conditions (e.g., pressure ulcers, cognitive status, falls in the past year, ability to walk and transfer, renal function, and social support) and include them in your medical decision-making and plan of care. |
| | 25. Develop plans of care that anticipate and monitor of predictable complications in the patient's condition (e.g., gastrointestinal bleed causing ischemia). |
| | 26. Communicate with patients with hearing/sight impairments, speech difficulties, aphasia, and cognitive disorders (e.g., using family/friend, writing). |

NSAID = nonsteroidal anti-inflammatory drug; PCP = primary care provider

in the ED, the hospital, and at their home. To this end, specific imperatives include decreasing admissions and readmissions, decreasing falls, attention to medication management, delirium prevention, and advanced care planning. Depending on the level achieved, anywhere from 1 to 20 initiatives, not including hospital wide policies, are undertaken. As of January 2022, GEDA were issued to 288 U.S. EDs, of which 19 were Level 1, 34 were Level 2, 235 were level 3. The most common initiatives were fall prevention, and minimizing urinary catheter use.[16]

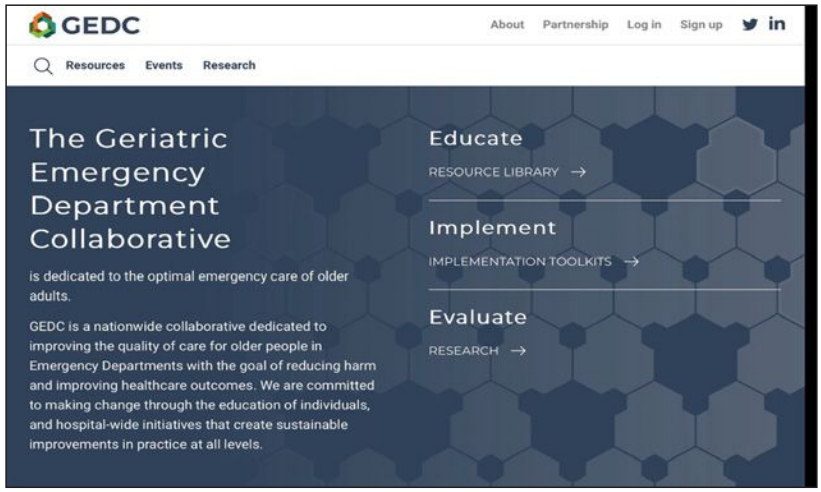



Figure 1. The GEDC home page with mission statement and access to a Resource Library, Journal of Geriatric Emergency Medicine, on-Demand Webinars, and Implementation Toolkits. The research tab provides a link to the GEAR Network.

## Team of Geriatric Champions

Developing a geriatric-centric ED is clearly a team effort, certainly not a one-person job. Nevertheless, endeavors of this magnitude must start at the beginning, and they may simply be one nurse and one healthcare provider, bringing additional staff members into the activity "inch by inch."[17] Physicians, Advanced Practice Nurses, RNs, Independent Care Techs, Social Workers, Physical and Occupational Therapists, Pharmacists, Dietitians, Home Care, Engineering, Prosthetics, and Medical Administration all play important roles. Overcoming inertia to build and then sustain a program requires resources and time, as well as published protocols and policies. Ideally, initiatives to improve the process, experience, cost-effectiveness, and outcomes of care for older adults will include partnering with facility Quality, Geriatrics, and Graduate Medical Education where applicable. Programs generally start small, with one ED physician and one nurse or nurse educator.[16,18] Adding the ED pharmacist is key to monitoring for polypharmacy and drug interactions, which are very common among the geriatric population.[19,20] In addition, care partner burden can be evaluated by social work[21] and strength and gait evaluations can be performed by physical therapy.[22]

## The Geriatric Emergency Department Infrastructure

While the architectural changes to a space are far less important to improving older adult emergency care than are trained and motivated champions empowered with evidence-based protocols, structural changes nonetheless are one component of the aforementioned guidelines. A geriatric ED can be a separate space designated for those over 65 (Figure 2). More commonly, the main ED is adapted towards holistic care of older individuals. These include dimmable lighting, contrasting colors, large print placards, and more appropriate signage, as well as improved acoustics. The geriatric ED guidelines provide a range of protocols to prevent post-visit falls, identify delirium, avoid polypharmacy, identify vulnerability, and enhance transition of care through communication with family and care partners, inpatient and outpatient teams, and home health. The importance of coordinated multidisciplinary inpatient and outpatient care cannot be overstated. In fact, the American College of Surgeons launched a similar "Geriatric Surgery Verification" accreditation program in 2019 [https://www.facs.org/quality-programs/geriatric-surgery]. Critical Care and Hospitalist services are contemplating related efforts. In best practices, geriatric ED teams actively screen older patients for geriatric syndromes such as delirium,[23] dementia,[24] frailty,[25] elder abuse,[26] and polypharmacy,[20] typically utilizing appropriately trained nurses, advanced practice providers, or physicians. However, volunteers,[27] pad-based technology,[28] and machine learning[29] are emerging as alternatives to burdening busy healthcare teams with additional responsibilities.

Ultimately, clear and readable discharge instructions that synthesize the geriatric screening results and actionable response, are essential for meaningful shared decision making.[30]

## Missouri Geriatric Emergency Departments

The St. Louis John Cochran Veterans Administration ED, under the direction of Edward Fieg, DO, developed a protocol to identify older adults (≥ 65 years of age) at risk due to medical, social, and administrative issues, independent of their presenting chief complaint. Staff are trained to utilize one or more screening tools, complete a Computerized Patient Record System (the Veterans Administration electronic medical record) template, and notify the veteran's PCP of the results. A geriatric clinic is also available for referrals. In particular, high risk complaints, including falls, care partner concerns, multiple ED visits, polypharmacy, age ≥ 85, and others, will lead to a screening via a variety of tools that may help to predict near future ED visits, hospitalization, and mortality.

Two of the screening tools employed are the identification of seniors at risk (ISAR) (Table 3a) and triage risk screening tool (TRST) (Table 3b). ISAR is a six-point system,[31,32] and a score of two or more predicts a greater likelihood of ED return, emergency hospitalization, and six-month mortality. Those with 2+ points tend to be older and take more medications, are more likely to have 30- and 90-day ED revisits, and are more likely to have 30- and 180-day hospitalizations for serious medical or trauma related problems. TRST has a similar approach, with a score of two or more associated with increased risk of ED visit and hospitalization.[33] Despite their frequent utilization, more recent analysis has shown that "no individual risk factor, frailty construct, or risk assessment instrument accurately predicts risk of adverse outcomes in older ED patients." However, ISAR/TRST are still useful in clinical practice, since they attune healthcare staff to geriatric concerns, and currently a superior tool has not been identified.

## Why Falls Are So Important: Gravity is a Killer

One in three adults age 65 or older fall each year. Those older adults who sustain a fall are two to three times more likely to fall again. Falls are the leading cause of both fatal and non-fatal injuries to older Americans (National Council on Aging, Falls Prevention Facts, 2020). Falls increase the risk for hospitalization, decrease the ability to perform activities of daily living, and decrease the ability to perform instrumental activities of daily living, e.g. banking, shopping, preparing meals, paying bills, etc.[34] High risk falls often result in nursing home placement and death. Ten percent of falls in this population will result in serious injury (fracture, joint dislocation, or closed head injury). The total economic burden of falls is approximately $50 billion, 75% of which is paid by Medicare and Medicaid (cdc.gov fact sheet). In 2018 an estimated 2.4 million ED visits for adults ≥ 65 were attributed to falls, motor vehicle crashes, unintentional prescription opioid overdoses, and self-harm. A striking 91.8% of these visits were due to falls.[35] Unfortunately, there is little research evidence to support fall prevention screening or fall prevention protocols, though Emergency Medicine is working diligently to close this knowledge gap.[36-38]




Figure 2.
Courtesy of UC San Diego. Dedicated Geriatric ED featuring non-slip floors, natural lighting, noise free rooms, and scenic photos.

## Falling Forward to Prevent Post-ED Injuries

Missouri Baptist Medical Center (MBMC) in St. Louis County achieved GEDA Level 3 status in January 2019. The motivation to obtain this accreditation derived from the fact that 37% of the ED volume are individuals ≥ 65 years old, many of whom presented after a fall. A retrospective review of 989 geriatric patients seen for falls revealed that 628 were discharged home [MoBap achieves ACEP Geriatric Accreditation; first in region at www.missouribaptist.org, March 6, 2019. Accessed January 5, 2022]. A

Table 2. Requirements for each GEDA Level illustrating stepwise, increasingly comprehensive requirements moving from Level 3 to Level 1.
*Source: http://www.acepnow.com/article/acep-accredits-geriatric-emergency-care-emergency-departments/*

| LEVEL | STAFFING | EDUCATION | SAMPLE POLICY | SAMPLE OUTCOME MEASURES | STANDARD ED EQUIPMENT |
|---|---|---|---|---|---|
| 3 | One nurse and one physician to provide geriatric-focused education | No requirements | Evidence of adherence to urinary catheter avoidance policy | No requirements | Mobility aids |
| 2 | Level 3 staffing + transitional care nurse + interdisciplinary care team (physical therapy, occupational therapy, social work, pharmacy) + dedicated hospital administrator who supervises and supports GED | Document geriatric EM–appropriate educational CME for providers working in the GED | Standardized assessments for delirium, dementia, elder abuse, and falls<br>Access to postdischarge follow-up resources such as community paramedicine | Proportion of patients assessed (for delirium, dementia, falls, etc.) and proportion identified as high-risk<br>Rates for hospital admissions and ED returns<br>Proportions of patients with extended ED lengths of stay (>8 hours) | Mobility aids, nonslip socks, pressure-reducing mattresses, hearing aids, bedside commodes, condom catheters, bedside transition stools, large-face analog clocks |
| 1 | Level 2 requirements + patient adviser or patient council providing monthly input on GED care quality | Same as level 2 | Same as level 2 + guidelines defining criteria for accessing the GED | Same as level 2 | Ideally a separate space within or adjacent to non-geriatric ED |

multidisciplinary team of ED physicians and nurses, Primary Care Providers (PCP), Pharmacists, Therapy Staff, Case Management, Barnes Jewish Christian Home Health Care, and Washington University Emergency Care Research Core Fall Experts developed a program to arrange a follow up home visit immediately after discharge, to be coordinated with the patient's PCP.

In the MBMC ED, providers caring for patients ≥ 65 receive a prompt ("Best Practice Advisory") in the electronic health record as a reminder to consider ordering a Geriatric Fall Risk Referral. A two to three minute order entry process results in a Home Health Referral. A therapist is ultimately deployed to the patient's home, where their fall risk is assessed, and recommendations are made to decrease the likelihood of a future fall. The therapist interacts with the PCP to obtain orders for needed durable medical equipment for the patient, and coordinates additional therapy and home health care if needed. In late 2019 the team at MBMC began to review data to assess the impact of this program, but due to the pandemic, additional data was not reviewed.

## Key to the future: Geriatric Emergency Care Research

The growth of our older adult population has been well documented, as has their increasing ED utilization. Medical science has elucidated the unique pathophysiology and psychosocial aspects of aging. As the role of the ED has become more critical, so has the stress on ED infrastructure. How can we more efficiently use our resources to improve the care of older adults? The current evidence base for geriatric emergency care has been described as "nascent."[39] More than ever, we need quality randomized controlled trials (RCT) to build on the many published observational studies. Funding is essential for innovations and outcomes-based research, even if it means "putting the cart before the Clydesdale." As the practice of medicine increasingly incorporates Clinical Practice Guidelines (CPGs) to help foster the development of best practices, it is clear that adaptations are necessary with respect to older adults with multiple chronic conditions (MCC).[40,41] Historically, CPGs excluded individuals due to an upper age limit in 1/3 of studies, and additional exclusion criteria that could lead to under-representation of older adults

included polypharmacy/concomitant medication use (37%), cardiac issues (30%), cancer history (24%), and cognitive impairment (20%).[42] The importance of including older adults in clinical trials that lead to publication of CPGs has been emphasized.[43] The Center for Leading Innovation and Collaboration (CLIC) has initiated a curriculum for inclusion of older adults in clinical and translational research (https://clic-ctsa.org). Additionally, the AGS and associated entities have received a grant from the National Institute on Aging to research MCCs.

Tables 3a and 3b. Each of the 6-question screening tools can be utilized to gather information of potential value to assist in management and decision making of older adults presenting to the ED.

| Table 3a - ISAR Questions |
|---|
| 1. Before the illness that brought you to the ED, did you need someone to help you on a regular basis? |
| 2. Since the illness or injury that brought you to the ED, have you needed more help than usual to take care of yourself? |
| 3. Have you been hospitalized for one or more nights during the past 6 months? |
| 4. In general, do you see well? |
| 5. In general, do you have serious problems with your memory? |
| 6. Do you take more than 3 different medications every day? |

| Table 3b - TRST Questions |
|---|
| 1. Is there a history of cognitive impairment |
| 2. Difficulty walking/transferring or recent falls? |
| 3. Has there been an ED visit in the last 30 days or hospitalization in the last 90 days? |
| 4. Five or more medications? |
| 5. Lives alone and/or no longer available caregiver? |
| 6. ED staff is concerned about one of the following: nutrition/weight loss, sensory deficits, incontinence, medication issues, depression? |

## GEAR: Geriatric Emergency care Applied Network

The GEAR network (https://gearnetwork.org) drives innovation in ED research. As a multidisciplinary task force, the GEAR network prioritizes and helps to provide funding from the NIH and other resources to researchers committed to improving emergency care of older adults. Our aging population with increased ED utilization, and consequently, an increased need for studies to improve care, led to this network's formation. GEAR 1.0 focuses on falls, elder abuse, medication safety, care transitions, and cognitive impairment. GEAR 2.0's focus is dementia and other cognitive abnormalities.

## Moving Forward

In addition to increased research funding, efforts to provide an impetus to hospitals to invest in geriatric emergency care and pursue GEDA status must continue.[44] As an increasing number of EDs achieve GEDA status, and as more high quality research emerges, it is conceivable that The Joint Commission and CMS will employ quality metrics (e.g. return visits/readmissions, ED-related falls) germane to the care of older adults. Hospitals may benefit from such an investment by being proactive in this regard. The potential for ED overcrowding to benefit from geriatric protocols may one day ring true. In 2021 Hwang et al. published a paper on cost outcomes among Medicare beneficiaries,[45] and demonstrated a reduction in cost to the Medicare program, but not to the hospitals and providers that have made accredited geriatric EDs possible. Further insight into the costs to hospitals and health systems to provide efficient care to the older adult is warranted, possibly focusing on older patients in ACOs or other scenarios. If financial benefits are manifested by geriatric emergency care programs, reimbursement by Medicare or other health care payers is certainly warranted. As more information becomes available in support of the extraordinary benefit of improved older adult care, perhaps more funding will lead to additional advances. One key question is who will pay for the advances.

## References

1. Ortman J, Velkoff VA, Hogan H. An aging nation: The older population in the United States: Population estimates and projections. Washington DC, US Census Bureau; 2012.
2. Pines, JM, Mullins PM, Cooper JK, Feng LB, Roth KE. National trends in emergency department use, care patterns, and quality care of adults in the United States. J Am Geriatr Soc. Jan 2013;61(1):12-17.
3. Smith AK, McCarthy E, Weber E, Cenzer IS, Boscardin J, Fisher J et al. Half of Older Americans Seen in the Emergency Department in Last Month of Life; Most Admitted to Hospital, And Many Die There. Health Affairs. Jun 2012;31(6):1277-1285.
4. Carpenter CR, Melady D, Krausz C, Wagner J, Froelke B, Cordia J et al. Improving Emergency Department Care for Aging Missourians: Guidelines, Accreditation, and Collaboration. Missouri Med. Nov/Dec 2017;114(6):447-452.
5. Geriatrics – the care of the aged. JAMA Sep 2014;312(11):1159. Originally published December 25, 1937: JAMA 1937;109(26):2143-2144.
6. Magdison PD and Carpenter CR. Trends in Geriatric Medicine. Emerg Clin N Amer. May 2021;39(2):243-255.

