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by CASEY L. PENN

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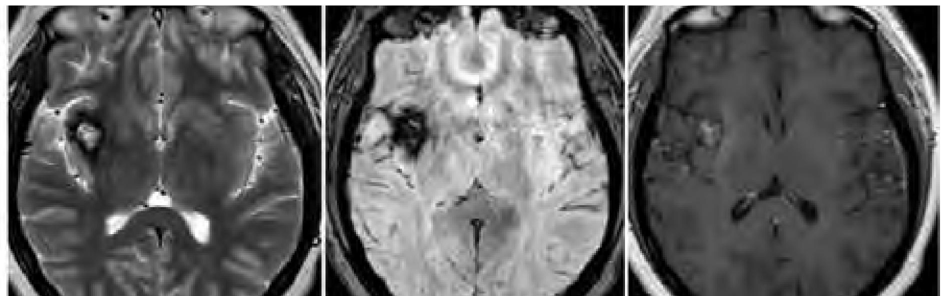


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**Erratum:** JAMS. 2019 Nov; 116(5): 100
In the Derm Dilemma: Purulent Ulcer, Ashley Ederle, MD, was listed as author. Correct author is Kelsey Parks.

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COMMENTARY

Tobias Vancil, MD

# Challenge Yourself

**I consider myself one of the fortunate ones in that I'm able to provide medical education as part of my daily practice**. I spend a significant amount of time delivering patient care side-by-side with trainees at both the student and resident level. However, the majority of this time is spent with third-year students who are rotating through the internal medicine clerkship at UAMS. During these interactions, I typically ask them, "What are you going to do with your life?"

Early in the third year, the answer is an understandable "I'm not sure yet" as most of our students, including those coming from a family with some medical background, really have no idea what career field they will pursue. As students experience a few rotations, some start to narrow their choices but are still largely undecided. Midyear and after, this question tends to cause some degree of panic as there are significant decisions to be made in order to set a schedule for the senior year and move forward with their residency match application. Recently, a student's answer caught me off guard; he confidently said, "I came here with a plan to one day deliver primary care to those in the small town where I grew up." Why was this such a surprise to me? Let's just say I haven't heard that response in a while. Years ago this would have been a very common answer, but of late, the tendency is for increasing numbers of students to elect a residency out-of-state. The concern, of course, is that once they leave their home state for training elsewhere, they're less likely to return. This is not only an issue for us, as almost every state has seen this trend, but UAMS students matching into residencies inside the state has dropped to 42.9% from 52.2% over the last 10 years (JAMA Sept 10, 2019). In a state where we would like to see many of our trainees returning "home" to their small towns or underserved communities, we don't really want to see this trend continue.

Why is this happening? Speculation from the medical community suggests increased competition for limited residency spots as well as some geographical drift in certain medical specialties. Social commentary regarding behavior of the millennial population shows increased pressure by one's peers to "challenge yourself" in life by leaving home and living in different regions of the country throughout your career. The student I spoke with shared a different perspective and stated, "No one in my high school or hometown ever mentioned that a higher degree was a possibility. The idea of leaving was sort of foreign to me until I met students in college with this plan. I wish someone had just stimulated me earlier to be more open-minded about career options." Unfortunately, this is a common theme we hear when talking with students once they get on campus. Another student once told me, "My guidance counselor told me a career in medicine wasn't a very good plan because no one from this school has ever gone to medical school before." Obviously, these statements are generalizations and not meant to stereotype the attitudes of our entire education system, but it should be a reminder to all of us that our youth are impressionable. The lack of exposure to a new idea about career opportunities can be very powerful.

As a medical community, we should take these words as a challenge to ourselves to consider the potential in our younger generations, to avoid underestimating their insightfulness, and to encourage them to seek out goals they may have once thought unattainable. It stands to reason that it is easier to recruit physicians to small towns or communities if they already have a connection there, so we need to focus on reaching out to our adolescents in these areas. No one knows more about the rewards of a career in medicine in these communities than AMS members (and potential new AMS members) who provide health care in these environments every day; this makes them obvious mentors to our budding students. For those of us who deliver care in the larger "cities" of this state, it's important to keep in mind the prospective benefit to our patients that having more providers in these more rural regions would mean: less travel, more direct access to care, less time away from work seeking care, etc. As a society, I feel we have an opportunity to stand behind our colleagues in the more outlying expanses of the state and assist with outreach to these would-be physicians not yet identified in our communities. I know I am ready to help. AMS

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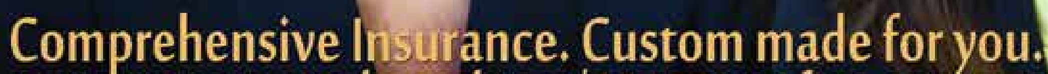

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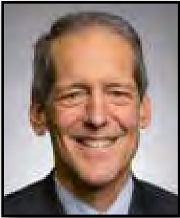

Kevin St. Clair, MD

# Derm Dilemma: Melanoma

**Kyle Sandiford**
*Candidate, UAMS Class 2021*
**Logan Rush, MD**
*Resident, UAMS Department of Dermatology*

**A 40-year-old male with no history of skin cancer presents with a dark "mole" on his left posterior shoulder.** It is asymptomatic and has never bled, but his spouse has noticed enlargement over the past nine months. Clinical and dermoscopic photographs are below:

What is your next step?

A. Reassurance that this is a benign seborrheic keratosis

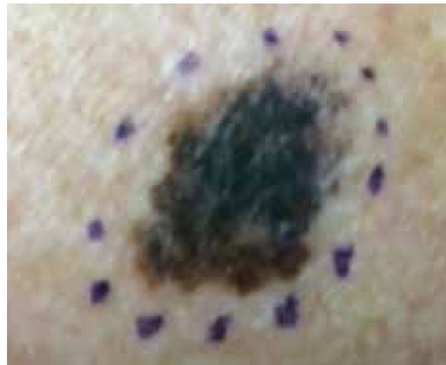
B. Excisional biopsy with 3 cm margins at time of presentation

C. Excisional biopsy of visible pigment, or if not feasible because of lesion size, a shave biopsy with the saucerization method

D. Monitor with serial photographs

E. 3 mm punch biopsy of the darkest part of the lesion

Answer: C.



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## Discussion:

The lesion in the photograph is a melanoma, which is notorious for its risk of metastasis and attendant morbidity and mortality. Fortunately, most melanomas are characterized by an initial "horizontal" growth phase, during which time local and distant metastasis is unlikely. therefore, early recognition is critical. Melanoma incidence has increased considerably in the last several decades, due at least in part to advances in detection and diagnosis. Hand-held dermoscopes have led to improvement in distinction from benign pigmented lesions and earlier recognition of melanoma; however, dermatopathologic examination remains the gold standard in melanoma diagnosis. Vertical tumor thickness, or Breslow depth, is the most important prognostic factor.

Clinically, melanoma is often characterized by the ABCD's:

A Asymmetry
B Border irregularity
C Color (dark, but not uniform)
D Diameter > 6mm; continuing enlargement

If possible, smaller suspected melanomas should be excised completely at the time of presentation. For larger lesions where complete excision is not feasible, a deep shave biopsy ("saucerization") method may be employed. Care must be taken not to transect the pigmented lesion at the deep margin, so that the dermatopathologist may determine the Breslow depth. Later, when melanoma is confirmed, wide local excision is performed with appropriate margins that are determined by the Breslow depth and other histologic features. Sentinel lymph node biopsy may be indicated, and immunotherapeutic agents are available for metastatic disease. AMS

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*by* CASEY L. PENN

# Geriatrics: A Challenging and Rewarding Subspecialty

**"I think a lot of people aren't interested in older folks, but it's a treat to me to care for them and honor them," said Geriatrician Homer Brooks, MD, touching on his interest in elderly patients.** Dr. Brooks currently practices at NEA Baptist in Jonesboro and is among a relatively small-but-growing number of fellowship-trained geriatricians here in Arkansas. "Every day, I'm able to stand up for an older person and show that little bit of respect for their age and wisdom."

## Demographics on Aging

- Nearly 10,000 people turn 65 every day.
- People 75 and older use 3-4x more hospital days than people 45-55 years old.
- People 85 and older spend about 5x more on health care than people 45-55 years old.
- 25% of Medicare expenditure in last year of life – half of this in last 60 days.

Internist Holly Jennings, MD, treats geriatric patients at Adult Medicine Specialists, a clinic within the Baptist Health system in Fort Smith. While her practice isn't dedicated solely to geriatrics, she has acquired a large geriatric patient population in her 25 years of community-based practice. "Most people come to me at age 45-50, but now they're 70-75 years old. I still take adults of any age, but because of the difficulties older adults have navigating the health care system, I often accept them preferentially."

In 2018, there were 7,298 certified geriatricians in the U.S. (americangeriatrics.org). According to UAMS Associate Professor Priya Mendiratta, MD, MPH, AGSF, CMD, the number of fellowship-trained geriatricians trained and practicing in Arkansas is around 30. "Of these, three are practicing primarily in other fields, while 27 have stayed in state to practice geriatrics," she said. Dr. Mendiratta directs the geriatric clerkship and coursework at Donald W. Reynolds Institute on Aging. The Institute addresses the needs of an aging generation and is part of the UAMS Centers on Aging network across the state.

*Priya Mendiratta, MD*

Given the projected growth of the U.S. population aged 65 and older, it's important for all physicians (regardless of specialty) to understand how to better care for older patients. "We have an increasing geriatric population," said Dr. Mendiratta. "Geriatricians alone in any state cannot take care of all of them."

The American Geriatrics Society recommends collaboration between medical specialties to help strengthen geriatrics training for all physicians. With this in mind, below is a snapshot of the geriatric specialty, including a brief overview, geriatric-patient challenges, and trials and rewards that go along with helping patients who, said Dr. Brooks reverentially, are "walking history books." ***(Also, see our sidebar on the challenges of community-based, small-practice geriatrics.)***

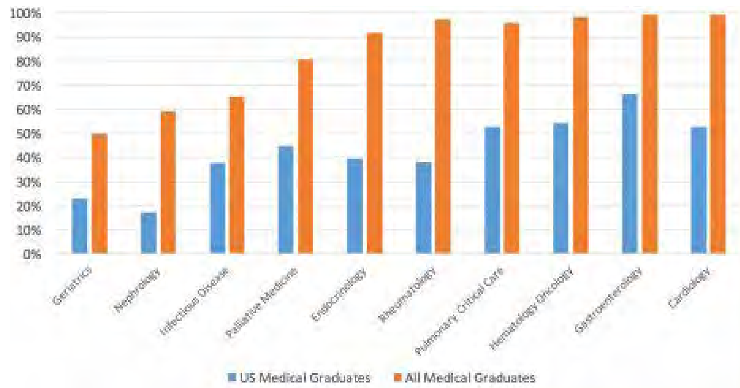
## Geriatrics – An Overview

The American Medical Association defines *geriatrics* as the practice of physicians "who have special knowledge of the aging process and special skills in the diagnostic, therapeutic, preventive and rehabilitative aspects of illness in the elderly."