7. Leipzig RM, Granville L, Simpson D, Anderson MB, Sauvigne K, Soriano RP. Keeping granny safe on July 1: A consensus on minimal geriatric competencies for graduating medical students. Acad Med. May2009;84(5):604-610.
8. Tinetti M, Huang A, Molnar F. The Geriatric 5M's: A New Way of Communicating What We Do. J Am Geriatr Soc. Sep 2017;65(9):2115.
9. Hogan TM, Losman ED, Carpenter CR, Sauvigne K, Irmiter C, Emmanuel L et al. Development of Geriatric Competencies for Emergency Medicine Residents Using an Expert Consensus Panel. Acad Emerg Med. Mar 2010;17(3):316-324.
10. Biese K, Roberts E, LaMantia M, Zamora Z, Shofer FS, Snyder G et al. Effects of a geriatric curriculum on Emergency Medicine Resident attitudes, knowledge, and decision making. Acad Emereg Med. Oct 2011;18 Suppl 2:S92-S96.
11. Hogan TM, Olade TO, Carpenter CR. A profile of acute care in an aging America: snowball sample identification and characterization of United States geriatric emergency departments in 2013. Acad Emerg Med. Mar 2014;21(3):337-346.
12.Schumacher JG, Hirshon JM, Magdison P, Chrisman M, Hogan T. Tracking the Rise of Geriatric Emergency Departments in the United States. J Appl Gerontol. Aug 2020;39(8):871-879.
13. American College of Emergency Physicians; American Geriatrics Society; Emergency Nurses Association; Society for Academic Emergency Medicine; Geriatric Emergency Department Guidelines Task Force. Geriatric Emergency Department Guidelines. Ann Emerg Med. May 2014;63(5):e7-e25.
14. Carpenter CR, Bromley M, Caterino JM, Rosenberg M, Wilber ST. Optimal older adult emergency department care: Introducing multidisciplinary guidelines from American College of Emergency Physicians, American Geriatric Society, Emergency Nurses Association, and Society for Academic Emergency Medicine. J Am Geriatr Soc. Jul 2014;62(7):1360-1363.
15. Carpenter CR, Hwang U, Biese K, Carter D, Hogan T, Karounos M et al. ACEP Accredits Geriatric Emergency Care for Emergency Departments. ACEP Now 2017. http://acepnow.com/article/acep-accredits-geriatric-emergency-care-emergency-departments/. Accessed January 5, 2022.
16. Kennedy M, Lesser A, Israni J, Liu SW, Santangelo I, Tidwell N et al. Reach and Adoption of a Geriatric Emergency Department Accreditation Program in the United States. Ann Emerg Med. Apr 2022;79(4):367-373
17. Carpenter CR and Sherbino J. How does an "opinion leader" influence my practice? CJEM. Sep 2010;12(5):431-434.
18. Southerland LT, LoAX, Biese K, Arendts G, Banerjee J, Hwang U et al. Concepts in Practice: Geriatric Emergency Departments. Ann Emerg Med. Feb 2020;75(2):162-170.
19. Liu Y-L, Chu L-L, Su H-C, Tsai K-T, Kao P-H, Chen J-F et al. Impact of Computer-Based and Pharmacist-Assisted Medication Review Initiated in the Emergency Department. J Am Geriatr Soc. Nov 2019;67(11):2298-2304.
20. The 2019 American Geriatrics Society Beers Criteria Update Expert Panel. American Geriatrics Society 2019 Updated AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. J Am Geriatr Soc. Apr 2019;67(4):674-694.
21. Adelman RD, Tmanova LL, Delgado D, Dion BA, Lachs MS. Caregiver Burden – A Clinical Review. JAMA. 2014;311(10):1052-1060.
22. Kim HS, Kyle J, Strickland PT, Mullen KA, Lebec MT. Physical therapy in the emergency department: A new opportunity for collaborative care. Am J Emerg Med. Aug 2018;36(8):1492-1496.
23. Nagaraj G, Burkett E, Hullick C, Carpenter CR, Arendts G. Is delirium the medical emergency we know least about? Emerg Med Australas. 2016;28:456-458.
24. Carpenter CR, Banerjee J, Keyes D, Eagles D, Schnitker L, Barbic D et al. Accuracy of Dementia Screening Instruments in Emergency Medicine: A Diagnostic Meta-analysis. Acad Emerg Med. Feb 2019;26(2):226-245.
25. Arendts G, Burkett E, Hullick C, Carpenter CR, Nagaraj G, Visvanathan R. Frailty, thy name is… Emerg Med Australas. Aug 2017;29:1-5.
26. Hullick C, Carpenter CR, Critchlow R, Burkett E, Arendts G, Nagaraj G et al. Abuse of the older person: Is this the case you missed last shift? Emerg Med Australas. 2017:29:223-228
27. Sanon M, Baumlin KM, Kaplan SS, Grudzen CR. Care and Respect for Elders in Emergencies Program: A preliminary report of a volunteer approach to enhance care in the emergency department. J Am Geriatr Soc. Feb 2014;62(2):365-370.
28. Lee JS, Tong T, Tierney MC, Kiss A, Chignell M. Predictive Ability of a Series of Games to Identify Emergency Patients with Unrecognized Delirium. J Am Geriatr Soc. Nov 2019;67(11):2370-2375.
29. Yadgir SR. Machine learning-assisted screening for cognitive impairment in the emergency department. J Am Geriatr Soc. Oct 2021. On-line ahead of print.
30. Hogan TM, Richmond NL, Carpenter CR, Biese K, Hwang U, Shah MN et al. Shared Decision Making to Improve the Emergency Care of Older Adults: A Research Agenda. Acad Emerg Med. Dec 2016;23(12):1386-1393.
31. Carpenter CR, Shelton E, Fowler S, Suffoletto B, Platts-Mill TF, Rothman RE et al. Risk factors and screening instruments to predict adverse outcomes for undifferentiated older emergency department patients: a systematic review and meta-analysis. Acad Emerg Med. Jan 2015;22(1):1-21.
32. Carpenter CR and Mooijaart SP. Geriatric Screens 2.0: Time for a Paradigm Shift in ED Vulnerability Research. J Am Geriatr Soc. Jul 2020;68(7):1402-1405.
33. Meldon SW, Mion LC, Palmer RM, Drew BL, Connor JT, Lewicki LJ et al. A brief risk stratification tool to predict repeat emergency department visits and hospitalizations in older patients discharged from the emergency department. Acad Emerg Med. Mar 2003;10(3):224-232.
34. Hellstrom K, Sandstrom M, Waggart PH, Sandborgh M, Soderlund A, Adolfsson ET et al. Fall-Related Self-Efficacy in Instrumental Activities of Daily Living is Associated with Falls in Older Community-Living People. Phys Occup Ther Geriatr. 2013;31(2):128-139.
35. Moreland B and Lee R. Emergency Department Visits and Hospitalizations for Selected Nonfatal Injuries Among Adults > 65 Years – United States, 2018. MMWR May 7, 2021;70(18):661-666.
36. Carpenter CR, Cameron A, Ganz DA, Liu S. Older Adult Falls in Emergency Medicine: 2019 Update. Clin Geriatr Med. May 2019;35(2):205-219.
37. Carpenter CR and Malone ML. Avoiding Therapeutic Nihilism from Complex Geriatric Intervention "Negative" Trials: STRIDE Lessons. J Am Geriatr Soc. Dec 2020;68(12):2752-2756.
38. Hammouda N, Carpenter CR, Hung WW, Lesser A, Nyamu S, Liu S et al. Moving the Needle on Fall Prevention: A Geriatric Geriatric Emergency Care Applied Research (GEAR) Network Scoping Review and Consensus Statement. Acad Emerg Med. Nov 2021;28(11):1214-1227.
39. Melady D. Geriatric Emergency Medicine: Research priorities to respond to "The Silver Boom." CJEM. May 2018;20(3):327-328.
40. Tinneti M, Bogardus ST, Agostini JV. Potential Pitfalls of Disease-Specific Guidelines for Patients with Multiple Conditions. N Engl J Med 2004;351:2870-2874.
41. Wyatt KD, Stuart LM, Brito JP, Leon BC, Domecq JP, Prutsky GJ et al. Out of context: Clinical practice guidelines and patients with multiple chronic conditions: a systematic review. Med Care. 2014; 52 Suppl 3:S92-S100.
42. Bernard MA, Clayton JA, Lauer MS. Inclusion Across the Lifespan: NIH Policy for Clinical Research. JAMA Oct 2018;320(15):1535-1536.
43. Lockett J, Sauma S, Radziszewska B, Bernard MA. Adequacy of Inclusion of Older Adulte in NIH-Funded Phase III Clinical Trials. J Am Geriatr Soc. Feb 2019;67(2):218-222.
44. Lo AX and Carpenter CR. Balancing Evidence and Economics While Adapting Emergency Medicine to the 21st Century's Geriatric Demographic Imperative. Acad Emerg Med. 2020;27(10):1070-1073.
45. Hwang U, Dresden SM, Vargas-Torres C, Kang R, Garrido MM, Loo G et al. Association of Geriatric Emergency Department Innovation Program With Cost Outcomes Among Medicare Beneficiaries. JAMA Network Open 2021;4(3):e2037334.doi:10.1001/jamanetworkopen.2020.37334. Accessed January 15, 2022.

## Disclosure

None reported.

**MM**

# Emergency Medicine Telehealth: A Pandemic Becomes a Gateway for Virtual Care in Missouri

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**The digital transformation and evolution of our world will not exclude the field of medicine.**



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## Abstract

**Telehealth provides a novel bridge between patient needs and available resources. On-demand telehealth visits provide urgent medical services in a virtual setting. Telehealth can be used to provide care for patients despite geographical distance. Emergency Medicine quickly adapted in response to the COVID-19 pandemic through utilization of telehealth to solve various problems. Tele-triage was used to coordinate COVID-19 testing and treatment. Greater utilization of all current and emerging telehealth modalities could increase access and quality of care for all Missourians.**

## Introduction

In 1879, *The Lancet* published a case report of the first telehealth encounter of a physician evaluating a child for croup via the telephone, listening for the characteristic barking cough.[1] Despite extraordinary advances in telecommunication technology since then, the COVID-19 pandemic was the catalyst telehealth needed to become mainstream. Medicine as a whole (including emergency medicine) adapted quickly and dramatically in response to the pandemic, primarily via increased utilization of telehealth. Telehealth is the use of a variety of telecommunication technologies (commonly video, phone, or electronic health record) to provide a broad-range of health care services.[2,3] Telehealth communication can be synchronous (real-time) or asynchronous (delayed) in nature, and allows for information exchange between geographically separated providers, or between a provider and a patient.[4] As COVID-19 created previously unforeseen obstacles to healthcare, telehealth provided a bridge between patient needs and available resources.

Since that first 19th Century telehealth encounter, remote communication technology improved exponentially, further expanding the ways in which telehealth could be used to provide care and increase medical access. In particular, over the past few decades video conferencing tools and access to broadband networks built primarily for use unrelated to telehealth improved dramatically, but awaited mainstream adoption for medical applications. COVID-19 abruptly altered that equation. Pre-pandemic, telehealth was mostly still a novelty with limited uptake. Specific use cases, such as in Tele-Critical Care and Tele-Stroke, suggested improved outcomes (morbidity

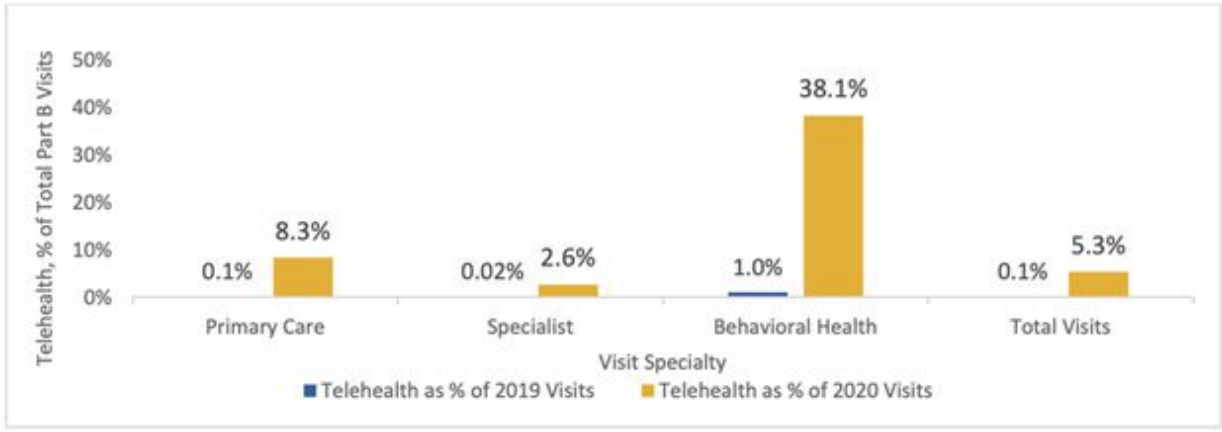



Figure 1: Compared with <1% telehealth use in 2019 across all categories, telehealth increased to 8.3% of all primary care visits and 2.6% of specialist visits in 2020. Visits to behavioral health specialists saw the largest increase in telehealth use during the pandemic, with 38.1% of all visits to these providers delivered by telehealth, compared with 1% in 2019.[27]

and mortality) utilizing telehealth in both single center trials and systematic reviews,[5,6] but adoption overall remained low. The reasons for low-adoption of telehealth was multifactorial, including start-up costs, billing and compliance regulatory hurdles, distrust and unfamiliarity with technology, cultural barriers related to practice change, provider preference, and patient expectations.[7] Almost overnight, those barriers became less onerous across the world in March 2020. With abrupt mandatory global wide lockdowns, the inertia to change in healthcare was no longer acceptable, forcing providers and patients to use telehealth to continue essential healthcare related services.

## COVID-19 in the Emergency Department

Novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which causes coronavirus disease 2019 (COVID-19) rapidly spread across the world in 2020. Amidst initial uncertainty regarding COVID-19 contagiousness, symptomatology, and severity in the early months of the pandemic,[8] the task of triage, diagnosis, treatment, and counseling fell primarily on physicians in emergency medicine (EM), intensive care, and hospitalist medicine, all while managing and treating other potentially critically ill patients.[9] Personal protective equipment was suddenly a scarce resource. The unknowns of virus transmission, morbidity, and mortality were a massive psychological strain on providers.[10,11] Personnel on the front lines were more likely to get sick first or be exposed,[12] further straining staffing ratios.[13] Furthermore, while collective cancellation of elective procedures and admissions resulted in an initial decrease in the volume of patients presenting to the emergency department (ED) during the pandemic, there was not a decrease in the number of medical emergencies.[14] Delay in presentations for medical emergencies was a possible cause of increased ED mortality seen despite lower overall patient volumes.[15]

## EM-Telehealth During COVID-19

Emergency Medicine, a specialty constantly faced with changing conditions and pressure to adapt, quickly realized telehealth could be utilized in a variety of ways to solve pandemic related challenges. Notably, EM providers are available to provide telehealth services around-the-clock, and have been aptly described as the "availabilists," a trait often overlooked, but critical to convenient and rapid care, both hallmark qualities of telemedicine.[16] Many acted heroically and nimbly, expeditiously creating telehealth-based solutions to ensure reliable access to patient care despite overwhelming barriers amidst the shifting landscape of COVID-19 unknowns.[17] In the prehospital setting, telehealth was used both for screening and evaluation prior to an ED visit for patients in facilities such as nursing homes or skilled nursing facilities, as well as for connecting first responders with emergency physicians

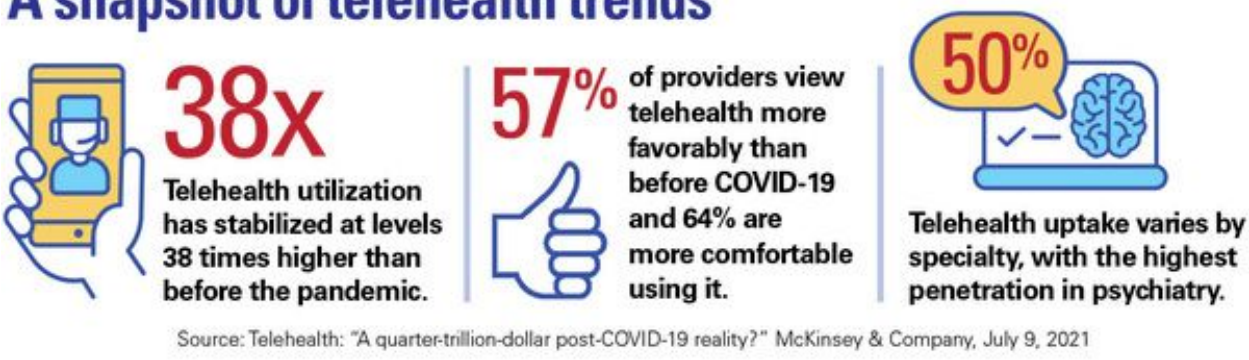



Figure 2: Summary of the utilization of, provider perception of, and uptake of telehealth after the COVID-19 pandemic.[35]

to help with triage and system level loading.[18] Within the ED, telehealth use grew to include remote attending supervision,[19,20] virtual evaluation to preserve personal protective equipment (i.e., 'e-PPE'),[21] and to connect patients with loved ones in the context of strict visitor policies.[22] Tele-specialist consultations for ED patients such as tele-stroke continued, but grew in many other specialties as well,[23,24] in particular for behavioral health patient evaluations with extended disposition times due to bed capacity issues (Figure 1). Toxicologists, the majority of which are emergency physicians, increasingly utilized telehealth, beyond just treating patients with substance use disorder.[25] Traditionally, most toxicologists are only available for consultation at academic institutions. With telehealth, they could provide consults in real-time at other hospitals allowing patients access to their expertise and potentially preventing long and costly transfers.[26]

Telehealth also was increasingly used in the post-ED discharge setting for ongoing monitoring of patients, particularly with COVID-19 oxygenation concerns.[28,29] This was a particularly effective strategy to allow for safe discharge and minimize exposures to others.

## Telehealth Legislation

Emergency Medicine is a specialty defined, in part, by operational flexibility.[30] During the COVID-19 pandemic, EM leveraged this flexibility to adopt telehealth, allowing increased access to care for patients. However, up to this time federal regulation authorized billing only for telehealth services to rural areas. To allow reimbursement for healthcare services provided via telehealth to all geographies, new directives were warranted. Effective March 6, 2020, the Centers for Medicare & Medicaid (CMS) approved reimbursement for telehealth services in a broader set of circumstances than previously allowed. This allowed for telehealth visits to be considered the same as regular in-person visits, with reimbursement at the same rate.[31] Furthermore, widespread use of telehealth during the COVID-19 pandemic required alterations to previous telehealth regulations regarding the Health Insurance Portability and Accountability Act (HIPAA).[32] With the transmissibility of COVID-19, many patients did not want to engage with in-person care, and providers themselves were concerned with unnecessary exposures, changing the typical patient encounter dynamic.[33] These changes in Medicare and HIPAA, along with Missouri House Bill Number 1617 passed in 2018, allowed for telehealth to be utilized in most settings and by any licensed health care provider, as long as the same standards of care were met in both telehealth visits and in-person visits.[34] These new laws permitted by Missouri and the national government allowed rapid telehealth growth for continued patient care. Adoption quickly escalated (Figure 2) due to favorable legislation because of the pandemic, but these laws are not guaranteed in perpetuity when the pandemic subsides.

## Telehealth Innovations In Missouri

Emergency Medicine organizations within the state of Missouri swiftly adapted to the pandemic utilizing telehealth. Examples include telehealth initiatives of Barnes Jewish Hospital/Washington University in St. Louis (BJH/WashU), University of Missouri -

Columbia, and Mosaic Life Care in northwest Missouri. BJH/WashU developed an on-demand telehealth service that was integrated with the electronic medical record (EMR) for synchronous and asynchronous patient evaluations, triage, and COVID-19 testing guidance. This setup allowed patients to access urgent care services from a variety of personal telecommunication devices (including mobile). Through this platform, patients were able to be evaluated for a variety of chief complaints and could have outpatient tests ordered; prescriptions electronically sent; or if needed, referred to an ED, primary care doctor, or outpatient clinic for in-person evaluation. One advantage this setup facilitated was remote COVID-19 testing, allowing patients to be evaluated virtually, and if indicated, sent to a drive-thru COVID-19 testing site. Through the implementation of on-demand telehealth visits, the physicians at BJH/WashU were able to divert possibly contagious COVID-19 patients away from the ED waiting rooms and manage their care in a remote fashion when indicated.

The University of Missouri's ED began utilizing telehealth for on-demand visits in early 2019. However, the potential benefits of those efforts in telehealth were not apparent until March of 2020 when the role of on-demand care during the COVID-19 pandemic became a necessity. As the ED leadership learned more about COVID-19 and CDC guidelines for testing were released, it became clear that an on-demand screening process in a controlled environment tied to a high-volume testing center was critical to the function of the healthcare system. Leaders from across the health system in information technology, EM, laboratory services, and ambulatory care collaborated to develop a workflow in which symptomatic or at-risk patients could be screened for COVID-19 24/7 by an advanced practice provider (APP). This collaboration, paired with an algorithm based upon CDC guidelines, allowed healthcare providers to increase visit capacity from about ten per day to over five hundred patient encounters per day.

Mosaic Life Care developed a system of tele-triage that utilized the flexibility of its emergency physicians. Emergency physicians at Mosaic established themselves as regional experts on COVID-19, becoming early adopters of monoclonal antibodies. However, as they began prescribing this therapy, they realized the complexities regarding eligibility-criteria caused confusion, leaving many eligible patients untreated. To address this problem, a few EM physicians became "COVID Physicians On-Call" for both their network of hospitals and the surrounding region. The physician on-call performed tele-triage, speaking directly to physicians and practitioners, assessing for onset of COVID-19 symptoms, comorbidities, and severity of illness. They then scheduled eligible patients for outpatient infusions or referred for ED evaluation. As of December 2021, they treated over 3,355 patients with monoclonal antibodies within the Mosaic hospital system.

## Future State of EM-Telehealth

The future of EM telehealth is bright as medicine enters the digital era alongside the rest of the world, transforming how we deliver care by utilizing technology to improve efficiency, quality, and safety. EM has the opportunity to be a leader in this space and grow exponentially with it, as almost no other specialist is armed with such a vast array of skills to catalyze patient-centered telehealth services. First, EM providers are "available" 24/7/365, a defining feature of the specialty.[36] Furthermore, local Tele-EM providers, as opposed to national and international telehealth companies, have access to "insider" information in their community to help arrange timely acute and follow-up care as needed. EM providers are also experts in triage, thriving on rapid decision making of the undifferentiated patient with limited information and benefiting from a broad knowledge base to allow for accurate triage.[37] Finally, EM providers are experienced in quickly establishing trust with new patients who are suffering, a skill that could be even more challenging in a virtual format.[38]

Within the ED, telehealth use for triage decisions both for new patient arrivals and inter-hospital transfers is a plausible role. This will likely become more essential over time as the COVID-19 pandemic highlighted system-wide bed capacity logistical issues that might not fade,[39] even if the pandemic wanes, given an ever-increasing geriatric population and a persistent healthcare labor shortage.[40] Especially in rural areas where local hospitals depend on a physician workforce that might not uniformly include physicians with extensive training and certification in EM, telehealth can offer a bridge to high quality care with triage, treatment, and disposition assistance.[41] A Tele-ED model allows high-quality emergency care simultaneously at multiple sites for critically ill patients in locations that do not see a high volume of these

patients. Utilizing a Tele-ED hub-and-spoke model, rural EDs are capable of handling clinical scenarios that would otherwise be difficult to train, staff, and plan for in resource-limited locations. This will allow some patients to receive care in local, smaller hospitals as opposed to being transferred to a larger medical center further away.[42]

Improving the triage process with tele-triage providers to decrease door-to-doctor-time might subsequently improve left-without-being-seen rates and department flow with early order placement. [44] Time critical diagnosis recognition (stroke activation, ECG interpretation, sepsis) will also be an opportunity for EM-telehealth providers to provide assistance and improve the quality of care that patients receive despite limited bedside staffing. The hub-and-spoke telehealth model lends itself to improved standards of care with core telehealth providers advising best practice protocols[45] (sepsis, lung protective ventilation, sedation, pulmonary embolism management, geriatric care, infection prevention). This model could decrease new knowledge translation time to the bedside for complex diseases with constantly evolving treatment guidelines. These effects are not just theoretical, they are resulting in increased quality of care presently. Telehealth use in remote and rural EDs demonstrated improved or equivalent clinical effectiveness, appropriate care processes, and—in certain contexts—improvement in speed of care.[43]

The future of EM-telehealth in the pre-hospital realm with emergency medical services is a prime opportunity and likely where most of the reach and growth of EM-telehealth will occur. Use cases abound primarily around the concept of "forward triage"[46] to help level load hospital systems, and direct patient care to the right place at the right time with an expert in triage—an EM provider (Table 1). Some of these opportunities are already live. In 2019, the emergency triage, treat, and transport (ET3) program was developed for EMS to treat patients at the scene of a call with the help of telehealth, or transport the patient to an alternative site like an urgent care or a doctor's office.[47] Although still in proof of concept/pilot stage, the ability to triage a patient at the point of contact to avoid an unnecessary ED visit or help guide the patient to the proper place of treatment could potentially be monumental in a value based health care system.[48] This concept should ultimately have positive financial impacts for hospital systems looking to avoid penalties on readmissions, insurance companies looking to avoid paying for high healthcare costs, medics for getting paid when not transporting patients, and patients themselves for lower healthcare spending. Forward triage by EM providers using on-demand telehealth evaluations to decrease unnecessary ED visits but still allow for expert evaluation is the future. Whether this is the "walking well" with minor care symptoms, EMS assisted such as with ET3, in skilled nursing facilities/assisted living/rehabilitation centers, tele-consults to other outpatient centers (urgent cares, primary care offices), private company partnerships, or community centers with "tele-booths" (shelters), EM-telehealth staffed by 24/7/365 experts in triage offers a solution. Finally, outside of critical triage roles, EM providers often wear many hats, more so than other specialties. Whether this is expertise in ultrasound, critical care, education, medical toxicology/substance use, global health, or EMS, it can be implemented and monetized in ways never before possible without telemedicine. Partnerships and contracts can be established near and far (state license depending) for best-in-class care in these domains without classic geographical, or even time zone restrictions.[49]

In-hospital telehealth consultation from EM providers may be a concept more challenging to envision as EM has historically stayed within the walls of the ED or in the pre-hospital setting. Of course, at one time, pre-hospital care disrupted the established order and took time to fully envision its scope. However, the skills of EM providers should not be limited to these areas as emergencies occur and need to be managed, regardless of location. Thus, a future use case where EM-telehealth leverages their skillset of expertise in resuscitation, management of the undifferentiated decompensating patient, triage, and procedural knowledge (troubleshooting, oversight via telehealth) could easily be imagined in the inpatient realm. Having access to an on-demand provider with these capabilities could improve patient outcomes, standardize treatments, leverage a smaller workforce, and decrease bedside provider stress/anxiety/burnout. EM expertise in a broad array of domains is an asset to be monetized and telehealth allows that at scale. This should appeal to EM programs looking for new/increased revenue models, and hospitals seeking to cut costs but maintain quality metrics. Telehealth also offers opportunities for EM physicians young

Table 1: Potential approaches and examples of patients who may qualify for telehealth based on input-throughput-output model of emergency care.36

| Emergency Care Phase | Potential Approaches | Examples of Potential Patient Presenting Concerns |
|---|---|---|
| Input | | |
| Unlikely to Need ED | • Asynchronous text-based messaging (or email)<br>• Telephone visits<br>• Synchronous audio-video visits<br>• Referral to primary care practices, retail clinics, or urgent care<br>• Virtual ED with outpatient coordination of diagnostic testing, if needed | • Asymptomatic hypertension in outpatient setting<br>• Patients being sent for test to avoid preauthorization<br>• Patients being sent for convenience of rapid specialty consultation<br>• Upper respiratory tract–type symptoms<br>• Potential Covid-19 testing without cardiovascular or neurological symptoms<br>• Sexually transmitted diseases<br>• Rashes<br>• Fever in healthy hosts<br>• Most extremity injuries<br>• Back pain |
| Reasonable to evaluate before deciding if they need to go to the ED | • Asynchronous text-based messaging (or email)<br>• Telephone visits<br>• Synchronous audio-video visits<br>• Referral to primary care practices, retail clinics, or urgent care<br>• Virtual ED with outpatient coordination of testing, if needed<br>• Community paramedicine<br>• Scheduled visits in the ED for patients who need ED but not emergently | • Abdominal pain<br>• Lacerations<br>• Asthma<br>• Infectious and pulmonary symptoms |
| Highly likely to need in-person evaluation in ED | • Community paramedicine<br>• Mobile stroke units<br>• Traditional 911 prehospital system | • Chest pain or new syncope in at-risk patient population (age or comorbidities)<br>• Stroke symptoms<br>• New difficulty breathing in patient without known asthma<br>• GI bleeding<br>• Significant trauma |
| Throughput | | |
| | • Tele-intake (tele-triage)<br>• Facial recognition software for registration<br>• Test ordering prior to or upon arrival<br>• Virtual rounds and family engagement<br>• Specialist consults by synchronous audio-video visits<br>• Interprofessional collaboration | • Most patients |
| Output | | |
| Moderately likely to be eligible for discharge from the ED rather than be admitted | • Digital discharge planning<br>• Text-based messaging<br>• Digital technology for home remote patient monitoring<br>• Community paramedicine<br>• Specialist consults by synchronous audio-video visits<br>• Hospital-at-home | • Most patients who would be placed in observation status<br>• Patients requiring antibiotic infusions<br>• Patients within 1–2 days of being ready for discharge (i.e., heart failure, chronic obstructive pulmonary disease, pneumonia, dehydration) |

and old to capitalize on geographical freedom, focus on wellness and avoid burnout, or less physically demanding work.[50]

## Challenges Ahead

Emergency Medicine, like all other specialties, is facing massive challenges to remain a competitive and profitable business. There will always be a need for EDs, without question, but how they are staffed (more APPs), the volumes they see, and the reimbursements they get could drastically change in the coming decade putting downward pressure on provider salaries and ED margins. As technology improves with Artificial Intelligence[51] and Machine Learning, organizations (both for-profit and nonprofit) will likely seek to utilize these tools to supplement a cheaper/less experienced workforce to maintain quality while increasing profits. In addition, current big tech companies (Amazon, Google, etc.) are actively trying to disrupt the healthcare industry via on-demand telehealth services they offer for low acuity complaints.[52] This could decrease ED volumes and revenue, and although at times frustrating, these lower acuity patients provide revenue to EDs that are essential. Finally, EM advocacy groups are constantly battling CMS for adequate reimbursement. Despite valiant efforts, the bureaucracy in medicine is overwhelming and unrelenting, making it challenging to maintain a financially sustainable business and be paid appropriately for services rendered. Emerging telehealth opportunities may help to alleviate some of these pragmatic challenges, while providing a patient-centered approach to 21st Century EM.

## Conclusion

Society is transforming, and as Marc Andreessen stated, "software is eating the world."[53] This digital transformation and evolution of our world will not exclude the field of medicine. In fact, COVID-19 just expedited it. Although there are challenges with telehealth and unknowns, society quickly embraced its benefits and is unlikely to retreat to yesterday's medicine. Patients from this point forward will expect access to telehealth as an option when outcomes are equal,[54] and will shift their consumer preferences to those who provide it, similar to preferences for web-based and mobile applications compared to their physical counterparts. EM must start planning for this future now as the shift to telehealth is still in its infancy. Younger generations will continue to be more facile with technology and expect its incorporation in their care as they grow older and acquire health issues. Telehealth is the next frontier for EM to innovate, lead, and grow. Important questions remain unanswered (patient satisfaction, cost savings, patient centered outcomes, health equity using telehealth, clinician wellness, etc.) as the gaps in knowledge around telehealth continue to be illuminated. The opportunity is now, and many Missouri EM programs have already seized the moment, embraced technology, and are boldly seeking ways to expand EM's reach and delivery of exemplary care to all patients in need, now in a more modern format. That is the ethos of EM, evolving virtually in front of our eyes.

## References

1. Aronson SH. The Lancet on the telephone 1876-1975. Med Hist 1977;21(1):69–87.
2. Mechanic OJ, Persaud Y, Kimball AB. Telehealth Systems [Internet]. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2022 [cited 2022 Mar 14]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK459384/
3. Hayden EM, Davis C, Clark S, Joshi AU, Krupinski EA, Naik N, et al. Telehealth in emergency medicine: A consensus conference to map the intersection of telehealth and emergency medicine. Acad Emerg Med 2021;28(12):1452–74.
4. Remote Consultation - MeSH - NCBI [Internet]. [cited 2022 Mar 14];Available from: https://www.ncbi.nlm.nih.gov/mesh/?term=%22Telecon sultation%22%5BMeSH+Terms%5D
5. Lilly CM, Cody S, Zhao H, Landry K, Baker SP, McIlwaine J, et al. Hospital mortality, length of stay, and preventable complications among critically ill patients before and after tele-ICU reengineering of critical care processes. JAMA 2011;305(21):2175–83.
6. Wilcock AD, Schwamm LH, Zubizarreta JR, Zachrison KS, Uscher-Pines L, Richard JV, et al. Reperfusion Treatment and Stroke Outcomes in Hospitals With Telestroke Capacity. JAMA Neurol 2021;78(5):527.
7. Lin C-CC, Dievler A, Robbins C, Sripipatana A, Quinn M, Nair S. Telehealth in health centers: Key adoption factors, barriers, and opportunities. Health Affairs 2018;37(12):1967–74.
8. Carpenter CR, Mudd PA, West CP, Wilber E, Wilber ST. Diagnosing covid-19 in the Emergency Department: A scoping review of clinical examinations, laboratory tests, imaging accuracy, and Biases. Academic Emergency Medicine 2020;27(8):653–70.
9. Nguyen J, Liu A, McKenney M, Liu H, Ang D, Elkbuli A. Impacts and challenges of the COVID-19 pandemic on emergency medicine physicians in the United States. Am J Emerg Med 2021;48:38–47.
10. Mercuri M, Clayton N, Archambault P, Wallner C, Boulos ME, Chan TM, et al. Canadian emergency medicine physician burnout: a survey of Canadian emergency physicians during the second wave of the COVID-19 pandemic. Can J Emerg Med [Internet] 2022 [cited 2022 Mar 14];Available from: https://link.springer.com/10.1007/s43678-021-00259-9
11. Kea B, Johnson A, Lin A, Lapidus J, Cook JN, Choi C, et al. An international survey of healthcare workers use of personal protective equipment during the early stages of the COVID-19 pandemic. Journal of the American College of Emergency Physicians Open [Internet] 2021 [cited 2022 Mar 14];2(2). Available from: https://onlinelibrary.wiley.com/doi/10.1002/emp2.12392
12 Nguyen LH, Drew DA, Graham MS, Joshi AD, Guo CG, Ma W, et al. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. The Lancet Public Health 2020;5(9):e475–83.
13. Lasater KB, Aiken LH, Sloane DM, et al. Chronic Hospital Nurse understaffing meets covid-19: An observational study. BMJ Quality & Safety 2020;30(8):639–47.