The specialty offers diverse career choices and a high rate of professional satisfaction, but demand far exceeds supply. According to a 2018 U.S. Census Bureau report, by 2035 "there will be 78 million people 65 years and older compared to 76.4 million under the age of 18 and the elderly population will outnumber children for the first time in America's history."

There are no strict rules about when a patient needs to start seeing a geriatrician as opposed to a general practitioner. Typically, a geriatric practice will focus on topics that are an expected part of life for the elderly and their caregivers. These include dementia, depression, chronic pain associated with aging, medication review and dosage adjustments, osteoporosis, Parkinson's disease, sleep disorders, cardiovascular, vaccinations, fall prevention, and home health care oversight. "There are some 65-year-olds that need to see me, and some 95-year-olds that don't need to see me," explained Dr. Brooks.

## Medical Graduates in Training




"It comes down to their ability to function. When old age and associated conditions start to interfere with daily activities, a geriatrician can be helpful. I do a lot of memory testing, mobility exams, bone densities, and that sort of thing."

Geriatricians like Dr. Brooks are also called on for hospital consults related to dementia, delirium, general geriatric care, and end-of-life care.

Geriatrics as a subspecialty is relatively new and is one of the least chosen areas by medical students in the U.S. and across the world, second only to nephrology. However, geriatric physicians are among the highest rated in physician job satisfaction. "To enter the field, residents from internal or family medicine do an additional fellowship in geriatrics," explained Dr. Mendiratta, who is happy to see growing interest in the area by students. Aside from this, however, there is required training in the field at a handful of medical schools across the nation. "Since the number of folks who are older adults continues to rise in the U.S. and in our state, our medical students at UAMS have a required fourth-year clerkship or rotation in geriatrics. Other medical schools are now introducing geriatrics as a clerkship. Currently, 15 medical schools have such a program.

"A large part of our responsibility at UAMS is in training and educating multiple learners – medical students, residents, and PA students – in the care of older adults. Our past geriatric fellows are all leading in the field to help with this and other missions, including clinical. UAMS requires its internal and family medicine residents to train in geriatrics during their residency. Afterwards, some of those students decide to further pursue the specialty. In the last two years, the geriatric fellowship slots have stayed full and some fellows pursued a second-year position."

Dr. Mendiratta emphasized the importance of keeping students engaged in geriatrics. "To that end, newer innovations have been employed and presented at national meetings," she said, describing some things that have been popular with learners. "These include virtual reality for dementia training, a culinary medicine workshop for geriatric friendly recipes, interprofessional simulations in geriatrics, telemedicine simulation in geriatrics, and development of tools by medical students each month that can be used to educate older adults. Also, several of our students who are in academic houses or on rotation participate each year [through this group] in senior fairs like senior expo or Alzheimer's walk."

### Caring for Older Patients

Taking care of older patients is a slower process, by nature and necessity. "We spend 30-45 minutes with a patient whereas the average primary care is only able to spend considerably less," said Dr. Brooks. "I'm fortunate in that here at NEA, even though we are not a senior health center, I'm able to practice geriatrics at my own speed rather than having to see 32 patients a day."

Dr. Jennings explained that the slower pace of practice makes sense considering the well-documented slowdown in processing speed that goes along with the aging process. "If you live long enough, you're going to be visually and/or hearing impaired," stated Dr. Jennings. "You're talking about patients who are visually impaired and hearing impaired, with age-related slowness in processing. If you then put them in front of a computer and tell them to access the patient portal to schedule a mammogram, they're just not going to do anything. Or take a patient who is challenged to keep up with a technical conversation in the office, and tell him to call the health system phone line to book an appointment or to clarify instructions with a nurse. He does that and gets an automated recording that he can't hear (well) – and can't rewind – that tells him to choose one of several choices. This goes on

> Continued on page 130.

*Used by permission (Dr. Mendiratta) UAMS 2018 Geriatric fellows with Drs. Wei and Mendiratta.*

and on, as you know. Between the pressing, the hearing, the seeing the numbers on the phone, he's going to give up."

Dr. Jennings has taken stock of how the nature of geriatrics conflicts with the current state of medical practice. "I think the message that most health systems don't want to hear is that the system is rigged against the senior patient. When things are driven by productivity and technology, even of necessity, the physician spends more time looking at the computer than when things were on paper. That changes the dynamic with patients. Younger patients are better able to accommodate that. Their attention spans are different, and the acuity of their needs are different. They're happy to play on their phones while you're typing and pecking. With an older patient, they're not coming in with a cell phone. They're there to look their physician in the face and take some time, and very frequently, must hear things several times."

Holly Jennings, MD

Though she doesn't fault physicians who aren't "turning themselves inside out to accommodate older patients" due to time constraints, Dr. Jennings sees the need for empathy for the elderly. "Small conveniences make such a difference," she said. "How fortunate for these patients when they're able to access an office where things are set up in a more geriatric-friendly style. How fortunate when they can hear 'Yes, we'll schedule your follow-up appointment right now, face to face,' or 'That test we said you needed? Sit with this person here, and she's going to write down where you need to be and at what time, so you'll have that appointment before you leave.'"

## Challenges and Rewards

Partly due to the slow nature of the practice, geriatrics isn't a lucrative specialty per se. "To make a decent living, many geriatricians practice at senior health center facilities," noted Dr. Brooks, who before joining NEA Baptist ran an independent practice. "These facilities receive additional resources from state and federal government. When I was in private practice, I did several [additional] things to make ends meet – nursing home care, hospice, and inpatient rehabilitation. My bread and butter was Medicare, and at the first of the year there are deductibles for the patient to cover. The first four months were always the hardest for me because many of my geriatric patients weren't always able to pay their first-of-the-year deductible immediately.

"We're all facing the challenges of getting paid for what we do. It would be wonderful if more doctors took Medicare, but there are certainly hoops to jump through with Medicare."

Despite these challenges, the job isn't without its endearments. "Most of my patients are

## The Daunting Task of Providing Geriatric Care for Community-Based Small Practices

*Adapted from a submission by Darrell R. Over MD, MSc, FAAFP*

Darrell Over, MD

Darrell R. Over MD, MSc, FAAFP is the associate professor and associate residency director for UAMS (South Central) Family Medicine Residency. He expressed concerns over how to incorporate geriatrics into patient centered medical homes (PCMH). He noted that an AMA report indicated that the majority of U.S. physicians (about 57%) still work in small practices of 10 or fewer physicians. This coupled with the mandates of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) Merit-Based Incentive Payment System (MIPS) has presented considerable challenges for small-practice physicians who are trying to provide health care to community-dwelling elders with complex medical needs.

The PCMH model was first introduced as a means for providing patient-centered, comprehensive, coordinated, and accessible care through a systems-based approach that is continuously improved. Within this model, the potentially frail elderly represent a patient group with highly complex health care needs who require intensive medical services that must be coordinated across multiple providers and a broad range of social support agencies to maintain health and ability to function independently in the community.

Dr. Over explained the hardships small practices face in such situations, "The transformation of a practice to PCMH standards has been a virtually insurmountable burden for smaller practices where simply managing the daily workload is a struggle. These practices typically have limited financial reserves, administrative infrastructure, and staff time to support the efforts of practice redesign to PCMH standards." The American Academy of Family Physicians' National Demonstration Project showed that even highly committed small practices working toward PCMH transformation, with support from transformation facilitators, were unable to incorporate all basic components of a medical home during the two-year demonstration.

Small practices, unlike larger practices, are unable to draw upon a considerable number and/or breadth of personnel such as nurse practitioners, pharmacists, dieticians, social workers and other allied health professionals to assist in the care of complex patients.

A further challenge for small-practice physicians is that often there is a diverse range of complex patients but with a low prevalence. Few small practices can either financially afford the extra investment or have the capacity to maintain and build the expertise to effectively serve a low volume of diverse complex patients. Considering the wide array of medical specialists, social service agencies, and home health service providers that comprise the "health care neighborhood," it is not conceivable that without considerable support, the community-based small practice physician is going to be able to identify, organize and track the necessary services for this diverse population of complex patients.

*Donald W. Reynolds Institute on Aging. Used by permission.*

hard of hearing or have poor eyesight. As a result, I go home now, and my normal voice is a bit too loud. I have to be reminded to use my inside voice," smiled Dr. Brooks. "In all seriousness, most of us that do geriatrics wouldn't do anything else. For me, it's professionally, personally, and spiritually rewarding."

Dr. Jennings, too, feels grateful for her elderly patients. "Older patients have been through a lot. Most of them didn't see just good times, so their expectations are different. They don't expect everything to be perfect. They're grateful for the good in their lives."

*Find out more about geriatrics through the Geriatrics Society at americangeriatrics.org.*

*Data source: American Geriatric Society (Source: American Board of Medical Specialties. 2017-2018 ABMS Board Certification Report)*

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# Creating Safer Transitions of Care

KIMBERLY GARNER, MD, JD, MPH, and LYNDA BETH MILLIGAN, MD

As a health care provider, after discharging an older gentleman who was recently admitted from home with a left, lower-lobe pneumonia, you wonder how he is managing at home. Is he safe or do changes need to be made in his home environment? Does he have supportive family and friends who can assist him? Can he understand and follow the discharge instructions? Does he have transportation to follow-up appointments and his pharmacy for medications? Even though you think he could be safely discharged home, you instead recommended admission to a skilled nursing rehabilitation facility to assist with his potentially complex transition of care to home.

"Transitions of care" refer to the hand-off of patients between health care providers and settings as their health status and care needs change. In the case above, the patient was receiving care from a primary care physician, then transitioned to care from a hospitalist physician and nursing team during his inpatient stay. At discharge he transitioned to another care team at a skilled nursing facility. Finally, he returned home, where he received care from a home health nurse and support from family members and a next-door neighbor.

Care transitions are very complex processes that are often the weak link in the chain of care. All too often they do not go smoothly. Research has shown that inadequate or uncoordinated care transition processes can lead to adverse events[1,2] and higher hospital readmission rates and costs.[2] One study found that 80% of serious medical errors during these hand-offs between providers[3] are related to ineffective communication of important details that can affect patient outcomes and increase the risk of complications. Poor transitions are more likely when multiple providers and specialists are involved. Coordination of care among more than one provider is complex and can create confusion for the patient and those responsible for transitioning care to the next setting and provider.[5]

Safe transitions should include most or all of the following elements:

- **Create a culture of multidisciplinary collaboration and communication.** This should start at admission and continue throughout the patient's inpatient stay to assure a successful transition to the next level of care.[8] In addition to daily rounding and meetings, this step should include actively teaching the patient and his family caregivers what is in the care plan and how to practice it,[4,5,7,8] including how to self-manage medications.[6]
- **Share health care provider accountability, involvement and communication between both the sending and receiving providers.[9]** Identify health care providers by name and exchange all necessary information verbally, electronically or by fax before and at the time of transition.[9]
- **Begin discharge planning at admission by assessing patients for risk factors that may limit their ability to perform necessary aspects of self-care.[4]** In-depth patient risk assessment is another way to ensure safe transitions of care. Risk assessment includes examining potential risk factors

with the goal of mitigating those risks, such as whether patients have adequate support upon discharge, transportation, a way to fill prescriptions, and if they are likely to be active and engaged in their community after discharge. These potential impediments to a safe transition home are often a factor in patient success and satisfaction, as well as in the risk of hospital readmission and negative patient outcomes.

- **Create a detailed written transition plan using standardized transition procedures and forms.** The plan should include active issues, diagnosis, medications, required services, warning signs of a worsening condition and whom to contact 24/7 in case of emergency.[8] Plans are provided in the patient's preferred language and appropriate reading level with pictures or diagrams.[4] Health care providers and staff should be trained on how to create a safe transition of care, the risks associated with transitions and communicate performance expectations about patient care transitions.
- **Followup, support and coordinate care in a timely manner after the patient leaves each care setting.** Organizations should develop, follow and maintain a process that provides for timely post-discharge follow-up for all patients and all discharge settings. Telephone or in-person follow-up, support and coordination can be performed by a case manager, social worker, nurse or another health care provider 24 to 48 hours after discharge. A 24/7 call center can provide a recently transitioned patient or family member with information or reassurance after regular clinic hours.[4] Follow-up support helps patients achieve successful recoveries.[4,7,8]
- **Perform continuous quality improvement that includes evaluating if a patient was readmitted or had any negative discharge outcomes within 30 days and gain an understanding of why.** Readmissions within 30 days of discharge often signal ineffective transitions of care from the hospital to other settings.[9] Identifying gaps in care can be used by organizations to improve care transitions. Using surveys and other data collection can help identify the root causes of ineffective transitions. They can also identify patient and caregiver satisfaction with transitions and their understanding of the care plan.

In summary, if a health care organization doesn't have a culture that values teamwork and accountability, plus an environment that encourages speaking up, then it is more likely to provide unsafe care transitions. It is important for all members of the health care team to take the time to identify and communicate about potential barriers before the transition occurs. Effective communication among team members helps prevent problems that can occur from and to virtually every type of health care setting, especially when leaving the hospital to another setting or home. To reduce both readmission rates and adverse events, all members of the health care team, including the patient and his caregivers, must be included in the discharge planning and empowered to identify and mitigate gaps in care to ensure that patients safely transition to their next level of care. ▲

*Dr. Garner is a dual-boarded in geriatrics, hospice and palliative care, and an associate professor at UAMS. Dr. Milligan is a family physician. Both work at the Central Arkansas Veteran Affairs Health Care Sytem, are AAFP Fellows and board certified by the American Board of Quality Assurance and Utilization Review Physicians.*

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**DECEMBER 2019**

iCASE STUDY

# Intracerebral Cavernoma Presenting as Hemiballismus

**Rumyar Vojdanian Ardakani[1]; Rohit Dhall, MD[2]; Pradeep Kumbham, MD[3]; Yohei Harada, MD[3]**

[1]Medical student, UAMS

[2]Associate Professor of Neurology, UAMS, Director of Neurodegenerative Disorders, UAMS

[3]Resident Physician, UAMS

## Abstract

**While stroke remains the most common etiology of acute-onset hemiballismus, vascular malformations such as cavernous angiomas are rarely reported in the literature.** We found cavernous angioma to be the cause of progressive, unilateral hemiballismus involving the legs, arm, and face in a 36-year-old woman. In this article, we present the clinical course of this patient and review the proposed etiology and diagnosis of hemiballismus.

## Introduction

Chorea is a type of hyperkinetic movement disorder characterized by involuntary movements that are irregular, abrupt, and unpredictable in nature. Chorea most commonly involves the distal extremities; however, it can occasionally involve the trunk and face, resulting in impaired speech and postural instability. The movements are non-patterned and can have variable direction, speed, and timing. More severe cases of chorea can present as proximal and high-amplitude movements that have a flailing or kicking character, labeled *ballismus* when bilateral or *hemiballismus* when unilateral. Hemiballismus is much more common, with only a few case reports of bilateral ballismus in the literature.[1] While ballismus is usually present at rest, it often becomes more exaggerated with action.

The etiology of hemiballismus is wide-ranging and can be classified as either primary or secondary. Primary hemiballismus is usually neurodegenerative in nature whereas secondary hemiballismus is often caused by vascular, infectious, autoimmune, neoplastic, and metabolic causes that ultimately induce damage to the basal ganglia. Stroke remains the most common cause by far of hemiballismus.[2] Cavernous malformations, also known as cavernomas, rarely cause choreiform movement disorders and there are few cases reported in the literature. Here we report a case of intracerebral cavernoma presenting as acute-onset hemiballismus in a 36-year-old woman.

## Case

A 36-year-old woman presented to our hospital from an outside facility complaining of involuntary, jerking movements of her left arm, leg, and face. Two weeks prior to her presentation, she developed paresthesia in her left fingers and toes. One week later, she started to develop abnormal, uncontrollable writhing movements of her left arm. Over the course of the next week, these movements progressed to involve her left face and leg and became progressively higher in amplitude. At the time of presentation to our facility, the patient's movements had progressed to become hemiballistic in nature. She stated that these movements were momentarily and mildly suppressible but mostly continued without break. She was prescribed benzodiazepines and Tizanidine at an outside clinic with no improvement in her condition. She ultimately presented to an outside emergency department for evaluation of her symptoms. At that time, a CT scan of the brain was concerning for possible hemorrhagic stroke and patient was transferred to our facility for evaluation and management.

Patient's past medical history was significant for diabetes mellitus type 2, hypertension, and anxiety. There was no personal or family history of similar symptoms. There was no drug usage prior to the start of her symptoms. At presentation, the patient's vitals were normal and her general physical examination findings were normal. On neurological exam, patient's orientation and language were normal. Cranial nerves function was intact bilaterally. Sensation and cerebellar exam were normal as well. Deep tendon reflexes (DTR) were normally active, with no pathological reflexes. Motor examination revealed normal tone, normal bulk, and full strength throughout. However, patient exhibited continuous writhing movements of left arm and left leg with intermittent hemiballistic movements. She also exhibited moderate left facial hemichorea. These movements did not reduce in quantity or amplitude with distraction. Routine labs were normal except elevated blood glucose at 205 mg/dL). Similarly, Hemoglobin A1c was severely elevated at 14.9% (normal 4.0%-6.0%). Urinalysis revealed moderate glycosuria (500 mg/dL) and elevated urine ketones (15 mg/dL).

Non-contrast computed tomography (CT) imaging revealed a hyperdensity within the right insula and sub-insular white matter consistent with parenchymal hemorrhage of unknown etiology. Follow-up computed tomography angiogram (CTA) revealed an irregular and rounded area of low attenuation within the hyperdense insula measuring approximately 1.2 cm but was otherwise normal. There was no associated mass effect or vasogenic edema present on this study. Electroencephalography (EEG) was also normal. The differential diagnosis at this time included hemorrhagic stroke, or neoplasm. MRI of the brain with and without contrast was ordered for further evaluation and subsequently demonstrated a cavernous malformation involving the right sub-insular region, putamen, and external capsule with evidence of previous hemorrhages (Image 1). This localization of the lesion was thought to be consistent with the contralateral choreiform movements of the patient. Neurosurgery was consulted and recommended non-surgical symptomatic management due to the location of the lesion and risks of surgery.

The patient was initially started on haloperidol 5mg QID with minimal response. She was subsequently switched from haloperidol to olanzapine 2.5mg BID and the dose was later increased to 5mg BID. Additionally, tetrabenazine 12.5mg TID

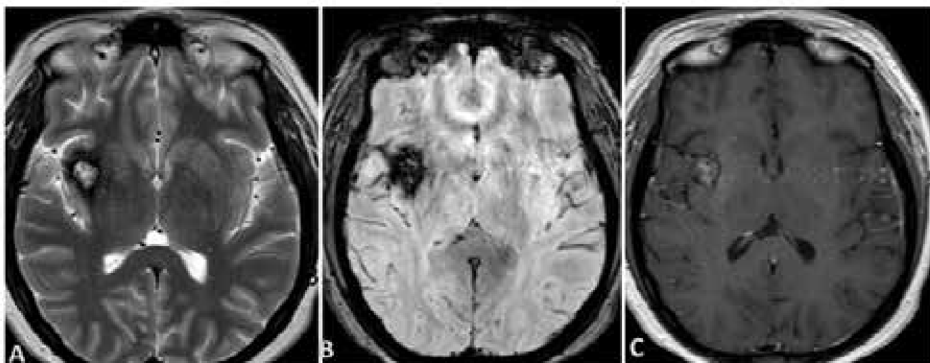


*Image 1: MRI brain shows cavernous malformation involving the right sub insular region, external capsule, and right putamen A. T2 weighted sagittal, B. GRE C. T1 post-contrast images.*

was started with goal of increasing to 25mg TID. Blood sugar was also controlled during hospitalization with sliding scale insulin regimen. With the addition of olanzapine and tetrabenazine, patient reported moderate improvement in her symptoms and was discharged home. Patient followed up in neurology clinic one month later with significant improvement in her symptoms and only mild choreiform movements of her left extremities. She was advised to continue symptomatic management with olanzapine and tetrabenazine.

## Discussion

The most common cause of hemiballismus is cerebrovascular disease such as stroke involving the subthalamic nucleus and other differential including metabolic disturbances, neoplasms, or infectious causes. Indeed, given the initial CT findings, hemorrhagic stroke was one of our first suspicions for this patient. Less common vascular causes of hemiballismus include vascular malformations such as arteriovenous malformations (AVMs), venous angiomas, capillary telangiectasias, and cavernomas.

Cavernomas, also known as cavernous hemangiomas, are benign blood vessel malformations composed of dilated, thin-walled endothelium without associated smooth muscle or elastin. They are estimated to comprise 8-15% of all cerebral vascular malformations and are most commonly located in the cerebrum with predominance for the subcortical temporal and rolandic regions.[3] Cavernomas are often asymptomatic and may be discovered incidentally or post-mortem. However, symptomatic cavernomas usually manifest in the third or fourth decade of life.[4] There is a wide array of symptomatology due to variable localization of the cavernoma. Common manifestations include hemorrhage, seizure, and progressive neurological deficits. These manifestations are believed to be due to hemorrhage, mass effect, and irritation of brain tissue from hemosiderin deposits. Although cavernomas occur with equal frequency in males and females, it is important to note that women are more likely to present with hemorrhage and/or neurologic deficits.[5]

Diagnosis of cavernomas requires adequate and appropriate neuroimaging. As symptoms may present abruptly and mimic stroke, brain CT is often the initial imaging modality utilized. CT will usually reveal an area of non-specific hyperdensity with or without areas of calcification. Since blood flow through cavernomas is minimal, angiography usually reveals no abnormalities and is rarely helpful in diagnosis. MRI is the imaging modality of choice and usually establishes the diagnosis of cavernoma.[6] MRI findings include T1W and T2W variable hyperintensities that may be surrounded by a hypointense "ring" representing previous hemorrhage. The cavernoma in our case was initially evaluated by CT and thought to represent either hemorrhage or neoplasm. It was not until MRI imaging was obtained that the diagnosis of cavernoma became evident. Therefore, timely MRI evaluation is essential to early diagnosis and management.