14. Boserup B, McKenney M, Elkbuli A. The impact of the COVID-19 pandemic on emergency department visits and patient safety in the United States. Am J Emerg Med 2020;38(9):1732–6.
15. Gutovitz S, Pangia J, Finer A, Rymer K, Johnson D. Emergency Department Utilization and Patient Outcomes During the COVID-19 Pandemic in America. The Journal of Emergency Medicine 2021;60(6):798–806.
16. Hollander J. History of EM Series: Judd Hollander [Internet]. emDOCs.net - Emergency Medicine Education. 2020 [cited 2022 Mar 14];Available from: http://www.emdocs.net/history-of-em-series-judd-hollander/
17. Jaffe TA, Hayden E, Uscher-Pines L, Sousa J, Schwamm LH, Mehrotra A, et al. Telehealth use in emergency care during coronavirus disease 2019: a systematic review. Journal of the American College of Emergency Physicians Open 2021;2(3):e12443.
18. Hollander JE, Carr BG. Virtually Perfect? Telemedicine for Covid-19. New England Journal of Medicine 2020;382(18):1679–81.
19. Hamm JM, Greene C, Sweeney M, Mohammadie S, Thompson LB, Wallace E, et al. Telemedicine in the emergency department in the era of COVID-19: front-line experiences from 2 institutions. Journal of the American College of Emergency Physicians Open 2020;1(6):1630–6.
20. Lin CH, Tseng WP, Wu JL, Tay J, Cheng MT, Ong HN, et al. A Double Triage and Telemedicine Protocol to Optimize Infection Control in an Emergency Department in Taiwan During the COVID-19 Pandemic: Retrospective Feasibility Study. Journal of Medical Internet Research 2020;22(6):e20586.
21. Turer RW, Jones I, Rosenbloom ST, Slovis C, Ward MJ. Electronic personal protective equipment: A strategy to protect emergency department providers in the age of COVID-19. J Am Med Inform Assoc 2020;27(6):967–71.
22. Lau J, Knudsen J, Jackson H, Wallach AB, Bouton M, Natsui S, et al. Staying Connected In The COVID-19 Pandemic: Telehealth At The Largest Safety-Net System In The United States. Health Affairs 2020;39(8):1437–42.
23. Hines AS, Zayas J, Wetter DA, Bridges AG, Camilleri MJ, McEvoy MT, et al. Retrospective analysis of 450 emergency department dermatology consultations: An analysis of in-person and teledermatology consultations from 2015 to 2019. J Telemed Telecare 2021;1357633X211024844.
24. Shah YS, Fliotsos MJ, Alaqeel A, Boland MV, Zafar S, Srikumaran D, et al. Use of Teleophthalmology for Evaluation of Ophthalmic Emergencies by Ophthalmology Residents in the Emergency Department. Telemed J E Health 2021.
25. Lin L, Fernandez AC, Bonar EE. Telehealth for Substance-Using Populations in the Age of Coronavirus Disease 2019: Recommendations to Enhance Adoption. JAMA Psychiatry 2020;77(12):1209–10.
26. Skolnik A. Telemedicine and Toxicology: Back to the Future? J Med Toxicol 2013;9(3):217–9.
27. Samson L, Tarazi W, Turrini G, Sheingold S. Medicare Beneficiaries' Use of Telehealth in 2020: Trends by Beneficiary Characteristics and Location [Internet]. ASPE. [cited 2022 Mar 14];Available from: https://aspe.hhs.gov/reports/medicare-beneficiaries-use-telehealth-2020
28. Whiteside T, Kane E, Aljohani B, Alsamman M, Pourmand A. Redesigning emergency department operations amidst a viral pandemic. Am J Emerg Med 2020;38(7):1448–53.
29. Annis T, Pleasants S, Hultman G, Lindemann E, Thompson JA, Billecke S, et al. Rapid implementation of a COVID-19 remote patient monitoring program. J Am Med Inform Assoc 2020;27(8):1326–30.
30. Ward MM, Ullrich F, MacKinney AC, Bell AL, Shipp S, Mueller KJ. Tele-emergency utilization: In what clinical situations is tele-emergency activated? J Telemed Telecare 2016;22(1):25–31.
31. Medicare Telemedicine Health Care Provider Fact Sheet | CMS [Internet]. [cited 2022 Mar 14];Available from: https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet
32. Affairs (ASPA) AS for P. Telehealth: Delivering Care Safely During COVID-19 [Internet]. HHS.gov. 2020 [cited 2022 Mar 14];Available from: https://www.hhs.gov/coronavirus/telehealth/index.html
33. Reeves JJ, Ayers JW, Longhurst CA. Telehealth in the COVID-19 Era: A Balancing Act to Avoid Harm. J Med Internet Res 2021;23(2):e24785.
34. House Bill NO. 1617. Vol 208.670 and 208.677. Jefferson City: 99th General Assembly; 2018.
35. A Fresh Perspective on Where Telehealth Growth Will Settle | AHA [Internet]. [cited 2022 Mar 14];Available from: https://www.aha.org/aha-center-health-innovation-market-scan/2021-07-20-fresh-perspective-where-telehealth-growth-will
36. Hollander J, Sharma R. The Availablists: Emergency Care without the Emergency Department. NEJM Catalyst Innovations in Care Delivery [Internet] 2021 [cited 2022 Mar 14];Available from: https://catalyst.nejm.org/doi/full/10.1056/CAT.21.0310
37. Burström L, Engström M-L, Castrén M, Wiklund T, Enlund M. Improved quality and efficiency after the introduction of physician-led team triage in an emergency department. Ups J Med Sci 2016;121(1):38–44.
38. McConnochie KM. Webside Manner: A Key to High-Quality Primary Care Telemedicine for All. Telemedicine and e-Health 2019;25(11):1007–11.
39. Kokudo N, Sugiyama H. Hospital capacity during the COVID-19 pandemic. GHM 2021;3(2):56–9.
40. Gutterman L. An Exploration of the Baby Boomer Crisis [Internet]. 2021 [cited 2022 Mar 14];Available from: http://d-scholarship.pitt.edu/40819/
41. Ward MM, Ullrich F, MacKinney AC, Bell AL, Shipp S, Mueller KJ. Tele-emergency utilization: In what clinical situations is tele-emergency activated? J Telemed Telecare 2016;22(1):25–31.
42. Natafgi N, Shane DM, Ullrich F, MacKinney AC, Bell A, Ward MM. Using tele-emergency to avoid patient transfers in rural emergency departments: An assessment of costs and benefits. J Telemed Telecare 2018;24(3):193–201.
43. Tsou C, Robinson S, Boyd J, Jamieson A, Blakeman R, Yeung J, et al. Effectiveness of Telehealth in Rural and Remote Emergency Departments: Systematic Review. Journal of Medical Internet Research 2021;23(11):e30632.
44. Joshi AU, Randolph FT, Chang AM, Slovis BH, Rising KL, Sabonjian M, et al. Impact of Emergency Department Tele-intake on Left Without Being Seen and Throughput Metrics. Academic Emergency Medicine 2020;27(2):139–47.
45. Mohr N, Hurst E, Mackinney A, Nash E, Carr B, Skow B. Telemedicine for Early Treatment of Sepsis. 2019. p. 255–80.
46. Ko K, Kurliand M, Curtis K, Palmer C, Naimer M, Rodi S, et al. Launching an Emergency Department Telehealth Program During COVID-19: Real-World Implementations for Older Adults. GEDC [Internet] [cited 2022 Mar 14];Available from: https://gedcollaborative.com/jgem/vol1-is7-launching-an-ed-telehealth-program-during-covid-19-real-world-implementations-for-older-adults/
47. Dalzell MD. 911 Doesn't Need To Mean a Trip to the ED. Manag Care 2019;28(6):23–5.
48. Powers JS. Value-Based Healthcare Transformation [Internet]. In: Powers JS, editor. Value Driven Healthcare and Geriatric Medicine: Implications for Today's Changing Health System. Cham: Springer International Publishing; 2018. p. 1–14.
49. Hiddleson C, Buchman T, Coiera E. Turning "Night into Day": Challenges, Strategies, and Effectiveness of Re-engineering the Workflow to Enable Continuous Electronic Intensive Care Unit Collaboration Between Australia and US. In: Cognitive informatics: reengineering clinical workflow for safer and more efficient care. 2019.
50. Udeh C, Udeh B, Rahman N, Canfield C, Campbell J, Hata JS. Telemedicine/Virtual ICU: Where Are We and Where Are We Going? Methodist Debakey Cardiovasc J 2018;14(2):126–33.
51. Mannam S. Applications of Deep Learning in Healthcare [Internet]. Journal of Young Investigators. [cited 2022 Mar 14];Available from: https://www.jyi.org/2020-august/2020/8/24/applications-of-deep-learning-in-healthcare
52. Thomason J. Big tech, big data and the new world of digital health. Global Health Journal 2021;5(4):165–8.
53. Andreessen M. Why Software Is Eating The World [Internet]. Wall Street Journal. 2011 [cited 2022 Mar 14];Available from: https://online.wsj.com/article/SB10001424053111903480904576512250915629460.html
54. Zulman DM, Verghese A. Virtual Care, Telemedicine Visits, and Real Connection in the Era of COVID-19: Unforeseen Opportunity in the Face of Adversity. JAMA 2021;325(5):437–8.

## Disclosure

None reported.

**MM**

# Anyone Anytime for Anything: The History of Emergency Medicine in Missouri

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**Emergency Medicine has come a long way in the last 50 years, and Missouri Emergency Medicine has been at the forefront of innovation in many areas.**



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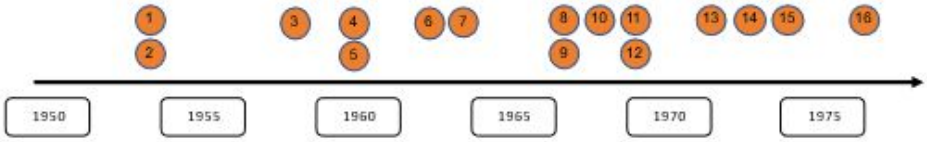
## Abstract

**The history of Emergency Medicine (EM) in Missouri reflects the larger history of EM as a burgeoning specialty throughout the United States, but with some important and unique contributions that may not be generally appreciated. We discuss historical events and important leaders of EM, but there are many we could not mention. Much of the information comes from personal interviews with the physicians who "were in the room where it happened.".**

**We hope the article will illuminate the progress made in caring for critical illness and injury through the development of a new specialty focused on that goal. We recognize there are many emergency physicians not mentioned that have played a large role in maintaining and growing the academic programs, improving the delivery of care through administrative and legislative actions, and navigating the specialty through enormously challenging times.**

## Introduction

Emergency Medicine became a reality about 60 years ago, recently enough to still be in living memory of many of its pioneers. During the 1960s and early 1970s, there was a cascade of events, discoveries, and innovations that led to recognizing a need for and feasibility of a specialty designed to treat life-threatening illness and injury (Figure 1). By the late 1960s the groundwork for treating several life-threatening conditions, including cardiac arrest, had been established. Now physicians knowledgeable and skilled in these life-saving procedures were needed to implement these changes. Recognizing the unique challenges facing practitioners dedicated to diagnosing and managing the full spectrum of medical and surgical emergencies, eight physicians formed the American College of Emergency Physicians (ACEP) in 1968. In 1969 these founders held their first annual scientific assembly.[1] In 1970, the first "emergency medicine" resident began training at the University of Cincinnati in a two-year curriculum granted by the American Medical Association under a Family Practice program.[2] This was followed in 1971 by an Emergency Medicine (EM) program at the Medical College of Pennsylvania and the first




| Nr. | Year | Activity |
|---|---|---|
| 1 | 1954 | Robert H. Kennedy's American College of Surgeon's Oration on Trauma identifies the ER as the "weakest link" in the chain of hospital care of the injured |
| 2 | 1954 | Flint's *Emergency Treatment and Management* is first modern textbook of EM |
| 3 | 1958 | Peter Safer demonstrates efficacy of mouth-to-mouth ventilation |
| 4 | 1960 | Zoll, et al. NEJM Demonstrates successful treatment of Vfib with external electric current |
| 5 | 1960 | Kouwenhoven, et al. JAMA Closed chest cardiac massage |
| 6 | 1962 | Lown develops DC defibrillator, Kouwenhoven makes it portable |
| 7 | 1964 | Spann et al report ventricular arrhythmias in 50% acute MI |
| 8 | 1966 | National Academy of Sciences publishes "Accidental Death and Disability, the Neglected Disease of Modern Society" which led to the 1966 Federal Highway Safety Act |
| 9 | 1966 | Highway Safety Act gave states funding for emergency services |
| 10 | 1967 | Pantridge publishes "A Mobile Intensive Care Unit in the Management of Myocardial Infarction" in the Lancet |
| 11 | 1968 | American College of Emergency Physicians is founded |
| 12 | 1968-1973 | Peak fighting in Vietnam war brings innovations in trauma care to civilians |
| 13 | 1971 | First residency in Emergency Medicine begins at Cinncinnati |
| 14 | 1973 | EMS Systems Act provided grants for developing regional emergency and trauma systems |
| 15 | 1974 | First Advanced Life Support Guidelines published |
| 16 | 1976 | First Advanced Trauma Life Support Class |

Figure 1. Timeline of events, clinical innovations, educational and legislative activities leading to the development of Emergency Medicine

academic department of Emergency Medicine at the University of Southern California. By 1975, there were 31 residencies in EM, including one in Kansas City, Missouri, and one in St. Louis.[2]

The 1970s saw the seeds of EM first sprout across Missouri. While beginning as a tale of two cities, the story quickly developed into a multi-regional effort to develop clinical, educational, and legislative opportunities that would improve emergency care throughout the state. We begin with emergency care in St. Louis public and private hospitals and academic medical centers in the 1960s.

## The St. Louis Story

The history of EM in St. Louis is intricately connected to the public hospitals and academic medical centers. In the early 1960s, St. Louis had three public hospitals. St. Louis City Hospital, built in 1846 (renamed Max C. Starkloff in 1942) served the white population of St. Louis (Figure 2). Homer G. Phillips Hospital, opened in 1937 and served the African American population of St. Louis. St. Louis County Hospital opened in 1931, caring for indigent county residents.[3] These hospitals, along with three adult and two pediatric hospitals associated with Washington University and Saint Louis University, were staffed by academic faculty and volunteer physicians in private practice. Attending physicians were not present in the emergency departments (ED).

Some private hospitals also provided emergency care and had various models of ED staffing. Most were staffed by one or more nurses who, after assessing the patient, would contact an on-call physician or the patient's private physician for medical orders. As physicians became reluctant to take every week-end call, hospitals found an alternative. Tom Cooper, having recently graduated from medical school at Indiana University, started a physician staffing program in St. Louis. He recalls being hired in 1970 to cover hospitalized patients at the old DePaul Hospital, followed by an ED staffing contract in 1971.[4]

Initially, contracts provided week-end shift coverage, provided by "moonlighting" residents from one of the affiliated teaching hospitals. Residents were hired to staff 60-hour shifts at $10/hour. These shifts were particularly prevalent and popular in the more rural hospitals. Within a year or so residents were covering Monday through Thursday overnight shifts as well.[4] It was not until 1973 or '74 that St.

Louis area hospitals began to have licensed physicians staffing the ED 24/7. These physicians were often not board-certified, consisting of residents and fellows. During this time-period, academic centers traditionally divided the ED into a medical and surgical side, staffed accordingly with residents from the primary specialties of Medicine and Surgery. Patients were triaged to one area or the other by a triage nurse. Junior assistant residents were often the sole provider of care. Theoretically, they had access to more senior physicians as back-up at the teaching hospitals, but this rarely included actual attending physicians apart from surgeons for operative intervention.




Figure 2. Physicians and administrators in front of City Hospital (Max Starkloff Hospital) circa 1946

Two decades earlier, this ED staffing model had been described as the "weakest link" in the chain of trauma care.[5] Allen Klippel, a Washington University surgeon, started a two-year EM residency program at St. Louis City Hospital in 1973 to help correct this weakest link in the chain of care. The program was terminated two years later. There would not be another allopathic EM residency in St. Louis for more than 20 years.

That is not to say that progress stood still. In the late 1970s, under the direction of Samuel Bonney, a general surgeon by training, Saint Louis University Hospital (SLUH) committed to 24/7 ED coverage by full-time, board-certified physicians who were academic faculty. None were EM trained. As was the case across America, extensive on-the-job training and continuing medical education were essential. In 1979, Larry Lewis who had completed a residency in Internal Medicine at Jewish Hospital, was hired by Bonney and helped build a core group of physicians with the requisite skills and knowledge needed for the job. Lewis became the co-director of the ED in 1985 along with Joseph Stothert, MD, of the Trauma Service. Following a five-year practice period, he and many of his colleagues sat for the board examination in EM, which had been approved by the American Board of Medical Specialties in 1979.

In 1989, with the support of the medical school and other SLUH emergency physicians, Lewis applied for an EM residency program. Unfortunately, the application was not approved. While the ED saw a wide mix of cases, many with high acuity, it was felt that a census of 25,000 patients per year was too low.[6] Despite this setback, the 1980s saw attending physician coverage proliferate across EDs in St. Louis, either through small private hospital-based groups or larger contract management groups. Physicians board-certified in emergency medicine however, remained scarce.[7] Spectrum Emergency Care, organized and run by Drs. Tom Cooper and Joe Gatewood, staffed several hospitals in the St. Louis area and throughout Missouri, including Barnes Hospital.

In the early 1990s the Barnes Hospital ED, which was affiliated with Washington University School of Medicine, was still functioning under a resident-run model of care, using contracted physicians to "supervise" the residents. In late 1993, John Atkinson, MD, the newly appointed chair of Internal Medicine at Washington University, asked Lewis to review the ED clinical model. Lewis confirmed what Atkinson already knew from two prior department surveys. Both understood that for the department to be successful, the culture would need to change. Atkinson asked Lewis to take charge of the department in 1994, agreeing to support the development of a residency program. A core group of



Figure 3. Dr. McNabney (second from left) watches as Joseph Waeckerle performs chest compressions. Truman Medical Center Emergency Medicine residency circa 1975.

emergency physicians came with Lewis from SLUH, including Drs. Brent Ruoff, Rosanne Naunheim, and John Fortney. Additional faculty were hired, including Drs. Doug Char and Dane Chapman, who would be the inaugural program director. In 1997, Washington University initiated a four-year residency in EM, primarily situated at Barnes-Jewish and St. Louis Children's Hospital. Dr. Char took over as residency program director in 2001, growing the training program and adding several fellowships over his 15 years at the helm. In 2004 Ruoff became the Chief of EM, helping the program to flourish, both academically and geographically, hiring subspecialty faculty in anticipation of developing specialty fellowships, and providing staffing across multiple hospitals in the BJC system.[8]

In 2008, Saint Louis University Hospital, whose ED volume had grown significantly over the years, was approved for a three-year residency program in EM under the leadership of Laurie Byrne, MD, as Chief of Emergency Medicine and Vijai Chauhan, MD, as the inaugural Program Director.

## The Kansas City Story

Unlike initial events in St. Louis, Kansas City had early success initiating and sustaining an EM residency program which has graduated nearly 400 residents to date and will celebrate its 50th anniversary in 2023. W. Kendall McNabney, MD, a general surgeon by training, established the program in Kansas City in 1973 (Figure 3). McNabney's interest in EM began during his residency at Kansas City General Hospital (which became Truman Medical Center and is now University Health) and continued during his military experience in Vietnam and Cambodia. Following his return to General Hospital in 1970, he was named Director of the Trauma Service and the hospital's first Director of Emergency Services.