In our case, we believe the symptomatic transformation was likely due to bleeding in the cavernoma, as there was evidence of previous hemorrhage on imaging. However, metabolic disturbances from hyperglycemia may also have contributed to our patient's presentation. Nonketotic hyperglycemia is the second-most-common cause of hemiballismus and is often seen in patients with very poorly controlled diabetes.[7] Given our patient's HbA1c of 14.9% and hyperglycemia at presentation, it is possible that hyperglycemia resulted in additional cumulative insult to the basal ganglia that ultimately led to her symptomatic transformation. Additionally, it is important to note that our patient's cavernoma demonstrated no involvement of the subthalamic nucleus. While lesions of the subthalamic nucleus have classically been associated with hemiballismus, several reports in the literature have demonstrated that damage to several areas of the basal ganglia can produce this unique clinical disease.[8]

In conclusion, cavernomas may rarely cause symptoms of chorea or hemiballismus. In such cases, MRI is the imaging modality of choice and will usually demonstrate a lesion localized to the basal ganglia.

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# Thyroid Cancer in Arkansas: Facts & Figures

**Sarah N. O'Connor, BS[1]; Abby Holt, MPH[2]; L. Joseph Su, PhD, MPH[1,3]; Kristyn Vang, MPH[2]**

[1]*Department of Epidemiology, UAMS,* [2]*Arkansas Central Cancer Registry, Arkansas Department of Health,* [3]*Winthrop P. Rockefeller Cancer Institute, UAMS*

## Abstract

It is estimated that in 2018, thyroid cancer will be the 12th most common malignancy in the U.S. Among females, the thyroid gland is projected to be fifth in the ranking of top-ten leading cancer sites. Contrarily, among males, the thyroid gland will not rank among the ten leading cancer sites. While age-adjusted incidence rates of thyroid cancer have been steadily increasing over recent decades, especially among females, age-adjusted mortality rates have remained stable for both sexes. This report describes thyroid cancer incidence and mortality trends in Arkansas from 2001 to 2015.

**Keywords: Thyroid cancer; Arkansas**

## Introduction

**Thyroid cancer is a disease in which cancerous cells form in the tissues of the thyroid (National Cancer Institute [NCI], 2018).** The thyroid is a gland located at the base of the throat adjacent to the trachea (NCI, 2018). Butterfly-shaped, the gland has two lobes: one left and one right connected by a thin piece of tissue called the isthmus (American Cancer Society [ACS], 2016). The thyroid gland is an integral component of the endocrine system and is predominantly responsible for utilizing the mineral iodine to produce and release hormones to be dispersed throughout the body (American Thyroid Association [ATA], 2016). A healthy thyroid gland is about one inch wide. In some situations, changes in the gland's shape and size can be palpated or even visualized by patients or by their physician. A change in the gland's shape or size could be indicative of an abnormal growth of cells, also known as a nodule (ACS, 2018). While most thyroid nodules are benign or noncancerous, the American Cancer Society (ACS) estimates two out of 20 thyroid nodules are malignant or cancerous (ACS, 2018).

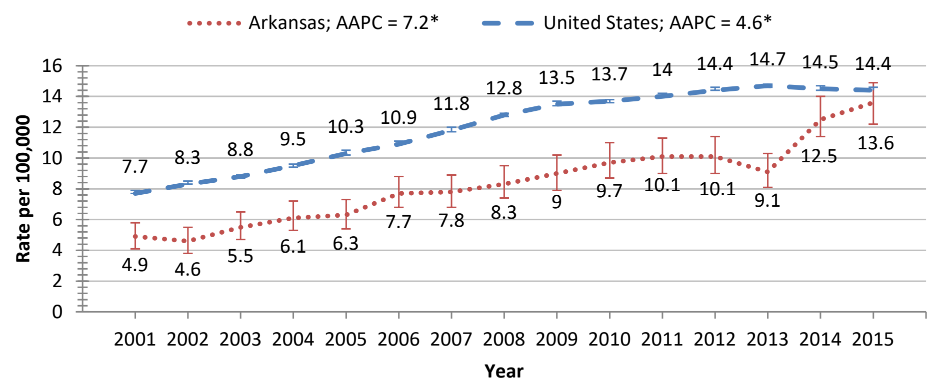
## Types of Thyroid Cancer

The four main types of thyroid cancer include: papillary, follicular, medullary, and anaplastic (NCI, 2018). Papillary and follicular types are frequently referred to as differentiated thyroid cancers. The most common type of thyroid cancer is papillary, with an estimated eight out of 10 cases diagnosed as papillary (ACS, 2018). Papillary cancers are slow growing and commonly develop in one lobe of the thyroid gland (ACS, 2018). Additionally, papillary thyroid cancer occurs most often before the age of 45, is more common in females than in males, and often spreads to the lymph nodes in the neck (NCI, 2018 & ACS, 2018).

The second most common type of thyroid cancer is follicular. An estimated one out of 10 thyroid cancers are follicular (ACS, 2018). Follicular cancers occur more frequently in countries where dietary iodine intake is low (ACS, 2018). The prognoses for both papillary and follicular thyroid cancers are favorable as both types are often treated successfully and are infrequently fatal (ACS, 2018).

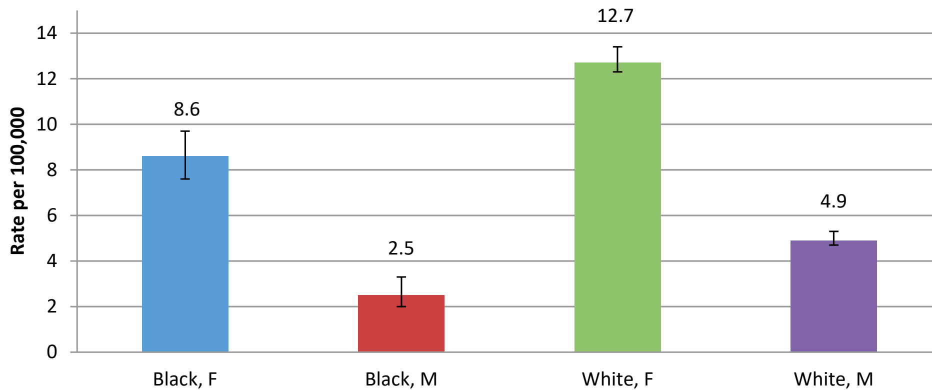
Medullary carcinomas are considered to be undifferentiated and account for an estimated 4% of thyroid cancers (ACS, 2018). Both medullary and anaplastic types of thyroid cancer are undifferentiated because of the atypical appearance of the malignant cells when compared with normal thyroid cells (ACS, 2018). They are often more difficult to detect, diagnose, and treat compared to differentiated types of thyroid cancer. Medullary thyroid cancer develops from cells of the thyroid gland that produce calcitonin, a hormone which helps to regulate the amount of calcium in the blood (ACS, 2018). There are two subtypes of medullary thyroid cancer. Familial medullary thyroid cancer is hereditary and often develops during childhood or adolescence (ACS, 2018). Approximately two out of 10 medullary carcinomas result from inheriting an abnormal gene (ACS, 2018). The second subtype of medullary thyroid cancer is considered sporadic (ACS, 2018).

***Figure 1: Age-Standardized Thyroid Cancer Incidence Trends with 95% Confidence Intervals, Arkansas and United States, 2001-2015***




**The AAPC is significantly different from zero (p < 0.05). Note: Abbreviation: AAPC - Annual Average Percent Change. AAPCs were calculated using weighted least squares method. Incidence rates per 100,000 population; age-adjusted to the 2000 U.S. Standard Population. United States Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence – U.S. Cancer Statistics 2001–2015 Public Use Research Database, based on November 2017 submission. Cases were identified based on "Site and Morphology Site Recode ICD-O-3/WHO 2008 = Thyroid". Accessed at www.cdc.gov/cancer/npcr/public-use. Retrieved on 10/03/2018.*

***Figure 2: Age-Standardized Thyroid Cancer Incidence Rates with 95% Confidence Intervals by Race and Sex, Arkansas, 2001-2015***




*Note: Incidence rates per 100,000 population; age-adjusted to the 2000 U.S. Standard Population. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence – U.S. Cancer Statistics 2001–2015 Public Use Research Database, based on November 2017 submission. Cases were identified based on "Site and Morphology Site Recode ICD-O-3/WHO 2008 = Thyroid". Accessed at www.cdc.gov/cancer/npcr/public-use. Retrieved on 10/03/2018*

The least common type of undifferentiated thyroid cancer is anaplastic (ACS, 2018). It is an aggressive and rare type of thyroid cancer, making up an estimated 2% of all thyroid cancers (ACS, 2018, NCI, 2018). Quick to metastasize and therefore difficult to treat, anaplastic carcinoma has the worst prognosis of the four types of thyroid cancer (ACS, 2018). It is known to be the most lethal type, and the median life expectancy after diagnosis is estimated to be four months (Gilliland et al., 1997 & Kebebew et al., 2005).

According to the Arkansas Central Cancer Registry (ACCR), beginning in 2001 through 2015, there were 3,067 cases of papillary, 348 cases of follicular, 89 cases of medullary, and 28 cases of anaplastic thyroid cancer observed in Arkansas (Arkansas Central Cancer Registry [ACCR], 2018).

Age, type, and stage of disease at the time of diagnosis have been determined to be significant prognostic factors of survivorship (Kebebew et al., 2000 & Modigliani et al., 1998). The five-year relative survival rate for patients diagnosed with stage I papillary or follicular thyroid cancer is approximately 100% (ACS, 2016). While the five-year relative survival rate for patients diagnosed with stage I medullary thyroid cancer is also approximately 100%, the rate for those diagnosed at stage III or IV is 81% and 28%, respectively (ACS, 2016). All cases of anaplastic carcinoma are considered to be stage IV disease, and the five-year relative survival rate is approximately 7% (ACS, 2016).

## Incidence

ACS featured Surveillance, Epidemiology, and End Results Program (SEER) case projections in the 2018 publication of *Cancer Facts & Figures,* which

*> Continued on page 138.*

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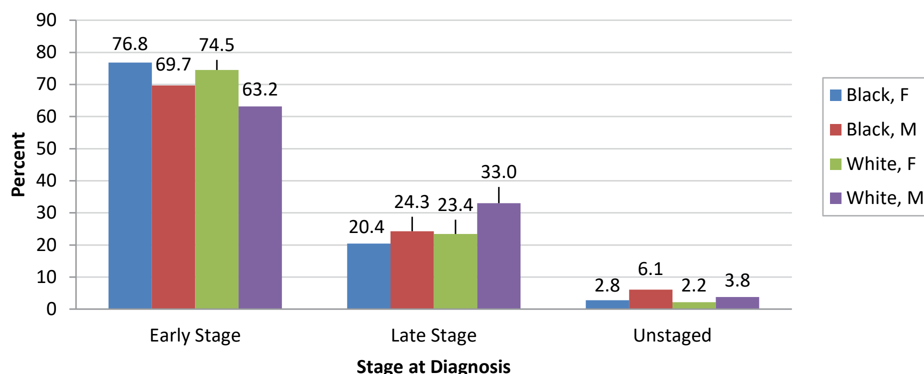
**Figure 3: Thyroid Cancer, SEER 2000 Stage at Diagnosis, by Race and Sex, Arkansas, 2001 -2015**




*Note: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. National Program of Cancer Registries and Surveillance, Epidemiology, and End Results SEER*Stat Database: NPCR and SEER Incidence – U.S. Cancer Statistics 2001–2015 Public Use Research Database, based on November 2017 submission. Cases were identified based on "Site and Morphology Site Recode ICD-O-3/WHO 2008 = Thyroid". Accessed at www.cdc.gov/cancer/npcr/public-use. Retrieved on 10/03/2018.*

estimates 53,990 new cases of thyroid cancer will be diagnosed in the U.S. in 2018 (Siegel, Miller, & Jemal, 2018). Among the new cases, an estimated 40,900 will occur in women and 13,090 will occur in men (Siegel et al., 2018). The combined-year age-adjusted incidence rate from 2001 through 2015 in the U.S. was 12.2 per 100,000 (CDC, 2016). The national age-adjusted incidence rate was 7.9 per 100,000 and 14.5 per 100,000 in 2001 and 2015, respectively (Figure 1).

According to the NPCR calculated with SEER*Stat, from 2001 through 2015 there were a total of 3,841 incident cases of thyroid cancer reported in Arkansas (ACCR, 2018). The age-adjusted incidence rate in Arkansas was 5.1 per 100,000 and 13.7 per 100,000 in 2001 and 2015, respectively (Figure 1). The combined year age-adjusted incidence rate in Arkansas during the years 2001 through 2015 was 8.6 per 100,000 (ACCR, 2018). The ACS estimates that 380 new cases of thyroid cancer will be diagnosed in Arkansas in 2018 (ACS, 2018). The statistically significant average annual percent change (AAPC) in the incidence of thyroid cancer was 7.0% ($p<0.05$) and 4.5% ($p<0.05$) in the US and Arkansas, respectively (Figure 1).

According to 2018 estimates, thyroid cancer is the fifth most common cancer among females (NCI, 2018). Contrarily, it is not among the ten leading cancer sites among males (NCI, 2018). For reasons currently unknown, thyroid cancer occurs approximately 2.6 times more often in females than in males, and this gender disparity persists across racial groups. After adjusting for age, the combined-year incidence rate for white and black females was nearly three times (Risk Ratio [RR]: 2.6 and 3.4) that of white and black males, respectively (Figure 2).

During the years 2001-2015, 69.7% of the total cases among black males were diagnosed at the early stage of disease, and the remaining 30.3% of cases were diagnosed in the late stage of disease or were not staged (Figure 3). Of the four race and sex categories, white males were most likely diagnosed with late stage thyroid cancer; while black males fared worse in regards to unstaged, followed by white males (Figure 3).

## Mortality

Comparable to the national average, during the years 2001 through 2015, there were a total of 233 deaths from thyroid cancer in Arkansas; 103 deaths among men and 133 deaths among females (CDC, 2017). After adjusting for age, the combined year mortality rate from 2001 through 2015 was 0.5 per 100,000 in Arkansas (CDC, 2017).

## Risk Factors

Other than exposure to radiation in childhood through adolescence, none of the established risk factors, such as age, female sex, inherited genetic mutations, and family history, for developing thyroid cancer is modifiable (ACS, 2017, ATA, 2016, NCI, 2018).

## Screening

The U.S. Preventative Services Task Force (USPSTF) recommends against screening for thyroid cancer among adults who are asymptomatic (USPSTF, 2017). The USPSTF concludes with sufficient certainty that screening for thyroid cancer in asymptomatic adults is potentially harmful or has no net benefit (USPSTF, 2017).

## Discussion

### *Incidence-Mortality Discrepancy*

Thyroid cancer is the most rapidly increasing malignancy in the U.S. (ACS, 2018). Some describe the trend as an epidemic of incidence. The age-adjusted incidence rate of thyroid cancer has been steadily increasing for nearly two decades (CDC, 2016) (Figure 1). While the incidence rate was increasing, the rate of mortality from thyroid cancer remained stable (CDC, 2016). This incidence-mortality rate discrepancy is suggestive of enhanced disease detection and overdiagnosis. However, the steadily increasing trend in the incidence of thyroid cancer should be monitored. There are a few reasons that can explain the alarming rapidly increased trend in thyroid cancer incidence rate observed:

### *Overdiagnosis*

In 1973, significant developments in the capabilities of medical ultrasonography led to a rise in the detection of thyroid cancer, some of which included cases of overdiagnosis (ACS, 2018). Overdiagnosis is when an asymptomatic cancer is identified through diagnostic criteria, but the malignancy is neither invasive nor so fast-growing that it would be life-threatening (NCI & Kramer, 2018). While incidence rates increased for malignant nodules of all sizes, the increases were most rapid for smaller sizes (Enewold et al., 2009). During the years 1975 to 2009, 87% of the increase in incidence can be attributed to papillary thyroid tumors that measured 2 centimeters or smaller (Davies & Welch, 2014). This discussion may lend some support to the notion that the seemingly ever-increasing incidence rate of thyroid cancer is a result of evolving diagnostic processes.

Our findings demonstrate gender disparities in thyroid cancer incidence and stage at diagnosis (Figures 2 and 3). Previous literature suggest that thyroid cancer detection is strongly related to an individual's exposure to medical care (Davies & Welch, 2014). Gender differences in the utilization of medical care (e.g., females use health care services more frequently than males (Bertakis et al., 2000)) could suggest a mechanism by which the disparity in incidence among females occurs. Additionally, males being more likely to be diagnosed in the late or unstaged phases of disease than their female counterparts lends further support for this mechanism.

### *Cohort Effect*

From the 1930s until the 1960s, children were routinely treated with external radiation therapy for benign conditions of the head and neck such as cystic acne or enlarged tonsils or adenoids (ACS, 2017, Haugen et al., 2015, Iglesias et al., 2017). After

exposure to radiation, the minimum latency period before the development of radiation-related thyroid cancers is five to 10 years (Iglesias et al., 2017). This risk increases and peaks at 20-35 years post-exposure (Iglesias et al., 2017). Therefore, persons treated as children would be in the peak post-exposure age range to develop radiation-related thyroid cancer around 1950 through 1995. The threefold increase in age-adjusted incidence rates of thyroid cancer during the years 1975 to 2005 lends support to this suggested cohort effect.

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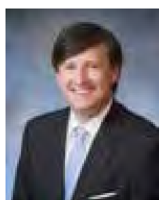

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We invite groups of five or more physicians to take advantage of the AMS Group Memberaship Program. Our goal with this program is to be able to provide the practice management resources your practice needs and the advocacy that the physician needs in one group benefit.