At that time, General Hospital had very few full-time staff, relying mostly on volunteer staff to supervise the interns and residents on the floors. Physician staffing in the ED consisted of rotating interns during the weekday and one or more moonlighting residents at night and weekends. Following McNabney's return from military service, this began to change. Staffing consisted of McNabney, an internist, and several part-time physician staff. All moonlighting ceased and all medicine, surgical, and Ob-Gyn residents were required to spend two months during their PG-1 year and one month during their PG-2 year in the ED. To enlarge the resident base, resident physicians were solicited from training programs outside of General Hospital for a one to three month experience working in the ED. Inquiries returned asking if this was for a residency program in EM. The answer at the time was "no," but the seed had been planted.[9]

In 1972 General Hospital established a department of Emergency Health Services within the hospital bylaws, resulting in parity with the departments of Internal Medicine, Surgery, Radiology, Pathology and Obstetrics-Gynecology. Correspondingly, these departments were recognized within the University of Missouri-Kansas City School of Medicine's new innovative six-year curriculum shortly before the new residency program was established. As a result, there was not the same degree of ownership or turf wars regarding the running of the ED that was encountered at other older traditional medical centers. By 1973, there

were about a dozen EM programs in the United States, most less than one year old, but there was no roadmap for how to teach emergency medicine.

McNabney, recognizing the need for curriculum development, attended a 1973 University Association of Emergency Medicine (UA/EM) workshop in Hamilton, Ontario, which focused on establishing training programs in EM. That year he started the Kansas City EM program with four residents. At the time of his retirement in 1986, McNabney said, "More than anything, the Emergency Medicine Residency Program has been my proudest accomplishment during my career at TMC [Truman Medical Center]".

William (Bill) Robinson, MD, an early graduate of the UMKC program, became Chair of EM following McNabney's retirement and reflects that it was "a period of extraordinary evolution for emergency medicine and I felt lucky to have been a part of it." The most important change was the emerging acceptance of emergency medicine as a valued specialty. The demand for EM-trained, board-certified physicians was significant in the private sector almost instantly, but it took longer to convince more traditional medical centers that EM could meaningfully contribute to the provision of clinical services, training resident physicians and students, and carrying out medical research.

While there are many UMKC contributions to the pioneering efforts of EM, Joseph Waeckerle, MD, one the first residents, merits recognition. He had a profound impact on generations of emergency physicians and the entire clinical and academic field of emergency medicine. Waeckerle became the founder of the Emergency Medicine Residents' Association and was the first residency-trained president of UA/EM, later to become the Society for Academic Emergency Medicine (SAEM). He also served as Editor-in-Chief of *Annals of Emergency Medicine* from 1989-2002. For these contributions, Waeckerle received the James D. Mills Outstanding Contribution to Emergency Medicine Award from the American College of Emergency Physicians (ACEP) in 2002.

## Springfield, Columbia, and Joplin

The evolution of EM in more rural areas paralleled that of the two larger cities. With private staff physicians increasingly reluctant to cover patients in the ED 24/7, there was a clear need for competent full-time ED coverage. To staff these hospitals, many primary care physicians, like Roger Willcox, MD, made the transition to EM.[10]

In the late 1970s, Willcox was working in Branson, Missouri, as a family physician. His general practice group covered the local ED which, like many rural hospitals, did not have dedicated physician staffing. After Willcox attended an ACEP Scientific Assembly in 1976, he was hooked. Given the energy and excitement of the new specialty he noted, "I could not have done anything else." Willcox caught the eye of the physicians at Cox Hospital in Springfield for his care of survivors of a helicopter crash, and he was offered a job in their ED in 1977. Two years later, he became medical director of the ED across town, at St. John's Hospital (now Mercy Hospital Springfield). At the time, Springfield was unique in that both hospitals were seeing upwards of 100 patients per day in the ED, with each hospital staffed by an independent group.[9] By 1990, when Ted McMurry, MD, started at St. John's Hospital, he notes that almost all the physicians were board-certified in EM, with half of them residency trained like himself.[11]

In 1980, Willcox returned to his hometown of Columbia to become the medical director at Boone Hospital Center. Like other hospitals, Boone was looking for dedicated full-time, preferably board-certified physicians. While Willcox successfully made the transition to EM, becoming board-certified in 1984, he acknowledged that a significant number of physicians did not and "over time were weeded out."

The University of Missouri Hospital (now MU Health) also had several pioneers in EM. Frank Mitchell, MD, who trained in general and thoracic surgery, returned from military service in 1959 and recognized the need to upgrade civilian prehospital care to that of military standards. Over the next decade and a half, he would take the lead in Missouri to develop training programs for ambulance attendants to become emergency medical technicians and paramedics. He also led the effort to develop standards for trauma centers nationwide and recognized the need for full-time emergency physicians to staff the ED.12 In 1982 Mitchell hired Dean Nierling, MD, after a chance encounter enroute to a medical meeting. Nierling became medical director and took over the training

Table 1. Current Fellowships in Emergency Medicine Offered in Select Missouri Programs

| Fellowship | Year started* |
|---|---|
| Pediatric EM* | 1992 |
| EMS | 2005 |
| Critical Care | 2009 |
| Toxicology | 2011 |
| Ultrasound | 2012 |
| Medical Education/simulation* | 2012 |
| Research | 2012 |
| Administration* | 2016 |

* These fellowships are offered at multiple EM residencies. Year started is for the initiation of the first program at any of the EM residencies in the state.

of the EMTs and paramedics. He was well liked and respected, and was working towards an EM residency at MU Health, but unfortunately died before this could happen.[13]

William Womack, MD, a family physician in Chillicothe started his EM career in 1977 moonlighting 60-hour weekend shifts at Hedrick Medical Center (HMC). He was hired in 1982 to be their one and only full-time ED physician. In 1988 Mitchell met Womack while working with HMC to install a helicopter pad and recruited him to join the faculty at the University of Missouri, where he served as the ED medical director from 1994-2002 and recalls that a residency site review done in the early 1990s concluded the ED volume was too low to support an EM residency.[14]

As the ED census grew, there was a renewed effort to start a residency program at MU Health. In 2011 Marc Borenstein, MD, joined the faculty as chair of EM, with that goal. A three-year program was approved in 2013. Borenstein was the initial program director with Brian Bausano taking over in 2015.

Freeman Hospital in Joplin also has a residency program in EM, with its first residents starting in 2001. John Dougherty, DO who was Director of Medical Education at Freeman, was instrumental in the development of the program. In 2018, the three-year program became Accreditation Committee on Graduate Medical Education certified.[15,16]

## The Role of Organized Medicine

Emergency Medicine in Missouri received significant benefit from organized medicine, but it also made significant contributions as well. The Missouri Chapter of the American College of Emergency Physicians (MOCEP) was formed in 1978. Charter members included Joe Waeckerle, MD, and Ralston R. Hannas, MD, a "founding father" of emergency medicine. Hannas was the co-organizer of the first EM Scientific Assembly, chairman of the committee that formed the American Board of Emergency Medicine and helped start the EM residency program at Northwestern.[17] Over the years, many Missouri emergency physicians, too many to list, have played key roles on national committees and effected real change in emergency medical care.

By the mid-1980s, MOCEP brought together academic, urban and rural emergency physicians from around the state to be included on the board of directors. In 1987, the statewide Combined Clinical Conference had its first educational meeting, bringing together EMTs, paramedics, emergency nurses and emergency physicians.[18] The enthusiasm and collegiality for the new specialty was infectious. During its early years, to its benefit, MOCEP contracted with Missouri State Medical Association (MSMA) to provide an executive director, office space, and guidance. Over the years, MOCEP has found its place in the House of Medicine, working with MSMA on critical legislative issues and statewide initiatives to improve patient care.

## The New Millennium

Missouri now has five EM residency programs, graduating 47 board-eligible emergency medicine physicians every year. With the nationwide growth in programs, the new millennium has seen a shift in staffing to residency trained physicians. More EM residents are interested in post-graduate specialized training, spurring the development of several fellowship programs (Table 1). The past few decades have led to a revolution in time-dependent therapies for life-threatening conditions such as myocardial infarction, stroke, trauma, and sepsis. Emergency Medicine has been as responsible as any specialty in pushing the envelope to rapidly diagnose and treat these conditions.[19,20] A general belief held by the early academic and practicing pioneers in EM, both in Missouri and elsewhere, was that clinical care must drive the other two legs of the "tripartite" academic mission. One cannot teach students and residents how to best care for patients unless it is demonstrated to them, and medical research without

clinical bedside implementation has minimal impact on patient care. Consequently, EM has been a leader in advancing clinical care through research and implementation[21-23] and has stood as the safety net for all, something starkly illustrated during the COVID-19 global pandemic.[24]

Another important characteristic among our earliest academic EM leaders was their leadership style. They considered the people working 24/7 under them as their most important constituents, rather than the upper echelons of hospital or medical school administration. They inherently recognized something codified by the Marriott organization; that ONLY by treating your workers in the best way can you ensure extraordinary services to your customers [patients].[25]

Emergency Medicine has come a long way in the last 50 years, and Missouri EM has been at the forefront of innovation in many areas.[26-30] There continue to be new and recurring challenges facing the specialty, both nationally and locally.[31,32] Many of us nearing the end of our careers might prefer the old challenges to the new ones, but EM is secure with amazing new leaders who are more than capable of taking the reins and navigating the evolving iterations of our specialty with a continued patient-centered focus.

## References


1. Suter RE. Emergency Medicine in the United States: a systemic review. World J Emerg Med 2012;3:5-10. DOI: 10.5847/wjem.j.1920-8642.2012.01.001
2. Zink BJ. A Brief History of Emergency Medicine Residency Training in: Anyone, Anything, Anytime-A History of Emergency Medicine. Mosby 2006
3. Missouri Historical Society https://mohistory.org/collections/item/P0966
4. Tom Cooper, Lewis personal communication 8.13.2021.
5. Robert H. Kennedy "Oration on Trauma" American College of Surgeons' Clinical Congress. 1954. Atlantic City, New Jersey
6. St. Louis University Hospital Emergency Medicine Residency Review Committee report. 1989
7. Steele MT, Lewis LM. Schwab RA, Perez NM, Watson WA. Emergency medicine credentials in St. Louis and Kansas City: does the presence of an emergency medicine residency program have a geographic difference? Ann Emerg Med 1996;28:27-30. doi: 10.1016/s0196-0644(96.70134-8.
8. Douglas Char & Lawrence Lewis, Szewczyk Personal communication. December 2021
9. W. Kendall McNabney, Department of Emergency Health Services, Truman Medical Center-University of Missouri-Kansas City School of Medicine, July 30, 1979
10. Roger Willcox, Szewczyk personal communication 8.18.2021
11. Ted McMurray, Lewis personal communication 8.11.2021
12. Potter, Erik. Battlefield Lessons: Trauma care in mid-Missouri owes a lot to American soldiers fighting overseas. Mizzou Magazine, May 21, 2013 https://mizzoumag.missouri.edu/2013/05/battlefield-lessons/index.html
13. Carol Nierling, Szewczyk personal communication 8.16.2021
14. William Womack, Szewczyk personal communication 12.20.2021
15. Brenda Barger-Saunders, Szewczyk personal communication 12.21.21
16. Linkedin, https://www.linkedin.com/in/john-dougherty-do-facofp-38274136/
17. Misssouri College of Emergency Physicians, Awards and Grants, https://mocep.org/grants-awards/
18. Missouri College of Emergency Physicians, The History of MOCEP, https://mocep.org/about/the-history-of-mocep/
19. Gorelick AR, Gorelick PB, Sloan EP. Emergency department evaluation and management of stroke: acute assessment, stroke teams, and care pathways. Neurologic Clinics 2008;26:923-942
20. Rivers E, Nguyen B, Havstad S, Ressler J, Muzzin A, Knoblich B, Peterson E, Tomlanovich M. for the early goal-directed therapy collaborative group. Early goal-directed therapy for the treatment of severe sepsis and septic shock. N Engl J Med 2001; 345:1368-1377. DOI: 10.1056/NEJMoa010307
21. Hedges JR. The knowledge translation paradigm: historical, philosophical, and practice perspectives. Acad Emerg Med. 2007;14:924-27. doi: 10.1197/j.aem.2007.06.016924
22. Diner BM, Carpenter CR, O'Connell T, Pang P, Brown MD, Seupaul RA, Celentano JJ, Mayer D, for the KT-CC Theme IIIa members. Graduate medical education and knowledge translation: role models, information pipeline, and practice change thresholds. Acad Emerg Med 2007; 14:1008-1014
23. Neta G, Glasgow RE, Carpenter CR, Grimshaw JM, Rabin BA, Fernandez ME, Brownson RC. A framework for enhancing the value of research for dissemination and implementation. American Journal of Public Health 2014;105:49-57. https://doi.org/10.2105/AJPH.2014.302206
24. Kline JA, Burton JH, Carpenter CR, Meisel ZF, Miner JR, Newgard CD, Quest T, Martin IBK, Holmes JF, Kaji AH, Bird SB, Coates WC, Lall MD, Mills AM, Ranney ML, Wolfe RE, Dorner SC. Unconditional care in academic emergency departments. Acad Emerg Med 2020;27: 527-28.
25. Vision and Mission of Marriott International Company. https://studycorgi.com/marriott-international-company-human-resources-management
26. Ablordeppy EA, Drewry AM, Beyer AB, Theodoro DL, Fowler SA, Fuller BM, Carpenter CR. Diagnostic accuracy of central venous catheter placement by bedside ultrasound versus chest radiography in critically ill patients: a systematic review and meta-analysis. Crit Care Med 2017;45:715-724 doi: 10.1097/CCM.0000000000002188.
27. Fuller BM, Mohr NM, Drewry AM, Carpenter CR. Lower tidal volume at initiation of mechanical ventilation may reduce progression to acute respiratory distress syndrome: a systematic review. Crit Care 2013 Jan 18;17(1.:R11. PMID: 23331507
28. Marks LR, Munigala S, Warren DK, Liang SY, Schwarz ES, Durkin MJ. Addiction Medicine consultations reduce readmission rates for patients with serious infections from opioid use disorder. Clinical Infectious Diseases 68;2019:1935–1937 https://doi.org/10.1093/cid/ciy924
29. Lewis LM, Carpenter CR, Jotte R, Schwarz E. Healthcare provider wellness in the time of COVID and beyond. Missouri Medicine 2021;118:13-17. PMID: 33551471
30. Carpenter CR, Melady D, Krausz C, Wagner J, Froelke B, Cordia J, Lowery D, Ruoff BE, Byrne LE, Miller DK, Lewis LM. Improving emergency department care for aging Missourians: guidelines, accreditation, and collaboration. Missouri Medicine.2017;114:447-452
31. McKenna P, Heslin SM, Vicellio P, Mallon WK, Hernandez C, Morley EJ. Emergency department and hospital crowding: causes, consequences, and cures. Clin Exp Emerg Med 2019;6(3.:189-195. https://doi.org/10.15441/ceem.18.02232.
32. Lin M, Battaglioli M, Melamed M, Mott SE, Chung AS, Robinson DW. High prevalence of burnout among US emergency medicine residents: results from the 2017 national Emergency Medicine wellness survey. Ann Emerg Med 2019;74:682-690. doi.org/10.1016/j.annemergmed.2019.01.037


## Disclosure

None reported. **MM**

# ADHD Diagnostic Trends: Increased Recognition or Overdiagnosis?

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**For those who have been struggling with unrecognized ADHD, there are significant impacts to mental health, social life, and work life. Thoughtful diagnosis and subsequent treatment can make all the difference.**



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## Abstract

**The prevalence of Attention Deficit Hyperactivity Disorder (ADHD) has seen a consistent rise in recent years. These numbers spark a debate over the reason for the observed trends, with some concerned about over diagnosis and over prescription of stimulant medications, and others raising the issue of diagnostic disparities, particularly in underrepresented populations. In this paper we look at both sides, starting with the history of ADHD and its diagnostic criteria changes, from early concepts of alterations in attention and hyperactivity in the 19th and 20th century, to its introduction in the Diagnostical and Statistical Manual of Mental Disorders (DSM), and its evolution into how it is defined today. The general broadening of ADHD diagnostically over time plays a role in the increased prevalence over the years, but it is not the only reason. Increased awareness of physicians and the public is also believed to play a big role, particularly in underrepresented minorities and women. However, there continues to be disparities in detection of ADHD in these groups. There are significant consequences to a patient's social, interpersonal, and professional life when ADHD is left unrecognized and untreated. Thoughtful evaluation, accurate diagnosis, and adequate treatment can make a big difference.**

## Case History

Agatha has been struggling with school work since starting college in the fall. She always had difficulty paying attention in certain subjects, but did fairly well in high school. Lately she has been feeling more anxious because her study habits that worked throughout high school no longer seem to be effective. She feels completely inundated by the sheer volume and difficulty of her current assignments. She finds herself constantly procrastinating, regularly feeling guilty about her inability to adhere to deadlines. Problem sets are riddled with careless errors and papers contain numerous typos and grammatical errors. Sometimes, especially after doing poorly on an exam, guilt and anxiety about school become so high that she simply shuts down and avoids doing any work for the rest of the day. She has seen a lot of ADHD content on TikTok recently, and wonders if she may have ADHD herself. Her college

friend has offered her Adderall, and while she hasn't taken it without a prescription, she wonders if she may benefit from it.

## Introduction

The past couple of decades have seen a continuous increase in attention deficit hyperactivity disorder (ADHD) diagnoses. National population surveys reflect an increase in the prevalence from 6.1% to 10.2% in the 20-year period from 1997 to 2016 and experts continue to debate and disagree on the causes for this trend.[1] On the one hand, while there are children whose diagnoses are irrefutable and undeniably require treatment, some experts worry about the risk of overdiagnosis and subsequent over prescription of stimulants and other psychotropics. Like with most psychotropic medications, treatment consideration needs to be carefully weighed with regards to potential adverse outcomes. For stimulants there is also concern for diversion and misuse of the medication for performance enhancement rather than for treatment. On the other hand, diagnostic disparities and underdiagnosis exist in various communities, including women and underrepresented minorities, as seen with Agatha. In this article, we aim to better understand the debate about the growing number of those affected by reviewing how ADHD morphed into the diagnosis we know today, and the variability and disparities observed.

## Attention Deficit Hyperactivity Disorder: The Basics

Attention Deficit Hyperactivity Disorder is a neurodevelopmental disorder that globally affects 5% - 7.2% of youth and 2.5% - 6.7% of adults.[2-4] Recent estimates indicate that prevalence is even higher in children in the United States (U.S.), around 8.7% or 5.3 million.[5] Although it has long been conceptualized as a disorder of childhood, up to 90% of children with ADHD continue to experience symptoms into adulthood.[6] Obtaining a diagnosis in adulthood is also possible, as in one study, 75% of adults with ADHD were not previously diagnosed in childhood.[7] While in childhood the male to female ratio is 4:1, the ratio is closer to 1:1 in adults.[8]

Attention Deficit Hyperactivity Disorder is thought to be caused by a combination of factors: genetic, neurobiologic, and environmental. Twin studies show that ADHD is highly hereditable (60-70%), and scientists have identified a number of genes believed to underlie vulnerability to the disorder.[9] This includes genes that regulate the expression of Brain Derived Neurotrophic Factor, which plays a role in learning and memory, as well as those involved in modulation of the brain's dopaminergic system.[9] Environmental risk factors like perinatal complications and toxic exposures are also believed to play a role.[9-10]

ADHD is a clinical diagnosis, which is accomplished through questionnaires, clinical interview, and in some cases, neuropsychiatric testing. While neuroimaging studies suggest a potential correlation between ADHD and white matter volume abnormalities in cortico-striatal pathways and the prefrontal cortex in study samples, biomarkers are not currently sensitive enough to assist with diagnosis.

The treatment for ADHD is often a combination of medication, skill building, and psychotherapy. In the 1930s, Charles Bradley, MD, noticed a drastic improvement in children's behavior and school performance after administration of amphetamine sulfate—a drug he was hoping would help treat headaches. That serendipitous discovery led to the development of other stimulants, a class of medications that is still considered the gold standard and first line ADHD treatment. Pharmacologic therapy is reported to be effective in up to 70% of cases, yet the benefits are not without risk.[11] The most common side effects are decreased appetite, anxiety, nausea, headaches, and in children in particular, concern about tolerance, weight loss, and insomnia. Data on long-term stimulant use also remains limited. A recent literature review found long-term use to be generally safe, but authors did advise providers to use caution when prescribing stimulants to pre-school age children, adolescents at high risk of abuse, and children with tics and psychosis.[12]

There are also many non-pharmacological modalities of treatment for ADHD, including behavioral parent training and mindfulness-based attention training.[13-14] Psychotherapy, especially cognitive behavioral techniques, has also been shown to be quite effective.[11] Finally, a newer non-pharmacological approach, neurofeedback, has some benefits, though clinical application remains logistically challenging. More research is required into its efficacy.[15]

Table 1. Changes in diagnostic determination for ADHD between the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV and V editions

| | DSM-IV | DSM-V |
|---|---|---|
| **Number of symptoms required** | 6 or more in either inattention of hyperactivity domains | 6 or more in either domain if <17 years old, OR<br>5 or more in either domain if >17 years old |
| **Age of symptom onset** | <7 years | <12 years |
| **Impairments at onset** | Onset of impairment <7 years | Not required |
| **Pervasiveness** | "Evidence of *impairment* in 2 or more settings" | "Evidence of *symptoms* in 2 or more settings" |
| **Autism exclusionary?** | Yes | No |

## ADHD: Changes in Diagnostic Criteria Over Time

To understand its diagnostic trends, it is important to consider the origins of ADHD and its diagnostic criteria. In the Eighteenth century, Sir Alexander Crichton wrote one of the earliest documented clinical descriptions of a disorder in attention in his 1798 book *On Attention and its Diseases.* He described "morbid alterations" of attention that "render [individuals] incapable of attending with constancy to any one object of education."[16] Although not globally recognized and treated at the time, his observations bear striking similarities to modern descriptions of the inattention domains of ADHD.

In the early 1900s, British physician Sir George Frederic Still described a number of children with a "defect of moral control."[17] Although more similar to the modern concepts of conduct disorder (CD) or oppositional disorder (ODD), his description identified a number of features typically seen in ADHD like impulsivity and impaired frustration tolerance. Later, in the 1930s, physicians Kramer and Pollnow wrote about children with "hyperkinetic disease of infancy", a syndrome that more closely resembled modern ADHD descriptions including both hyperactivity, emotional excitability and impulsivity, and inattention.[17]

ADHD made its first appearance in the Diagnostic and Statistical Manual of Mental Disorders (or DSM) in 1968, as "Hyperkinetic Reaction of Childhood." As the name implies, the emphasis was on overactivity and distractibility. In the years that followed, and with subsequent editions of the DSM, there was a clear shift in focus towards attention deficit as the defining feature of the disorder. The publication of the DSM-III in 1980 gave rise to the diagnosis of "attention deficit disorder," or ADD, a term that remains part of popular vernacular to this day. The DSM-III also introduced a cutoff for the number of symptoms to earn the diagnosis, as well as age at onset, symptom duration, and exclusion of confounding psychiatric disorders and substance use.

The label ADHD that we know and use today first appeared in 1987 with the DSM-III-R, and combined both inattention and hyperactivity domains into one diagnosis. Then, the DSM-IV iteration divided the diagnosis into three subtypes: predominantly inattentive, predominantly hyperactive-impulsive, and combined type. The release of the DSM-V in 2013 saw the definition of ADHD broaden significantly. The changes are summarized in Table 1. One such change allowed for autism spectrum disorder (ASD) and ADHD to coexist, which was not the case in previous iterations. Given the high comorbidity between ADHD and ASD, it is clear that this change, along with others (Table 1), contributed to the rise in ADHD prevalence, as it added a large group of children who were previously excluded.[18]

Clearly, the evolution of the diagnostic criteria accounts for some of the rise in ADHD. In fact, Polanczyk and his collaborators have done a lot of work on ADHD epidemiology—and they have consistently demonstrated that the observed variability in prevalence rates across various studies

Table 2. Example of questions clinicians can ask when assessing for ADHD. Adapted from "Integrative Treatment for Adult ADHD: A Practical, Easy-to-use Guide for Clinicians" by Ari Tuckman (New Harbinger Publications, 2007). Broader questions can often elicit more information and will allow clinicians to explore more in depth than a memorizable check-list.

| Helpful Diagnostic Questions for Clinicians |
|---|
| Could you describe how it feels when you have to sit through a long movie or meeting? |
| Tell me how you did with being attentive in class in middle school compared to other students? |
| What is your experience when you try to read or focus on work for an extended period of time? |
| Have you ever made a mistake on an exam or at work that could have easily been prevented? |
| Do you often lose things like your keys or cell phone? If so, what do you do to keep track of them? |
| How likely are you to remember to do a task without writing it down (make a phone call, water the plants, do the laundry etc..) |
| What happens when you have a lot of tasks to do and need to get them all done? |
| Tell me about your ability to focus on things you like and want to do as opposed to harder less exciting things. |
| Do your friends and family ever ask you if you are paying attention to them? Do you feel you need to ask them to repeat something? Do you sometimes pretend you heard the conversation but actually didn't? |
| Do you ever feel the urge to say whatever is on your mind right there and then, sometimes interrupt people? Does it ever get you in trouble with others? For example, losing friendships, or having difficulties with your boss? |
| Do you drink coffee? If so, how much and how do you notice it affects you? |
| ***Note to clinicians:** In addition to the questions mentioned above, you can rely on close observation of patient presentation to help in your diagnosis. A few things to consider include: Is the patient late? Have they missed any appointments before this one? Does the patient talk fast and is difficult to interrupt? Do they forget the question you asked and often ask you to repeat things? Are they constantly fidgeting or moving around? Do you see piles of papers in their bag, or on zoom, a mess behind them? |

was attributed largely to differences in measurement of outcomes, namely the criteria used to diagnose ADHD and the inclusion or exclusion of functional impairment.[19-20]

The changing criteria only makes clinical diagnosis more difficult. In the absence of biomarkers, diagnosis is made by signs and symptoms. Some helpful questions for screening by clinicians are suggested in Table 2. However, this leaves a lot up to the clinician, and may lead to under and over diagnosis. Due to the overlapping nature of psychiatric symptoms, ADHD is often missed, and patients end up with inaccurate psychiatric diagnoses and medication regimen. This latter point is important as we now know ADHD has high rates of psychiatric comorbidities, such as behavioral aberrances (52%), anxiety (33%), depression (17%), and autism (14%). While this may lead to overdiagnosis, more likely than not, ADHD can be misdiagnosed as a result, and subsequently inadequately treated.[21] Screening tools have been developed and validated for detection of ADHD in adults such as WHO's Adult ADHD Self Report Scales or ASRS and many clinicians will ask for reports from schools and loved ones as well.[22] Referring to neuropsychiatric testing is also an option, though it is expensive and not required to make the diagnosis.

## ADHD: Increased Awareness, Increased Prevalence

Outside of simply diagnostic changes, studies have provided other explanations for the rise in ADHD, including increased awareness and familiarity of physicians and the public with the diagnosis, geographic location and cultural differences, as well as other public health related factors such as improved access to care.[23] ADHD has even earned its own Awareness Month as of October of 2004. A quick search on Google Trend shows a steady increase in ADHD-related searches throughout the years, with popularity in March 2022 at the highest it has ever been (Figure 1).

ADHD has also become prominent in popular culture. Characters with problems in attention and hyperactivity can be found all over early literary works

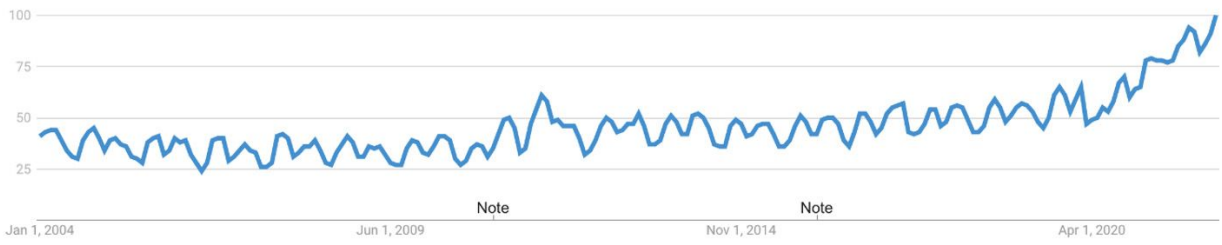



Figure 1. Google search trends for the term "ADHD", from 2004 to present

- physician Heinrich Hoffman wrote short stories in the mid-1800s featuring characters like "Fidgety Philip" and "Johnny Look-in-the-Air," the names of which alone indicate hyperactivity and inattention as core features of the characters.[24] Today, a number of movies and television characters have ADHD as part of their plotline and defining features - from Barney Stinson on "How I Met Your Mother," to Phil Dunphy on "Modern Family," and even Bart Simpson. Social media has also propelled ADHD into popular awareness, as it has taken over platforms like TikTok and Twitter. As of May 2022, the hashtag #adhd has 11.4 billion views on TikTok. Many people credit these platforms with helping them realize they had the diagnosis and subsequently seeking treatment for it. However, as is always the case with the internet and social media, misinformation about ADHD is fairly prevalent. A recent study has found that more than half of ADHD content on TikTok was misleading, most of them posted by non-health care providers.[25] That same study however did show that content posted by health care providers was overwhelmingly more accurate and useful to consumers.[25]

## ADHD and Undertreatment

While there is concern from rising ADHD diagnoses, a U.S. national survey reported in 2006 that only 11% of adults with ADHD were being treated for it. This is critical as deficits in organization and time management can lead to major educational, professional, or financial problems, with higher drop-out rates, higher unemployment rates, and lower income attainment in adults with ADHD.[26] Deficits can also have major interpersonal implications, with higher rates of divorce documented in adults with ADHD, for example.[27] People with untreated ADHD are also at elevated risk of substance use, car accidents, unintentional injuries, depression, anxiety, and suicide.[28] In other words, underdiagnosis has significant implications, far beyond inability to focus.

Some have raised concerns over non-medical use of stimulants. Non-medical use is most studied in student populations, where medications can function as either a cognitive enhancer, or are used recreationally. However, while some studies reported non-prescribed use of stimulants in about 7% of college students, most of the misuse was in the setting of attentional difficulties impairing the student's ability to succeed in class.[29] This is a possible indication that said student has undiagnosed ADHD, and not a desire to use the medication to get ahead. More importantly, a recent review has found that pharmacological treatment of ADHD was associated with a decreased risk of substance use, not the opposite.[30]

## Disparities in ADHD Diagnosis in Minoritized Populations

Any discussion of ADHD diagnostic trends would be incomplete without a review of disparities among minoritized population. Increasing awareness of these disparities might be contributing to the increase in rates of diagnosis. Over the past 20 years, available literature showcases the presence of pervasive disparities in ADHD diagnosis related to both race and gender. For instance, between 2004-2006, Black students were more likely than their White counterparts to have ADHD symptoms (12% vs. 7% respectively), but were less likely to have received a diagnosis (9% vs. 14% respectively).[31] During the following decade, rates of diagnosis among Black individuals grew at a rate 3 times higher than among White individuals.[32] Similar

trends have been seen among girls, who demonstrated a 3 times higher increase in diagnosis rates than boys over the past two decades.[32-33] In fact, with regard to gender, experts have attributed changes in DSM-IV diagnostic criteria to recent diagnostic trends. Following changes that placed increased focus on inattention, rather than hyperactivity, there was a correspondingly significant increase in ADHD diagnosis among females.[34] Specifically, between 1991 and 2008, diagnosis rates increased by a factor of 5.6 in girls compared to only 3.7 in boys.[35] In other words, knowing girls and underrepresented groups are more likely to have missed diagnoses, and even present with different symptoms, patients and clinicians might be asking more questions as a result. The rise might be due to the fact that these groups are just simply finally diagnosed, rather than over-diagnosed.

Even still, the data suggests we still are missing groups and underdiagnosing ADHD for many. To date, recent findings indicate that ADHD continues to be less frequently diagnosed in youth who are Black Indigenous and Persons of Color (BIPOC) and female, compared to those who are White and male, even after controlling for potential confounders such as socioeconomic status and adverse childhood experiences.[36-37] Girls continue to be diagnosed at older ages than boys and tend to endorse higher levels of perceived stress.[38] Reasons for these disparities stem from a multitude of systems level factors, however racial and gender bias is likely to play a major role. For example, diagnosis of any mental illness, especially ADHD, depends on individual interpretations of behavior and the way that a clinician integrates multiple informant reports from parents, caregivers, and teachers. Studies have found that clinicians tend to be more responsive to White parents who solicit an ADHD diagnosis and treatment for their child compared to BIPOC parents.[39] Further, BIPOC youth with ADHD are disproportionately more likely to be misdiagnosed with ODD or CD.[40-41]

ADHD manifests differently across gender, as there may be stronger social pressures for girls to sit quietly compared to boys. In fact, studies show that boys have historically been more likely to exhibit hyperactivity and disruptive behaviors, prompting earlier detection of the disorder, compared to those with inattentive symptoms, a group that most often includes girls.[42] Interestingly, other studies have indicated there to be no true difference in level of hyperactivity across gender, rather a bias among teachers leading to under-recognition of hyperactive symptoms among girls.[43] While some are concerned about the overdiagnosis of ADHD, there are still many groups who are underdiagnosed and unaccounted for in the data. Ultimately, focusing on the idea of "overdiagnosis" among providers may be harmful, particularly for these populations, as this may present additional barriers to them receiving appropriate care.

## Conclusion

ADHD is not a new phenomenon, however its prevalence has increased significantly in the recent years. Given changing diagnostic criteria and increasing awareness of the disorder in marginalized populations, especially individuals of color and females, this finding is not surprising. The general public has become increasingly more aware of ADHD through the media and social media. People are more likely to bring up their concerns to a physician, which in turn might prompt more numbers of people to be diagnosed. While some may argue that the increase is concerning and due to intentional feigning of symptoms in order to gain access to stimulant medication or test accommodations, the evidence suggests these groups have a negligible impact on diagnostic trends. In fact, as medical providers, focus on the idea of "overdiagnosis" may instead be harmful, create additional barriers to care, and add to the stigma towards their requests for help. It is important, instead, to approach patients holistically, and with an understanding of both the risks of treatment and undertreatment in mind. For those who have been struggling with unrecognized ADHD, there are significant impacts to mental health, social life, and work life. Thoughtful diagnosis and subsequent treatment can make all the difference.

## References

1. Xu G, Strathearn L, Liu B, Yang B, Bao W. Twenty-Year Trends in Diagnosed Attention-Deficit/Hyperactivity Disorder Among US Children and Adolescents, 1997-2016. JAMA Netw Open. 2018;1(4):e181471. Published 2018 Aug 3. doi:10.1001/jamanetworkopen.2018.1471.
2. Posner J, Polanczyk GV, Sonuga-Barke E. Attention-deficit hyperactivity disorder. Lancet. 2020;395(10222):450-462. doi:10.1016/S0140-6736(19)33004-1.
3. Thomas R, Sanders S, Doust J, Beller E, Glasziou P. Prevalence of attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. Pediatrics. 2015;135(4):e994-e1001. doi:10.1542/peds.2014-3482.
4. Song P, Zha M, Yang Q, Zhang Y, Li X, Rudan I. The prevalence of adult attention-deficit hyperactivity disorder: A global systematic review and meta-analysis. J Glob Health. 2021;11:04009. Published 2021 Feb 11. doi:10.7189/jogh.11.04009.