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Keisker, Henry W., MD
Kelley, Morris, MD
Kelley, David, DO
Kelly, Owen L., MD
Kelly, James E., III, MD
Kemp, Charles E., MD
Kemp, C. Len, MD
Kendall, William B., MD
Kendrick, Michael, MD
Kennedy, Joshua Loren, MD
Kennedy, Robert B., MD
Kent, Sheffield, MD
Kerin, Douglas, MD
Kerr, Robert L., MD
Ketcham, Michael, DO
Key, J. Michael, MD
Khalil, Mazen Younis, MD
Khalil, Omer, MD
Khalil, Muhammad Asim, MD
Khan, Ikram, MD
Khan, Nasim, MD
Khasawneh, Khaled R., MD
Kientz, John L. B., Jr., MD
Kilambi, Nirmal K., MD
Kilgore, Kenneth M., MD
Killingsworth, Stephen M., MD
Killough, Larry R., MD
Killough, Timothy, MD
Kilpatrick, Catherine, MD
Kim, Elizabeth, MD
Kim, Peter J., MD
Kim, Thomas, MD
Kimball, Shane P., DO
Kimbrough, Mary Katherine, MD
Kincheloe, A. Dale, MD
Kindrick, William C., MD
King, Michael, MD
King, Joe D., MD
King, W. David, MD
King, Deanne, MD
King, John Smith, MD
King, Mark S., MD
King, Stephen, MD
King, William R., MD
Kinslow, IVory, MD
Kirchner, Jeffrey J., MD
Kirsch, Jeffrey P., MD
Kiser, Thomas S., MD
"Kle, IVer, Trina, MD
Kleinbeck, Seth M., MD
Kleinhenz, Robert W., MD
Klepper, Charles R., MD
Klimova, Alla, MD
Klopfenstein, Keith, MD
Kluck, C. Wesley, Jr., MD
Knapple, Whitfield L., MD
Knecht, Kenneth, MD
Knight, Daniel A., MD
Knox, Robert B., MD
Knox, Thomas E., MD
Koch, Clarence W., Jr., MD
Kocher, David B., MD
Kocurek, Emily Gaddis, MD
Koehler, Andrew M., MD
Koehn, Martin A., MD
Kohler, Peter O., MD
Konis, George, MD
Koonce, Thomas W., MD
Kopparapu, Anil Kumar, MD
Korourian, Soheila, MD
Kosinski, T. Joseph, MD
Kota, Manjusha, MD
Kothari, Atul, MD
Kovaleski, Thomas M., MD
Kradel, R. Paul, MD
Kraleti, Shashank, MD
Kramer, Edward, DO
Krause, Michelle W., MD
Krisht, Ali F., MD
Kronfol, Ned O., MD
Kueter, Joseph C., MD
Kuhn, Ronald G., MD
Kulkarni, Lina, MD
Kumar, Anil, MD
Kumar, Manoj, MD
Kumar, Nihit, MD
Kumar, Sudhir, MD
Kumarapeli, Asangi Rashmi K, MD
Kumpuris, Andrew G., MD
Kuo, Karen, MD
Kusenberger, Don L., MD
Kyle, Richard S., MD
Kyser, J. Floyd, MD
L, Ivers, Nathan Duane, MD
L, Ivingston, Sean Michael, MD
Laakman, Robert W., MD
Laffoon, Gregory A., MD
Laffoon, Scott L., MD
Lai, Robert, MD
Lambert, John S., MD
Lambertsen, Zachary Aaron, MD
Lancaster, Ted S., MD
Landberg, Karl H., MD
Landers, James H., MD
Landgren, Robert C., MD
Landrum, Samuel E., MD
Landrum, Leslie G., MD
Lane, John, MD
Lane, Lydia, MD
Lane, Natalie, MD
Lane, Wesley, MD
Lang, Nicholas P., MD
Lang, David, DO
Lang, Patrick, MD
Langford, Timothy D., MD
Langston, Lloyd G., MD
Langston, James D., MD
Lansford, Bryan K., MD
Larey, Mark E., DO
Large, Erin Elizabeth, MD
Larrimer, Margaret, MD
Larson, John, MD
Laryea, Jonathan, MD
Latch, Rebecca L., MD
Laudadio, Jennifer, MD
Lavender, Robert C., MD
Lawrence, Frank M., MD
Lawrence, Brent, MD
Lawrence, Brooks, MD
Lawrence, George S., MD
Lawson, J. Larry, MD
Layton, Ann D., MD
LeBlanc, Heather N., MD
Ledbetter, Charles A., MD
Leding, Carl J., MD
Lee, Dicey G., MD
Lee, John R., MD
Lee, Jonathan E., MD
Lee, M. Mimi, MD
Lee, Ronnie D., MD
Lee, Christopher Iae, MD
Lefler, Mark W., MD
Lemdja, Mimo Rose, MD
Lendel, Vasili, MD
Lepore, Diane G., MD
Levin, Frederick R., MD
Levy, Paul Steven, MD
Levy, Rebecca, MD
Lewellen, Thomas L., Sr., DO
Lewing, Hugh S., MD
Lewis, David M., MD
Lewis, Johnathan W., MD
Lewis, Jacob, MD
Lewis, Paul Spencer, Jr., MD
Li, Ruizong, MD
Li, Maria Shih Kwan, MD
Lide, Riley Susanne C, MD
Lieblong, Justin B., MD
Lienhart, Kristen, MD
Liggin, Rebecca L., MD
Lile, Henry A., MD
Lile, Scott A., MD
Lim, William N., MD
Lim, Paolo, MD
Lincoln, Ben M., MD
Lincoln, Candy Suzanne, MD
Lincoln, Lance, MD
Lindberg, Rani, MD
Lindsay, Jason T., MD
Linker, Gary A., MD
Lipke, Jay M., MD
Lipschitz, Riley Wagner, MD
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Lipsmeyer, Keith M., MD
Little, Seth, MD
Littlejohn, Nathan, MD
Litwiller, Scott Eric, MD
Lo, Monica, MD
Lochala, Richard M., MD
Lochala, Roddy S., DO
Locke, Stephen W., MD
Lockwood, Matthew, MD
Loftis, Adrienne, DO
Loiacano, Dale, MD
Lollar, Kevin Wayne, MD
Lombeida, Juan I., MD
Long, Michael J., MD
Long, Yuanyuan, MD
Lopez, Maya Liza Conce, MD
Lorio, Jerry J., MD
Lotia, Mitesh Pravin, MD
Lott, Britton Bennett, MD
Love, Tommy L., Jr., MD
Lovett, Angela R., MD
Lowery, Robert D., MD
Lowery, Benjamin R., MD
Lowery, Lisa A. J., MD
Lowery, Robert S., MD
Lowery, Ronald L., MD
Lowery, Curtis L., Jr., MD
Lowrey, Douglas H., MD
Lowry, James L., MD
Lowther, Laura M., MD
Loyd, Gregory M., MD
Lu, Eugene, MD
Lu, Fang, MD
Lucas, Reginald A., MD
Lue, Cummins, MD
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Lum, Don, MD
Lunde, Stephen P., MD
Luo, Cathy C., MD
Luper, Rebecca A., MD
Luter, Dennis W., MD
Luttrell, Rex E., MD
Lyerly, Meghan Lindsay, MD
Lyerly, Michael, MD
Lyle, Robert E., MD
Lynch, John, DO
Lynn, W. Steve, DO
Lyons, Virgle E., Jr., MD
Lyons, Karen, MD
Lyons, Lewis Clinton, III, MD
Lytle, Jim E., MD
Lytle, John O., MD
Ma, Zhangliang, MD
Mabrey, William T., MD
Mabry, Charles D., MD
Mabry, Andrea, MD
Mac Dade, A., MD
MacBruce, Daphne, MD
Machado, Bruno Lopes Can, MD
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Mack, Mendy, MD
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Maglothin, Douglas L., MD
Magness, C. R., MD
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Magnuson, Kristopher Paul, MD
Magre, Ann-Marie, MD
Mahan, Meredith, MD
Main, Bert G., DO
Majmudar, Bittu Rajen, MD
Makhoul, Hanan, MD
Makhoul, Issam, MD
Malak, Sharp F., MD
Maline, Michael G., DO
Mallory, John A., MD
Malone, Matthew Phillip, MD
Malte, Brian Imbao, MD
Manbeck, Heather, DO
Mancino, Anne T., MD
Mancino, Michael J., MD
Mandoff, Victor L., MD
Mangroo, Navin, DO
Manning, Lance A., MD
Manning, Nirvana A., MD
Manning, Thomas A., III, MD
Manolagas, Stavros C., MD
Mansour, Munthir Mohamma, MD
Manus, Stephen C., MD
Mapes, Raelene Ann, DO
Maraboyina, Sanjay, MD
Maram, Silpa, MD
Marcus, Herschel C., MD
Markell, Kristin L., MD
Marks, Stephen R., MD
Marotte, Jeffrey B., MD
Marotti, A. Scott, MD
Marotti, Tonya L., MD
Marrero, Ralph J., MD
Marsh, James D., MD
Marsh, Michael A., MD
Martin, Joshua Gordon, MD
Martin, William C., MD
Martin, Cade, MD
Martin, Dan A., MD
Martin, Dawn M., MD
Martin, Jana M., MD
Martin, Kenneth A., MD
Martin, Kristin, DO
Martin, Robert, MD
Martin, Sara R., MD
Martin, Terri L., MD
Martindale, J. L., MD
Martindale, Mark A., MD
Martinelli, Heather A., MD
Martinello, Caroline, MD
Martinson, Alice M., MD
Maruf, Lubna, MD
Maruthur, Gopakumar, MD
Marvin, Shawn, MD
Marx, Douglas, MD
Maryanov, Timothy Yefim, MD
Marzewski, David J., MD
Masangkay, Neil, MD
Mason, William L., MD
Mason, Sharron, MD
Mason, Stephen, MD
Masood, Asif, MD
Massanelli, Gregg L., MD
Masse, Courtney, MD
Massey, James Y., MD
Massey, V. Rudolph, MD
Massey, Adam C, MD
Massoll, Nicole, MD
Masters, Chadwick J., MD
Matchett, W. Jean, MD
Mathews, Grant K., MD
Mathews, J. Steven, MD
Mathur, Ashish, MD
Mathur, Pankaj, MD
Matin, Aasiya, MD
Matlock, David, Jr., MD
Matthews, Joseph W., MD
Matthews, Eli C., MD
Mauch, E. Jane, MD
Maxson, Robert, MD
Maxwell, Teresa, MD
May, Robert H., Jr., MD
Mayfield, M. Bradley, MD
Mayhew, Kathy L., DO
Mays, Joann B., MD
McAdams, Edward, MD
McAlister, Matthew K., MD
McAlister, Michael Bradley, MD
McBee, Sara, DO
McCallum, Jennifer A., MD
McCann, Ronald K., Jr., MD
McCarley, James Robert, MD
McCarthy, Richard E., MD
McCarthy, Kathryn, MD
McCarty, Gordon E., Jr., MD
McCasland, Leslie, MD
McChristian, Paul L., MD
McChristian, Jimmy W., MD
McClain, Charles M., Jr., MD
McClain, Charles M., III, MD
McClard, Helen P., MD
McClinton, Christopher Mar, MD
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McConnell, John D., MD
McConnell, Jason Paul, MD
McCord, Virginia L., MD
McCourtney, Bill R., II, MD
McCowan, Jon, MD
McCoy, James R., MD
McCoy, Daniel W., MD
McCracken, Gail Ann, MD
McCrary, George A., MD
McCrary, Robert F., Jr., MD
McCrary, Matthew P., MD
McCraw, Barry W., MD
McDaniel, Craig A., MD
McDonald, Judy L., MD
McDonald, James E., II, MD
McDonald, James E., MD
McDonnell, Bryan D., MD
McElroy Smith, Kellye C., MD
McEntire, David, MD
McFarland, Mike S., MD
McGee, Brian, MD

McGhee, Linda M., MD
McGhee, Michael A., MD
McGowan, Robert J., Jr., MD
McGowan, Patrick Michael, MD
McGowan, William J., MD
McGrath, Christopher R., MD
McGrath, Leslye, MD
McGrath, A. Joseph, Jr., MD
McGraw, Renee P., MD
McGrew, Robert N., MD
McKee, Dwight L., MD
McKee, Steven Greg, MD
McKelvey, K. David, MD
McKelvey, Samantha S., MD
McKelvey, Kent D., Jr., MD
McKenzie, James M., MD
McKenzie, Allan, MD
McKenzie, Gregory, MD
McKnight, William D., MD
McLaughlin, ShanRES, MD
McLeane, Mark, MD
McLemore, Heather Hurdle, MD
McLeod, Kevin, MD
McMasters, Joel, MD
McMillon, Jacob, MD
McNamara, Timothy, MD
McNee, Valerie, MD
McVay Gillam, Marcene Renee, MD
Meacham, Donald F., MD
Meacham, Kenneth R., MD
Meade, Arturo E., MD
Meador, Annette P., MD
Meadors, Carol C., MD
Meadors, John, MD
Means, Kevin M., MD
Mears, Simon, MD
Medeiros, Felipe Almada, MD
Medel, Noel M., MD
Medlock, Rickey D., MD
Meek, James C., DO
Meek, Mary, MD
Meena, Nikhil, MD
Meggers, William B., MD
Mego, David M., MD
Mehaffey, Gregory, MD
Mellor, Roy D., II, MD
Melnyk, Oksana Y., MD
Melton, Clinton G., MD
Mendelsohn, Lawrence A., MD
Mendiratta, Priya, MD
Menendez, Moises A., MD
Meredith, Samuel G., Jr., MD
Meredith, James T., Jr., MD
Merritt, Tina, MD
Mertz, John D., MD
Messias, Erick, MD
Metrailer, Aaron, MD
Meyer, Brian, MD
Meziere, Tom L., MD
Mhyre, Jill Marie, MD
Mian, Amir Rafique, MD
Middleton, Toni L., MD
Miedema, Mark, MD
Miles, David, MD
Miller, Charles H., MD
Miller, Forrest, Jr., MD
Miller, James L., MD
Miller, Jeffrey J., MD
Miller, Joseph, MD
Miller, Laurence H., MD
Miller, Michael M., MD
Miller, Oren Francis, MD
Milligan, Lynda Beth, MD
Millner, Rachel Owings, MD
Milsten, Marc Steven, MD
Mings, Harold H., MD
Minton, Randell B., MD
Miquel Verges, Franscesca, MD
Mirza, Mashhud, MD
Misischia, Paul J., DO
Mitchell, George K., MD
Mitchell, Bennie E., MD
Mitchell, Aaron J., MD
Mitchell, Katherine B., MD
Mitma, Angel Alejandro, MD
Mizell, Jason, MD
Mizell, Philip, MD
Mizes, Craig Britt, MD
Mocek, Christopher K., MD
Moffett, T. Robert, Jr., MD
Molden, Raymond K., MD
Money, Wandal D., MD
Monfee, Andrew M., MD
Monroe, Lance, MD
Montgomery, Corey O., MD
Montgomery, F. Renee', MD
Montgomery, Jeffrey, MD
Montgomery, Lori E., MD
Montiel, Patricio, MD
Montoya, Gregory R., MD
Moody, Michael N., MD
Moon, Steven L., MD
Mooney, Donald K., MD
Moore, Burton A., MD
Moore, James F., MD
Moore, Robert B., MD
Moore, J. Malcolm, Jr., MD
Moore, Donald, MD
Moore, Jesse D., MD
Moore, John, MD
Moore, John David, MD
Moore, Laura, MD
Moore, Richard, MD
Moore, Samuel, DO
Moore, Thomas C., MD
Moreno Vera, Mauricio, MD
Morgan, Christopher O., MD
Morgan, Joseph, DO
Morgan, Sofie Rahman, MD
Morgan, Elizabeth Hale, MD
Morisy, Lee, MD
Morris, W. Dale, MD
Morris, Barbara K., MD
Morris, Thomas, III, MD
Morris-Besancon, Robin, MD
Morrison, Debra F., MD
Morrison, Lynnette, MD
Morrow, William R., MD
Morse, Michael, MD
Morse, Miriam Gwenyth, MD
Morshedi, Richard Grant, MD
Morton, William J., MD
Moseley, Claiborne L., II, MD
Moseley, Mark Allen, Jr., MD
Moseley, Thomas H., Jr., MD
Mosley, David H., MD
Moss, Michele, MD
Motwani, Pooja, MD
Moursi, Mohammed M., MD
Moyo-Peters, Nomathamsanqa, DO
Muesse, Jason Leonard, MD
Muldoon, Robert T., MD
Mullins, Michael S., MD
Munoz Mendoza, Jerson, MD
Murfee, Robert M., MD
Murphy, David S., MD
Murphy, Fred Y., MD
Murphy, Michael A., MD
Murphy, Robert A., MD
Murphy, Tena E., MD
Murphy, Ira J., MD
Murray, Liza C., MD
Murray, Sunshine, MD
Muse, Jerry L., MD
Mustain, William Conan, MD
Muylaert, Michel, MD
Myers, J. Mark, MD
Myhill, Jeffrey, MD
Nair, Balan A., MD
Nair, Devi, MD
Nair, Ganesh K. V., MD
Nakagawa, Mayumi, MD
Nalleballe, Krishna Chaitan, MD
Napolitano, Charles A., MD
Nardi, Caroline, MD
Narisetty, Keerthy, MD
Nash, Gary Monroe, Jr., MD
Nassri, Louay K., MD
Naylor, David L., Jr., MD
Neaville, Gregory W., MD
Nehus, Ezechiel R., MD
Neis, John Paul, MD
Neis, Paul R., MD
Nelsen, David A., Jr., MD
Nelson, Alvah J., III, MD
Nelson, David G., MD
Nelson, Kristen M., MD
Nelson, Richard A., MD
Nelson, Tyler J., MD
Nelson, Garrett, MD
Nesmith, Clare C., MD
Neuhauser, Jeffrey H., DO
Neville, Kathleen A, MD
Nevins, William H., MD
New, Kenneth O., MD
Newbern, D. Gordon, MD
Newbolt, Evan, MD
Newcomb, T.L., MD
Newman, Mark S., MD
Newsum, Jon Kirby, MD
Newton, James Arthur, Jr., MD
Nguyen, Duong H., MD
Nguyen, Larry L., MD
Niazi, Tariq, MD
Niba, Suh N., MD
Nicholas, Richard W., Jr., MD
Nichols, David R., MD
Nichols, Scott R., MD
Nicholson, Julia, MD
Niemyer, Joselin G., MD
Nix, Matthew, MD
Nix, Richard A., MD
Nix, Thomas, MD
Nixon, David T., MD
Nixon, D. Allen, Jr., MD
Noel, Stacey W., MD
Nolder, Abby Renee, MD
Nolen, Lauren, MD
Nolen, Michael T., MD
Nolen, John R., Jr., MD
Nolewajka, Andre J., MD
Noonan, Robert F., MD
Norris, E. Lloyd, MD
Norris, B. Blake, MD
Norris, L. Parker, MD
Norton, George A., MD
Norton, Brian, MD
Norys, James William, MD
Novack, Amanda J., MD
Nowlin, James Bill, MD
Ntambi, James Alfred, MD
Nuckolls, J. William, MD
Nugent, Richard R., MD
Nutt, Hugh A., MD
Nutt, Angela K., MD
Nwokeji, Kris I., MD
Nwude, Ezinne, MD
Oakhill, Gregory J., MD
O'Brien, Mark S., MD
O'Brien, Marcus D., MD
Ocal, Eylem, MD
Ochoa, Daniela, MD
Ochoa, Eduardo R., Jr., MD
O'Connell, Joseph R., MD
Oddson, Terrence A., MD
Oden, Jon David, MD
Odum, Neadum Joseph, III, MD
Oglesby, Walter R., MD
O'Keefe, Kevin Joseph, MD
Okoye, Christian Chine, MD
"Ol, IVe, Robert J., Jr., MD
Olaya, Julio R., MD
Olgaard, Ericka Jane, DO
Oltmann, Michael, MD
O'Malley, Lawrence Kevin, II, MD
O'Neill, Joshua M., MD
Ong, Shirley, MD
Ong, Soraya, MD
Onisei, Anna M., MD
Onisei, Ducu F., MD
Onteddu, Sanjeeva Reddy, MD
Orsburn, H. Madison, MD
Orsini, Alexander N., MD
Osam, Patrick N., MD
Osleber, Lindsay Hayat, MD
Osleber, Michael Frederi, MD
Ostrom, Anna Truss, MD
Othman, Randa N. A., MD
Otter, Laura, MD
Over, Darrell R., MD
Overacre, Robert L., MD
Overley, Samuel Clay, MD
Owen, Richard R., Jr., MD
Owens, R. Brian, MD
Owens, Ben E., Jr., MD
Owens, Kristin Elizabe, MD
Owings, Richard A., MD
Oxner, Troy W., DO
Ozdemir, Aytekin, MD
Ozdemir, Burcu, MD
Pabona, John, MD
Pace, Daniel, MD
Pace, Rose A., MD
Pack, Philip Paul, III, DO
Padalino, Joseph Louis, MD
Paden, Tim C., MD
Pagan, Jonathan David, MD
Page, Robert, MD
Pait, Thomas G., MD
Paixao, Andre Rodrigues, MD
Palmer, Hal E., MD
Palmer, Jonathon D., MD
Palys, Viktoras, MD
Pandey, Soumya, MD
Pandey, Tarun, MD
Pang, Robert R., MD
Pappas, James J., MD
Pappas, John J., MD
Parchman, A. Janette, MD
Paris, Charles H., MD
Parish, Barton David, MD
Park, John P., MD
Parker, Thomas G., MD
Parker, Lee B., Jr., MD
Parker, Jonathan, MD
Parker, L. Joseph, MD
Parkhurst, J. Rod, MD
Parkhurst, Gary, MD
Parmley, Patricia E., MD
Parmley, Matthew, MD
Parnell, Clifton, III, MD
Parray, Tariq, MD
Parris, Ronald Neal, MD
Partridge, Paige, MD
Pasala, Sanjir, MD
Paschall, Chad E., MD
Patel, Ashay Sharad, DO
Patel, Dharmendra V., MD
Patel, Kamal, MD
Patel, Tejas, DO
Patil, Naveen, MD
Patil, Sowmya N., MD
Patrice, Kelly-Ann, MD
Patterson, Winston, MD
Patton, George L., MD
Patton, Kristin Doffing, MD
Patton, W. Curtis, MD
Paul, Christopher Ala, MD
Paul, Eric, MD
Paulk, Clyde D., MD
Paulus, Thomas E., MD
Paulus, Stephen Ernest, MD
Paydak, Hakan, MD
Paylor, Rogerich T., MD
Payne, Cheryl L., MD
Payne, Michael, II, MD
Payton, Terry, MD
Peacock, Loverd M., MD
Peal, Gabriel M., MD
Pearce, Larry W., MD
Pearce, Malcolm B., MD
Pearce, Charles E., MD
Peck, Cole Stephens, MD
Peebles, Samuel W., MD
Peek, Richard, MD
Peeples, R. Earl, Jr, MD
Peeples, Guy L., MD
Peeples, Sara, MD
Pellegrino, Richard G., MD
Pemberton, John David, DO
Penick, Edward, III, MD
Pennington, Donald H., MD
Pennington, Jaymie, MD
Penor, Stephen P., MD
Perkins, Lalita, MD
Perkins, Richard, MD
Perkins, Frederick H., Jr., DO
Perry, Tamara T., MD
Pesek, Robert D., MD
Peters, Phillip J., MD
Petersen, Erika Anne, MD
Peterson, Mark A., MD
Petursson, Gissur J., MD
Pevahouse, Joe B., MD
Peyton, Shawn C., MD
Pham, Dac, MD
Phan, Nhan Marc, MD
Phelan, Christie B., MD
Phelan, David A., MD
Phillips, Hannah M., MD
Phillips, Amy M., MD
Phillips, Blake, MD
Phillips, David L., MD
Phillips, Don R., MD
Phillips, Kevin Clark, MD
Phillips, Paul, MD
Phillips, Sumer, MD
Pickett, James D., MD
Pickhardt, Mark G., MD
Piediscalzi, Nicholas, MD
Pierce, Barry D., MD
Pierce, Kelly A., MD
Pierce, Reid G., MD
Pierce, Ruston Y., MD
Pierce, Trent P., MD
Pike, John D., MD
Pillow, Edward L., MD
Pillow, Gill G., MD
Pillow, James H., MD
Pillow, Jessica Leigh, MD
Pillow, Jill S., MD
Pillsbury, Richard C., MD
Pina Oviedo, Sergio, MD
Pinto Miranda, Veronica, MD
Piontek, Joseph, DO
Pippenger, Mark A., MD
Pirnique, Allan S., MD
Pittman, Christopher, MD
Platt, Michael R., MD
Pleimann, Jason H., MD
Podrazik, Paula, MD
Pollard, Arlee E., MD
Pollard, J. Alan, MD