5. Bozinovic K, McLamb F, O'Connell K, et al. U.S. national, regional, and state-specific socioeconomic factors correlate with child and adolescent ADHD diagnoses pre-COVID-19 pandemic. Sci Rep. 2021;11(1):22008. Published 2021 Nov 10. doi:10.1038/s41598-021-01233-2.
6. Sibley MH, Arnold LE, Swanson JM, et al. Variable Patterns of Remission From ADHD in the Multimodal Treatment Study of ADHD. Am J Psychiatry. 2022;179(2):142-151. doi:10.1176/appi.ajp.2021.21010032.
7. Faraone SV, Spencer TJ, Montano CB, Biederman J. Attention-deficit/hyperactivity disorder in adults: a survey of current practice in psychiatry and primary care. Arch Intern Med. 2004;164(11):1221-1226. doi:10.1001/archinte.164.11.1221.
8. Palladino VS, McNeill R, Reif A, Kittel-Schneider S. Genetic risk factors and gene-environment interactions in adult and childhood attention-deficit/hyperactivity disorder. Psychiatr Genet. 2019;29(3):63-78. doi:10.1097/YPG.0000000000000220.
9. Núñez-Jaramillo L, Herrera-Solís A, Herrera-Morales WV. ADHD: Reviewing the Causes and Evaluating Solutions. J Pers Med. 2021;11(3):166. Published 2021 Mar 1. doi:10.3390/jpm11030166.
10. Zayats T, Neale BM. Recent advances in understanding of attention deficit hyperactivity disorder (ADHD): how genetics are shaping our conceptualization of this disorder. F1000Res. 2019;8:F1000 Faculty Rev-2060. Published 2019 Dec 5. doi:10.12688/f1000research.18959.2.
11. Jensen PS, Arnold LE, Swanson JM, et al. 3-year follow-up of the NIMH MTA study. J Am Acad Child Adolesc Psychiatry. 2007;46(8):989-1002. doi:10.1097/CHI.0b013e3180686d48.
12. Krinzinger H, Hall CL, Groom MJ, et al. Neurological and psychiatric adverse effects of long-term methylphenidate treatment in ADHD: A map of the current evidence. Neurosci Biobehav Rev. 2019;107:945-968. doi:10.1016/j.neubiorev.2019.09.023.
13. Ciesielski HA, Loren REA, Tamm L. Behavioral Parent Training for ADHD Reduces Situational Severity of Child Noncompliance and Related Parental Stress. J Atten Disord. 2020;24(5):758-767. doi:10.1177/1087054719843181.
14. Modesto-Lowe V, Farahmand P, Chaplin M, Sarro L. Does mindfulness meditation improve attention in attention deficit hyperactivity disorder?. World J Psychiatry. 2015;5(4):397-403. Published 2015 Dec 22. doi:10.5498/wjp.v5.i4.397.
15. Micoulaud-Franchi JA, Geoffroy PA, Fond G, Lopez R, Bioulac S, Philip P. EEG neurofeedback treatments in children with ADHD: an updated meta-analysis of randomized controlled trials. Front Hum Neurosci. 2014;8:906. Published 2014 Nov 13. doi:10.3389/fnhum.2014.00906.
16. Crichton A. An inquiry into the nature and origin of mental derangement: on attention and its diseases. Reprint published in J Atten Disord. 2008;12(3):200-206. doi:10.1177/1087054708315137.
17. Lange KW, Reichl S, Lange KM, Tucha L, Tucha O. The history of attention deficit hyperactivity disorder. Atten Defic Hyperact Disord. 2010;2(4):241-255. doi:10.1007/s12402-010-0045-8.
18. Zablotsky B, Bramlett MD, Blumberg SJ. The Co-Occurrence of Autism Spectrum Disorder in Children With ADHD. J Atten Disord. 2020;24(1):94-103. doi:10.1177/1087054717713638.
19. Polanczyk G, de Lima MS, Horta BL, Biederman J, Rohde LA. The worldwide prevalence of ADHD: a systematic review and metaregression analysis. Am J Psychiatry. 2007;164(6):942-948. doi:10.1176/ajp.2007.164.6.942.
20. Posner J, Polanczyk GV, Sonuga-Barke E. Attention-deficit hyperactivity disorder. Lancet. 2020;395(10222):450-462. doi:10.1016/S0140-6736(19)33004-1.
21. McIntosh D, Kutcher S, Binder C, Levitt A, Fallu A, Rosenbluth M. Adult ADHD and comorbid depression: A consensus-derived diagnostic algorithm for ADHD. Neuropsychiatr Dis Treat. 2009;5:137-150. doi:10.2147/ndt.s4720.
22. Kessler RC, Adler L, Ames M, et al. The World Health Organization Adult ADHD Self-Report Scale (ASRS): a short screening scale for use in the general population. Psychol Med. 2005;35(2):245-256. doi:10.1017/s0033291704002892
23. Xu G, Strathearn L, Liu B, Yang B, Bao W. Twenty-Year Trends in Diagnosed Attention-Deficit/Hyperactivity Disorder Among US Children and Adolescents, 1997-2016. JAMA Netw Open. 2018;1(4):e181471. Published 2018 Aug 3. doi:10.1001/jamanetworkopen.2018.1471.
24. Heinrich Hoffmann. The Story of Johnny Look-in-the-Air. Adam Matthew Digital; 2020.
25. Yeung A, Ng E, Abi-Jaoude E. TikTok and Attention-Deficit/Hyperactivity Disorder: A Cross-Sectional Study of Social Media Content Quality [published online ahead of print, 2022 Feb 23]. Can J Psychiatry. 2022;7067437221082854. doi:10.1177/07067437221082854.
26. Bernfort L, Nordfeldt S, Persson J. ADHD from a socio-economic perspective. Acta Paediatr. 2008;97(2):239-245. doi:10.1111/j.1651-2227.2007.00611.x.
27. Biederman J, Faraone SV, Spencer TJ, Mick E, Monuteaux MC, Aleardi M. Functional impairments in adults with self-reports of diagnosed ADHD: A controlled study of 1001 adults in the community. J Clin Psychiatry. 2006;67(4):524-540. doi:10.4088/jcp.v67n0403.
28. Massuti R, Moreira-Maia CR, Campani F, et al. Assessing undertreatment and overtreatment/misuse of ADHD medications in children and adolescents across continents: A systematic review and meta-analysis. Neurosci Biobehav Rev. 2021;128:64-73. doi:10.1016/j.neubiorev.2021.06.001.
29. DuPaul GJ, Weyandt LL, O'Dell SM, Varejao M. College students with ADHD: current status and future directions. J Atten Disord. 2009;13(3):234-250. doi:10.1177/1087054709340650.
30. Wilens TE, Woodward DW, Ko JD, Berger AF, Burke C, Yule AM. The Impact of Pharmacotherapy of Childhood-Onset Psychiatric Disorders on the Development of Substance Use Disorders. J Child Adolesc Psychopharmacol. 2022;32(4):200-214. doi:10.1089/cap.2022.0016.
31. Coker TR, Elliott MN, Toomey SL, et al. Racial and Ethnic Disparities in ADHD Diagnosis and Treatment. Pediatrics. 2016;138(3):e20160407. doi:10.1542/peds.2016-0407.
32. Fairman KA, Peckham AM, Sclar DA. Diagnosis and Treatment of ADHD in the United States: Update by Gender and Race. J Atten Disord. 2020;24(1):10-19. doi:10.1177/1087054716688534.
33. Collins KP, Cleary SD. Racial and ethnic disparities in parent-reported diagnosis of ADHD: National Survey of Children's Health (2003, 2007, and 2011). J Clin Psychiatry. 2016;77(1):52-59. doi:10.4088/JCP.14m09364.
34. Robison LM, Skaer TL, Sclar DA, Galin RS. Is attention deficit hyperactivity disorder increasing among girls in the US? Trends in diagnosis and the prescribing of stimulants. CNS Drugs. 2002;16(2):129-137. doi:10.2165/00023210-200216020-00005.
35. Sclar DA, Robison LM, Bowen KA, Schmidt JM, Castillo LV, Oganov AM. Attention-deficit/hyperactivity disorder among children and adolescents in the United States: trend in diagnosis and use of pharmacotherapy by gender. Clin Pediatr (Phila). 2012;51(6):584-589. doi:10.1177/0009922812439621.
36. Fadus MC, Ginsburg KR, Sobowale K, et al. Unconscious Bias and the Diagnosis of Disruptive Behavior Disorders and ADHD in African American and Hispanic Youth. Acad Psychiatry. 2020;44(1):95-102. doi:10.1007/s40596-019-01127-6.
37. Shi Y, Hunter Guevara LR, Dykhoff HJ, et al. Racial Disparities in Diagnosis of Attention-Deficit/Hyperactivity Disorder in a US National Birth Cohort. JAMA Netw Open. 2021;4(3):e210321. Published 2021 Mar 1. doi:10.1001/jamanetworkopen.2021.0321.
38. Isaksson J, Nilsson KW, Lindblad F. The Pressure-Activation-Stress scale in relation to ADHD and cortisol. Eur Child Adolesc Psychiatry. 2015;24(2):153-161. doi:10.1007/s00787-014-0544-9.
39. Leslie LK, Plemmons D, Monn AR, Palinkas LA. Investigating ADHD treatment trajectories: listening to families' stories about medication use. J Dev Behav Pediatr. 2007;28(3):179-188. doi:10.1097/DBP.0b013e3180324d9a.

## Disclosure

None reported.

**MM**

# A Summary of Maternal Mortality in Missouri: A Historical Perspective (1999-2018)

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**Improved social supports and counseling for pregnant and postpartum patients is critical to minimize the impact of postpartum depression, substance use, and suicide maternal mortality.**



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## Abstract

**The rate of maternal mortality in the United States (U.S.) is higher than any other industrialized nation, at 23.8 per 100,000 deliveries from 2000-2014. Although maternal mortality ratios decreased by 44% globally from 1990 to 2015, emerging evidence suggests that maternal mortality in the U.S. has been increasing.[2-4] One study quotes 700 maternal deaths every year, with 50,000 "near misses."[1] By one metric, Missouri ranks as the 44th-worst state for maternal mortality in the U.S.[5]**

## Pregnancy-Associated Mortality Review

Maternal mortality is defined by the U.S. Centers for Disease Control and Prevention (CDC) as deaths in pregnancy or within one year postpartum.[6] Provider error, patient/family factors, and systems issues are among the main factors contributing to maternal mortality. Provider errors may arise from unexpected complications, misdiagnoses, ineffective treatments, and medical errors. Patient or family factors include a lack of knowledge of warning signs to seek urgent care, suggesting a role for better patient and family education about such warning signs. Systems issues may include lack of coordination and communication (such as suboptimal hand-offs between teams at change of shift), need for protocols to address rare events, or lack of access to care. Many states have established "Pregnancy-Associated Mortality Review" (PAMR) boards to help elucidate root causes of maternal mortality cases, under liability protections to shield those boards from liability or discovery. In 2018, Missouri legislators created a PAMR board to analyze maternal deaths in our state.[7]

It is important to note that the CDC distinguishes pregnancy-associated deaths and pregnancy-related deaths. Pregnancy-associated deaths are deaths in which pregnancy was incidental to the immediate cause of death (i.e. tornado, earthquake, motor vehicle accident), whereas pregnancy-related deaths are deaths due to a pregnancy complication (such as eclampsia or amniotic fluid embolism). The distinction between pregnancy-related and pregnancy-associated deaths is important in determining the most appropriate actions necessary to decrease maternal mortality.

## Key Findings of 2018 PAMR Report

Published in July 2021, the 2018 Missouri PAMR report[9] analyzed the deaths of 68 women who lost their lives during or in the year following pregnancy. Key findings include:

- 82% of all pregnancy-related deaths that year had a "good chance" (39%) or "some chance" (43%) of being preventable.
- Overall pregnancy-related mortality ratio (PRMR) of 33 per 100,000 live births.
- Significant racial disparities exist, with PRMR for Black women at 87.6 per 100,000 live births, which was four times greater than that for White women (21.9 per 100,000).
- Homicide accounted for 25% of pregnancy-associated but not pregnancy-related deaths.
- Though 15% of live births were to Black mothers, Black women represented 71% of pregnancy-associated homicide deaths in 2018.
- The rate of pregnancy-associated deaths was more than four times higher for women on Medicaid than for women with private health insurance.
- The majority (63%) of pregnancy-related deaths were between 43 days and one year postpartum.
- Mental health conditions were the underlying cause of 50% of pregnancy-related deaths.
- While substance use disorder (SUD) is a mental health condition, it is identified by a separate checkbox on death certificates and contributed to 54% of deaths attributed to mental health conditions.
- Injury-related deaths were most often from overdoses/poisonings (49%) and motor vehicle crashes (28%).

## Comparison to Overall U.S. Trends

Significant racial disparities in maternal mortality are reflected in national and state-level trends. In the U.S., Black women were 2.5 times more likely to experience maternal mortality compared to non-Hispanic white women.[9-10] Missouri's 2018 data showed Black women are over four times more likely to die than White women. The National Center for Health Statistics reported a maternal mortality rate of 17.4 per 100,000 live births and a late maternal mortality (between 42 days and 1 year after delivery) rate of 7.2 per 100,000 live births in 2018.[10] This contrasts with Missouri data showing a higher incidence of maternal mortality after 42 days postpartum (63%) in 2018.[9] In one study of the CDC Pregnancy Mortality Surveillance System for 2007-2016, the pregnancy-related mortality ratio was 5.2 times higher for Black women with a college education compared to their White counterparts.[10]

Maternal mortality from direct obstetric causes, such as hemorrhage, pregnancy-related hypertension, and embolism have decreased over recent decades.[11] In a review of data from 14 U.S. Maternal Mortality Review Committees from 2008-2017, there are racial differences in the leading causes of pregnancy-related deaths, with the top three causes of non-Hispanic Black maternal deaths as cardiomyopathy (13.9%), cardiovascular conditions (13.9%), pre-eclampsia and eclampsia (11.4%); in contrast, the top three causes of non-Hispanic White maternal deaths were mental health conditions (14.9%), cardiovascular conditions (13.4%), and hemorrhage (13.4%).[12]

Given that maternal mortality events are thankfully still rare, the CDC also uses the term Severe Maternal Morbidity (SMM), which includes negative short-term or long-term consequences to a woman's health directly caused by labor and delivery events.[8] The U.S. is also seeing a rise in SMM.[8] Tracking 21 different indicators (including cardiovascular disorders, shock, and hysterectomy), SMM affected over 50,000 women in the U.S. in 2014.[8;13-14] Several studies have also shown racial disparities in SMM.[15-16] The 2018 Missouri PAMR report does not describe SMM.

## Recommendations: Addressing Root Causes

As the enabling legislation for our state PAMR committee was recently passed in 2018, we are still learning about the root causes of maternal mortality in Missouri.[9] Several factors contributing to maternal mortality have emerged as targets for intervention. Confronting racial disparities, treating mental health conditions, and increasing access to insurance coverage are among the most prescient factors contributing to maternal mortality in Missouri.

Addressing factors that contribute to racial disparities in Missouri maternal mortality is essential. The American Medical Association (AMA) recently stated that "the primary drivers of racial health inequity are systemic… and structural racism … and unconscious bias within medical research



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and healthcare delivery have caused and continue to cause harm to marginalized communities and society as a whole."[17] Implicit and unconscious bias are pervasive in medicine; a 2012 study found that cesarean deliveries were more common among Black and Hispanic patients than White patients after excluding medically necessary procedures.[18,30] This is a critical issue, considering that three of the six leading causes of maternal mortality (hemorrhage, anesthesia complications, and infections) are associated with Cesarean sections.[18] This issue also arises from the provider perspective; as of 2015, only 5.3% of OBGYNs in Missouri identify as Black.[19] Taking part in the continued national conversation on diversity, equity, inclusion, and racial/social justice is an important step to address the racial and socioeconomic disparities in maternal mortality.

A baseline higher level of chronic diseases among Black women has been attributed to "weathering."[20] Weathering is described as the phenomenon in which Black women experience higher levels of allostatic stress and earlier deterioration of health as a physical consequence of accumulated exposure to psychosocial, economic, and environmental stressors.[20] One significant contributor to allostatic stress and weathering in Black women is the historic mistreatment of Black individuals in Western medicine, such as the atrocities of J. Marion Sims' studies of surgical techniques via medical experiments on enslaved Black women without anesthesia.[21] Although the past cannot be undone, physician acknowledgement of past injustices and providing culturally-competent care with shared decision-making may help alleviate patient stressors.

Change can be made by refocusing some efforts on indirect causes of maternal mortality. A 2018 U.S. study found pregnancy-related death due to mental illness was the most common cause of death for Non-

Hispanic White women.[22, 31, 32] Continued education on SUD, rehabilitation, and mental illness treatments can make a major impact on maternal mortality in the postpartum period. Providers should have consistent screening for mental illnesses, SUD, and intimate partner violence throughout pregnancy and postpartum, as these are all risk factors for both medical and nonmedical causes of death.[22] Improving social support and counseling for our pregnant and postpartum mothers is critical to minimize the impact of perinatal mood disorders, substance use, and suicide as drivers of maternal mortality and SMM.

In Missouri, Medicaid covers 39% of births, including 47% of rural births, 57% of births to Hispanic women, and 67% of births to Black women.[23] While federal law mandates that states provide pregnancy coverage to pregnant women below 133% of the federal poverty level (FPL), Missouri's guidelines extend MO Healthnet for Pregnant Women (MPW) to pregnant women below 196% of FPL. Missouri established Show Me Healthy Babies (SMHB) in 2014 which provides full comprehensive benefits to pregnant women up to 300% of FPL. Both MPW and SMHB only provide benefits up to 60 days postpartum, at which point women who receive MPW benefits transition to Extended Women's Health Services, which is a limited benefits plan covering only family planning and related services. Women receiving SMHB benefits lose coverage completely.[24] Prior to Medicaid Expansion in Missouri, parents would need to be at 21% of FPL to qualify for more comprehensive benefits. For example, a single mother of two would need to have net income less than $301 per month to be eligible for comprehensive health coverage.[25]

While Missourians voted to pass Missouri Medicaid Expansion in 2020, the passage faced many court battles, which led to a delayed rollout that is still awaiting full funding from our state legislature. Even with Medicaid Expansion, many mothers will be excluded. While pregnant women with incomes up to 300% of FPL may have full coverage, expansion guidelines drop to 133% of FPL after 60 days postpartum, leaving a large income gap. Missouri more recently approved a waiver that expands behavioral health benefits to certain postpartum women diagnosed with a SUD to one year postpartum.[26] The Missouri PAMR Committee recommends extending full benefits to one year postpartum for all women.[9] The American Rescue Plan Act of 2021 provides federal matching fund to states which extend comprehensive Medicaid coverage for pregnant people to one year postpartum; Missouri's SUD waiver alone does not qualify for matched funds.[27] Despite the overall rise in U.S. MMR ratio, states with Medicaid expansion have a slower rate of rise compared to non-expansion states, with a concentrated slowing of maternal mortality trajectory among non-Hispanic Black women.[28] The decrease in MMR is more pronounced when including late maternal deaths, indicating that expansion of Medicaid to include longer coverage postpartum may be a major factor in decreasing maternal mortality.[28]

## Summary

The persistent racial and socioeconomic disparities in maternal mortality are a significant problem in the United States, and Missouri has one of the highest rates of maternal mortality and SMM. While data continues to emerge, improved social supports and counseling for pregnant and postpartum patients is critical to minimize the impact of postpartum depression, substance use, and suicide as drivers of maternal mortality and SMM. Addressing the high rate of cardiovascular mortality (heart attacks, strokes, peripartum cardiomyopathy, etc.) among Black pregnant women will require a better understanding of allostatic stress and weathering. Primary care providers can help to optimize preconception health by emphasizing the importance of chronic disease management prior to conception.[29] A broad-based approach that includes policymakers, payors, medical providers, mental health providers, community leaders, and public health experts is the optimal way to address the unacceptable rate of SMM and maternal mortality in Missouri today.

## References

1. Noursi S, Saluja B, Richey L. Using the Ecological Systems Theory to Understand Black/White Disparities in Maternal Morbidity and Mortality in the United States. J Racial Ethn Health Disparities. 2021 Jun;8(3):661-669. doi: 10.1007/s40615-020-00825-4. Epub 2020 Jul 27. PMID: 32720294.
2. Maternal mortality ratio (MODELED Estimate, per 100,000 live births). Data. https://data.worldbank.org/indicator/SH.STA.MMRT. Accessed July 15, 2021.
3. Petersen EE, Davis NL, Goodman D, Cox S, Mayes N, Johnston E, Syverson C, Seed K, Shapiro-Mendoza CK, Callaghan WM, Barfield W. Vital Signs: Pregnancy-Related Deaths, United States, 2011-2015, and Strategies for Prevention, 13 States, 2013-2017. MMWR Morb Mortal Wkly Rep. 2019 May 10;68(18):423-429. doi: 10.15585/mmwr.mm6818e1. PMID: 31071074; PMCID: PMC6542194.
4. Blackwell S, Louis JM, Norton ME, Lappen JR, Pettker CM, Kaimal A,

Landy U, Edelman A, Teal S, Landis R. Reproductive services for women at high risk for maternal mortality: a report of the workshop of the Society for Maternal-Fetal Medicine, the American College of Obstetricians and Gynecologists, the Fellowship in Family Planning, and the Society of Family Planning. Am J Obstet Gynecol. 2020 Apr;222(4):B2-B18. doi: 10.1016/j.ajog.2019.12.008. PMID: 32252942.
5. Maternal Morbidity in Kansas City. Nurture KC. https://nurturekc.org/docs/MaternalMorbidityReportforKCbyNutureKC.pdf. 2021. Accessed August 31, 2021. 2021. Accessed August 31, 2021.
6. Pregnancy mortality surveillance system. Centers for Disease Control and Prevention. https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm. Published November 25, 2020. Accessed September 1, 2021.
7. Williams R. Maternal Mortality, Addressing the Healthcare Crisis in Missouri. Missouri Department of Health and Senior Services; 2021. https://missourinurses.org/wp-content/uploads/1-MaternalMortalityandHealthcareWorkforce.pdf. Accessed August 31, 2021.
8. Severe maternal morbidity in the United States. Centers for Disease Control and Prevention. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/severematernalmorbidity.html. Published February 2, 2021. Accessed August 28, 2021.
9. Missouri Pregnancy-Associated Mortality Review: 2018 Annual Report. Missouri Department of Health and Senior Services; 2021. https://health.mo.gov/data/pamr/pdf/annual-report.pdf. Accessed July 111, 2021.
10. Joseph KS, Boutin A, Lisonkova S, et al. Maternal Mortality in the United States: Recent Trends, Current Status, and Future Considerations. Obstet Gynecol. 2021;137(5):763-771. doi:10.1097/AOG.0000000000004361
11. Singh GK, Lee H. Trends and Racial/Ethnic, Socioeconomic, and Geographic Disparities in Maternal Mortality from Indirect Obstetric Causes in the United States, 1999-2017. Int J MCH AIDS. 2021;10(1):43-54. doi:10.21106/ijma.448
12. Davis NL, Smooths AN, Goodman DA. Pregnancy-Related Deaths: Data from 14 U.S. Maternal Mortality Review Committees, 2008-2017. Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/MMR-Data-Brief_2019-h.pdf. Published 2019. Accessed August 26, 2021
13. How Does CDC Identify Severe Maternal morbidity? Centers for Disease Control and Prevention. https://www.cdc.gov/reproductivehealth/maternalinfanthealth/smm/severe-morbidity-ICD.htm. Published December 26, 2019. Accessed August 26, 2021.
14. Callaghan WM, Creanga AA, Kuklina EV. Severe maternal morbidity among delivery and postpartum hospitalizations in the United States. Obstet Gynecol. 2012 Nov;120(5):1029-36. doi: 10.1097/aog.0b013e31826d60c5. PMID: 23090519
15. Howell EA, Egorova N, Balbierz A, Zeitlin J, Hebert PL. Black-white differences in severe maternal morbidity and site of care. Am J Obstet Gynecol. 2016 Jan;214(1):122.e1-7. doi: 10.1016/j.ajog.2015.08.019. Epub 2015 Aug 15. PMID: 26283457; PMCID: PMC4698019.
16. Petersen EE, Davis NL, Goodman D, Cox S, Syverson C, Seed K, Shapiro-Mendoza C, Callaghan WM, Barfield W. Racial/Ethnic Disparities in Pregnancy-Related Deaths - United States, 2007-2016. MMWR Morb Mortal Wkly Rep. 2019 Sep 6;68(35):762-765. doi: 10.15585/mmwr.mm6835a3. PMID: 31487273; PMCID: PMC6730892.
17. O'Reilly, KB. AMA: Racism is a threat to public health. American Medical Association. https://www.ama-assn.org/delivering-care/health-equity/ama-racism-threat-public-health. Published November 16, 2020. Accessed July 11, 2021.
18. Saluja B, Bryant Z. How implicit bias contributes to racial disparities in Maternal morbidity and mortality in the United States. Journal of Women's Health. 2021;30(2):270-273. doi:10.1089/jwh.2020.8874
19. Missouri Physician Workforce 2015. Missouri Department of Health and Senior Services. https://health.mo.gov/living/families/primarycare/pdf/physician-workforce2015.pdf . Accessed September 21, 2021.
20. Geronimus AT, Hicken M, Keene D, Bound J. "Weathering" and age patterns of allostatic load scores among blacks and whites in the United States. Am J Public Health. 2006 May;96(5):826-33. doi: 10.2105/AJPH.2004.060749. Epub 2005 Dec 27. PMID: 16380565; PMCID: PMC1470581.
21. American College of Obstetricians and Gynecologists. "Collective Action Addressing Racism: Acknowledging Betsey, Lucy, and Anarcha. https://www.acog.org/news/news-articles/2021/02/collective-action-addressing-racism-acknowledging-betsey-lucy-and-anarcha. Published February 26, 2021. Accessed July 11, 2021.
22. Collier AY, Molina RL. Maternal Mortality in the United States: Updates on Trends, Causes, and Solutions. Neoreviews. 2019;20(10):e561-e574. doi:10.1542/neo.20-10-e561
23. Missouri Public Health Information Management System (MOPHIMS). Missouri Department of Health and Senior Services. https://healthapps.dhss.mo.gov/MoPhims/MOPHIMSHome. Published 2020. Accessed September 7, 2021.
24. MO Healthnet for Pregnant Women and Newborns. Missouri Department of Social Services. https://mydss.mo.gov/healthcare/mohealthnet-for-pregnant-women-and-newborns. Accessed September 7, 2021.
25. Income Guidelines for TANF, MHK, MHF, MPW, and UWHS. Missouri Department of Social Services. https://dss.mo.gov/fsd/pdf/mhk_mhf_ta_income_guidelines.pdf. Published 2021. Accessed September 7, 2021.
26. Waiver Programs. Missouri Department of Social Services. https://dss.mo.gov/mhd/waivers. Published 2020. Accessed September 7, 2021.
27. American Rescue Plan Act of 2021, Pub. L. No. 117-2, H.R. 1319, 117th Congress. https://www.congress.gov/bill/117th-congress/house-bill/1319/text. Accessed September 22, 2021.
28. Eliason EL. Adoption of Medicaid Expansion is Associated with Lower Maternal Mortality. Women's Health Issues. 2020;30(3):147-152. doi:10.1016/j.whi.2020.01.005
29. "Prepregnancy Counseling." Committee Opinion No. 762. Joint Committee Opinion from the American Society for Reproductive Medicine (ASRM) and American College of Obstetricians and Gynecologists' (ACOG) Committee on Gynecologic Practice. Fertil Steril 2019; 111:32-42.
30. Debbink MP, Ugwu LG, Grobman WA, Reddy UM, Tita ATN, El-Sayed YY, Wapner RJ, Rouse DJ, Saade GR, Thorp JM Jr, Chauhan SP, Costantine MM, Chien EK, Casey BM, Srinivas SK, Swamy GK, Simhan HN; Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network. Racial and Ethnic Inequities in Cesarean Birth and Maternal Morbidity in a Low-Risk, Nulliparous Cohort. Obstet Gynecol. 2022 Jan 1;139(1):73-82. doi: 10.1097/AOG.0000000000004620. PMID: 34856577; PMCID: PMC8678297.
31. Smid MC, Maeda J, Stone NM, Sylvester H, Baksh L, Debbink MP, Varner MW, Metz TD. Standardized Criteria for Review of Perinatal Suicides and Accidental Drug-Related Deaths. Obstet Gynecol. 2020 Oct;136(4):645-653. doi: 10.1097/AOG.0000000000003988. PMID: 32925616; PMCID: PMC8086704.
32. Smid MC, Schauberger CW, Terplan M, Wright TE. Early lessons from maternal mortality review committees on drug-related deaths-time for obstetrical providers to take the lead in addressing addiction. Am J Obstet Gynecol MFM. 2020 Nov;2(4):100177. doi: 10.1016/j.ajogmf.2020.100177. Epub 2020 Jul 15. PMID: 33345905; PMCID: PMC7753059.

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# We Are What We Eat

*by Betty M. Drees, MD & Brandon Barthel, MD*

**Our relationship to food is complex, but the consensus is that food should support both physical and mental well-being, and that the eating pattern most likely to achieve this outcome is one that is higher in plant proteins, fruits, vegetables, and whole grains while limiting saturated fats and added sugar.**



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With this issue of *Missouri Medicine*, the Journal concludes a series on diets and nutrition.[1-7] The foods we eat are determined by a complex set of factors, including personal preferences, cultural and religious practices, co-morbid health conditions, availability and accessibility of foods, agricultural practices, and public policy.

Cultural and religious directives on foods have been in place for thousands of years, with recorded practices documented in the Bible and in ancient Egyptian texts. The recognition that the food we eat impacts health also dates to ancient times.[8,9,10] Hippocrates, Asclepiades of Bithynia, Galen, and other Greek and Roman physicians wrote about diet interventions for health. The relationship between obesity and diabetes as well as recommendations for diet and physical activity for weight loss were also noted in ancient writings.

In addition to recognition of food and nutrition as contributing to health or causing disease, people have also used foods to enhance athletic ability and warrior status for centuries.[11] In modern times, alterations in food content or amount (i.e. diets) are still used with goals of enhancing athletic performance, improving physical looks (i.e. weight loss), and for improving health.

The rise of modern nutrition science and dietary guidance started in the late eighteenth century and progressed into the early twentieth century with the advent of modern science in chemistry, thermodynamics, and physiology that led to the understanding of macronutrients (proteins, carbohydrates, and lipids), vitamins, energy balance, and digestion.[12,13,14]

Understanding science and the complex relationships between diet and health is critically important in order to develop nutrition guidelines that inform the public and guide public policy and nutrition programs. Unfortunately, there remain many gaps in our knowledge, partly because nutrition studies on eating patterns and their impact on health are difficult to perform and generalize to the population. Many studies are of short duration, small size, and rely on self-reported food intake.

Formal nutrition guidelines began in the nineteenth century, initially focusing on macronutrients and energy needs, and following with vitamin and micronutrient recommendations as these nutrients were identified and understood. The relationship between specific vitamins or minerals (e.g. vitamin C or iron) are more easily understood than more complex epidemiologic relationships between macronutrients and chronic disease (e.g. dietary fat and carbohydrate effects on cardiovascular disease).[14]

Modern food guidelines in the United States were first published in 1980 and are updated every five years, with the most recent

The associations of pleasure in life, the foods we eat, and health have been known for centuries. Perhaps these relationships are best summed up by the French gastronome Anthelme Brillat-Savarin when he wrote in 1825: *"Tell me what you eat and I shall tell you who you are."*



published in 2020.[15,16] These guidelines have evolved over the past four decades to move from a focus on specific components (fats, carbohydrates, protein) to an emphasis on "healthy eating patterns." There is recognition that nutrition needs and metabolism change over the lifespan, and that eating is a pleasurable, social activity influenced by culture and the availability and affordability of healthy foods.

The food we eat should bring us both health and happiness. This is the underlying meaning of "you are what you eat." Fad diets rarely are sustainable in bringing both health and happiness and may even contribute to development or exacerbation of eating disorders. The nutrition and diet papers in this series covered eating patterns, popular diets, and the importance of food and nutrition security. Our relationship to food is complex, but the consensus is that food should support both physical and mental well-being, and that the eating pattern most likely to achieve this outcome is one that is higher in plant proteins, fruits, vegetables, and whole grains while limiting saturated fats and added sugar. We also need to have a positive relationship with the foods we eat, and emphasis should be on a positive approach of choosing foods based on personal and cultural preferences rather than a negative approach of avoiding foods.

The associations of pleasure in life, the foods we eat, and health have been known for centuries. Perhaps these relationships are best summed up by the French gastronome Anthelme Brillat-Savarin when he wrote in 1825: *"Tell me what you eat and I shall tell you who you are."*[17]

## References

1. Rakhra V, Galappaththy SL, Bulchandani S, Cabandugama PK. Obesity and the Western diet: How we got here. *Mo Med.* 2020 Nov-Dec;117(6):536-538.
2. Mccalmon S, Galappaththy SL, Bulchandani S, Cabandugama PK. Fasting off "The COVID-19". *Mo Med.* 2021 Mar-Apr;118(2):164-167.
3. Clem J, Barthel B. A look at plant-based diets. *Mo Med.* 2021 May-Jun;118(3):233-238.
4.. McGaugh E, Barthel B. Review of the ketogenic diet and lifestyle. *Mo Med.* 2022 Jan-Feb;119(1):84-8
5.. Nguyen B, Drees B. Food and nutrition security in clinical settings. Mo Med. 2022 Mar/Apr;119(2):167-72
6.. Voss MM. Eating disorders & the primary care physician. Mo Med. 2022 May-Jun;119(3):242-9
7. De Almeida R, Kamath G, Cabandugama P. Food addiction in application to obesity management. Mo Med. 2022 Jul-Aug;119(4):372-8
8. Hwalla N, Koleilat M. Dietetic practice: the past, present and future. East Mediterr Health J. 2004;10(6):716-30.
9. Haslam D. Obesity: A medical history. Obes Rev. 2007;8 Suppl 1:31-36. doi:10.1111/j.1467-789X.2007.00314.x
10. Yapijakis C. Hippocrates of Kos, the father of clinical medicine, and Asclepiades of Bithynia, the father of molecular medicine. Review. In Vivo. 2009 Jul-Aug;23(4):507-14
11.Applegate EA, Grivetti LE. Search for the competitive edge: A history of dietary fads and supplements. J Nutr .1997 May;127(5 Suppl):869S-873S. doi: 10.1093/jn/127.5.869S
12. Carpenter KJ. A short history of nutritional science: Part 2 (1885-1912). J Nutr. 2003 Apr;133(4):975-84. doi: 10.1093/jn/133.4.975
13. Jahns L, Davis-Shaw W, Lichtenstein AH, Murphy SP, Conrad Z, Nielsen F. The History and future of dietary guidance in America. Adv Nutr. 2018 Mar 1;9(2):136-147. doi: 10.1093/advances/nmx025
14. Ridgway E, Baker P, Woods J, Lawrence M. Historical developments and paradigm shifts in public health nutrition science, guidance and policy actions: A narrative review. Nutrients. 2019; 11(3):531. https://doi.org/10.3390/nu11030531
15. Schneeman BO. Evolution of dietary guidelines. J Am Diet Assoc. 2003 Dec;103(12 Suppl 2):S5-9. doi: 10.1016/j.jada.2003.09.030
U.S. Department of Agriculture and U.S. Department of Health and
16. Human Services. Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020. Available at DietaryGuidelines.gov https://www.dietaryguidelines.gov/resources/2020-2025-dietary-guidelines-online-materials
17. Rössner S. Anthelme Brillat-Savarin (1755-1826). Obes Rev. 2007 Nov;8(6):531-2. doi: 10.1111/j.1467-789X.2007.00380.x

## Disclosure

None reported.

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