Pollard, Kathleen, MD
Pollock, Michael M., MD
Pondexter Hunter, Regina, MD
Pope, Norton, MD
Pope, Christopher H., MD
Pope, David N., MD
Pope, Kevin L., MD
Porcelli, Phillip Michael, DO
Porter, Robert A., Jr., MD
Porter, Lewis E., MD
Post, James M., Jr., MD
Post, Ginell Ristic, MD
Potts, Michael E., MD
Pouly, Severin Marcel, MD
Pounders, John, Jr., MD
Powell, Brenda N., MD
Powell, Curtis Ryan, MD
Powell, Justin A., MD
Power, Robert C., MD
Prather, Jerry L., MD
Pratt, Cedric, DO
Prayaga, V. Sastry, MD
Prewitt, Taylor A., MD
Price, Lawrence C., MD
Price, Claire, MD
Price, Herbert H., III, MD
Prince, Heidi Ritze, DO
Pritchard, Jack L., MD
Pritchard, Charles Ridgell, MD
Pritchard, Jamie, MD
Pritchett, Daniel P., MD
Priyambada, Priya, MD
Prodhan, Parthak, MD
Pruiksma, Richard, MD
Pruitt, David E., MD
Pruitt, Tad, MD
Pullig, Thomas A., MD
Pummill, Daniel, MD
Pumphrey, Carla, MD
Purifoy, Shawn W., MD
Purvis, Kenneth W., MD
Putman, Chad Wayne, MD
Pyle, David, MD
Qadir, Fauzia, MD
Quade, Deborah S., MD
Quang, Lawrence, MD
Queeney, Joseph, DO
Quevillon, Robert D., MD
Quick, Charles M., MD
Quinn, Brian D., MD
Qureshi, Amir M., MD
Rabenhorst, Brien Michael, MD
Rabideau, Dana, MD
Racher, Mary Luann, MD
Rader, George, MD
Radvany, Martin Geza, MD
Ragland, James, MD
Ragland, Matthew, MD
Rainosek, David E., MD
Rains, Jeffrey, MD
Raisingani, Manish Gope, MD
Raja, Ali I., MD
Raja, Vijay N., MD
Raja, Grace Lee, MD
Ram, Roopa, MD
Ramakrishnaiah, Raghu Hosahalli, MD
Ramirez, Raul R., MD
Ramirez, Alejandro, MD
Ramiro, Mark A., MD
Rammos, Stylianos Kyria, MD
Ramos, Jeanette Marie, MD
Ranabothu, Saritha, MD
Randolph, GanRES, MD
Raney, Veronica M., MD
Raney, Herschel D., Jr., MD
Rankin, Joshua D., MD
Rankin, Katherine Eliza, DO
Ransom, C. E., Jr., MD
Rao, Aravind N., MD
Rapp, Richard J., MD
Rasberry, Ronnie D., MD
Rasmussen, Daniel Eugene, MD
Rasool, Shuja, MD
Ratcliff, John B., MD
Rauls, Russell, MD
Rayaz, Khalid, MD
Rayburn, John, MD
Rayburn, S. Thomas, III, MD
Ray-Griffith, Shona, MD
Raymond, Thomas H., MD
Raymundo, Bryan D., MD
Rector, Nancy F., MD
Redding, Allen H., MD
Reddy, Raghu, MD
Reddy, Arundathi M.N., MD
Reding, William M., MD
Redko, Oksana, MD
Redman, John F., MD
Redman, Anna T., MD
Reemtsen, Brian, MD
Reese, Michael C., MD
Reeves, Amy C., MD
Reeves, Carolyn, DO
Reeves, James, MD
Reid, Gene W., MD
Reid, Lloyene B., MD
Reinhart, Jeffrey H., MD
Reinholtz, Richard Ronald, MD
Reinsvold, Thomas Michael, MD
Reiter, Daniel, DO
Renard, Regis Louis, MD
Renno, Hannah Maling, MD
Renno, Markus Stephan, MD
Revard, Ronald E., MD
Reyenga, William, MD
Reynolds, Caroline Cade, MD
Reynolds, Kimberly, MD
Reynolds, Kirk A., MD
Rhodes, David M., MD
Rians, John, MD
Ribeiro, Paulo A., MD
Ricca, Gregory F., MD
Rice, Robert L., MD
Richard-Davis, Gloria Ann, MD
Richey, Jason D., MD
Richter, Gresham T., MD
Rico Crescencio, Juan Carlos, MD
Riddell, C. Michael, MD
Ridha, Ali Mundhir T., MD
Riggs, Ann T., MD
Riley, Don C., MD
Riley, William H., MD
Riley, Clayton, MD
Risch, Patrick, MD
Ritchie, Robert R., MD
Ritz, Ralph C., DO
Robben, Catherine, MD
Robben, John, MD
Robbins, Joseph, MD
Robbins, Kenneth V., MD
Robbins, Mark B., MD
Roberds, Aaron, MD
Roberson, Michael C., MD
Roberson, Russell Stuart, MD
Robert, Jon M., MD
Roberts, Franklin D., MD
Roberts, Kevin, MD
Roberts, Thomas S., MD
Robertson, Jeffrey David, MD
Robertson, Ronald D., MD
Robinette, James M., MD
Robinson, Eric J., MD
Robinson, Joe, MD
Robinson, Lonnie S., MD
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Rocha, Carlos B., MD
Roda, Ferdinand T., MD
Rodgers, Charles H., MD
Rodgers, Porter R., Jr., MD
Rodgers, Chad T., MD
Rodgers, Drew, MD
Rodgers, Kenneth F., MD
Rodrigues, Barbara N., MD
Rodriguez, Analiz, MD
Rogers, Henry B., MD
Rogers, Henry L., MD
Rogers, Becky J., MD
Rogers, Elizabeth Jeann, MD
Rogers, Marc A., MD
Rogers, Michael L., MD
Rogers, Hollis T., III, MD
Rollefson, William A., MD
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Romine, James C., MD
Ronck, John J., MD
Roper, Richard K., MD
Rosenbaum, Eric, MD
Rosenbaum, Thea, MD
Rosenfeld, Stephan B., MD
Rosenzweig, Kenneth M., MD
Ross, Cynthia, MD
Ross, Joseph G., MD
Ross, Ashley S., MD
Ross, Christopher, MD
Ross, Douglas B., MD
Ross, Ashley S., III, MD
Ross, Jeanne, MD
Rothrock, Rebecca Ann, MD
Roudachevski, Evgueni, DO
Rountree, Glen A., MD
Rouse, Kevin G., MD
Routon, Stephen G., MD
Rowe, James, MD
Rowe, Tracy L., MD
Rowell, Amy Catherine, MD
Rozas, David R., MD
Rubenow, Jon C., DO
Rucker, Gari D., MD
Rudder, James K., MD
Rude, Brenda, MD
Rude, Mary Katherine, MD
Rudorfer, Bennett, MD
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Ruiz-Rodriguez, Ernesto, MD
Rumans, Todd M., MD
Runion, Lance K., MD
Russell, James D., MD
Russell, John R., MD
Russell, E. Brian, MD
Russell, Mark S., MD
Russell, Shelley W., MD
Rutherford, Jeremiah, MD
Rutlen, David L., MD
Ryals, Rickey O., MD
Ryen, Christopher Cha, DO
Rypkema, Scott W., MD
Saccente, Carolyn S., MD
Saccente, Michael, MD
Sachleben, Brant Colin, MD
Sadiq, Bilal, MD
Saer, Edward H., III, MD
Saied, Nahel N., MD
Saitta, Michael R., MD
Sakharpe, Aniket, MD
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Saleh, Abdel-Rahman, MD
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Sales, Joseph H., MD
Sallam, Ahmed Abdel Bas, MD
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Salmon, James, MD
Salvador, Ester A., MD
Samant, Rohan S., MD
Samanta, Debopam, MD
Samman, Zaki A., MD
Samuel, Ferdinand K., MD
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Sanders, James W., MD
Sanders, Robert E., DO
Sanders, Scott, MD
Sanders, Ronald, Jr., MD
Sanders, Sara Camp, MD
Sandlin, Adam T., MD
Sanford, Joseph, Jr., MD
Sangster, Michael G., MD
Sanson, Jodi, MD
Sarinoglu, Cem, MD
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Sasser, L. Gordon, III, MD
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Savage, John Englebert, MD
Savage, Kamara, MD
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Schach, Christopher Pat, MD
Schaefer, Eric Scott, MD
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Schaefer, Gerald, MD
Schafer, Liudmila N., MD
Schechter, Ron D., MD
Scheer, Blake, MD
Schefano, Frank, III, MD
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Schemel, William H., MD
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Schexnayder, Stephen M., MD
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Schinke, Carolina Doroth, MD
Schlesinger, Kelli, MD
Schlesinger, Scott M., MD
Schluterman, Christopher A., MD
Schmitz, James L., DO
Schmitz, Michael L., MD
Schmitz, Susan, MD
Schmitz, Kelli Ruth, MD
Schmucker, Tracey A., MD
Schochler, Amy, DO
Schock, Ethan J., MD
Schoenberger, Carl Ira, MD
Schoettle, Steve P., MD
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Schumacher, Alan, MD
Scott, Amy, MD
Scott, Charles, MD
Scott, Lensey Crashun, MD
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Scotten, Mitzi, MD
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Scroggins, Sam J., MD
Scruggs, Jan W., MD
Scruggs, Jennifer, MD
Scurlock, Amy M., MD
Scurlock, John P., MD
Seale, James E., Jr., MD
Seale, J. Justin, MD
Seale, Lindsey N., MD
Searcy, Robert M., MD
Seffense, Stephen, MD
Seglem, Douglas Edward, DO
Seib, Paul M., MD
Sell, Christian Allen, MD
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Sethi, Rajesh, MD
Seupaul, Rawle Anthony, MD
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Shah, Hemendra R., MD
Shah, Vishank Arun, MD
Shahim, Reza, MD
Shalin, Sara Christine, MD
Shanbhag, Anusha Gopalkri, MD
Shanlever, William T., MD
ShanRES, Melissa L., MD
Sharma, Megha, MD
Sharma, Aparna, MD
Sharp, Jim D., MD
Sharp, Greg B., MD
Shaver, Robert O., MD
Shaver-Lewis, Mary Jo, MD
Shaw, Collie B., MD
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Shaw-Devine, Allison, MD
Shea, James, MD
Shedd, Leonus L., MD
Shelby, Eugene M., MD
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Shelton-Lang, Kyla Rae, MD
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Shorts, Stephen D., MD
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Shrum, Kelly D., DO
Shrum, Steven, MD
Shuffield, James E., MD
Shukla, Ankita, MD
Shurley, Floyd A., Jr., MD
Siddiqui, M. Saif-Ur-Rehm, MD
Siddiqui, Meraj, MD
Siddiqui, Sayyadul M., MD
Siems, Martin L., MD
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Simpson, P. B., Jr., MD
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Sims, James M., MD
Sines, Daniel, MD
Sing, Rachel, MD
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Skaug, Joy Catherine, MD
Skaug, Phyllis, MD
Skaug, Warren A., MD
Skelley, Christopher, MD
Skelley, Kimberly B., MD
Slagle, Brittany Marie, DO
Slater, John G., Jr., MD
Slayden, John E., MD
Sloan, Fredric J., II, MD
Sloan, Eugene E., MD
Slotcavage, Rachel Lynne, MD
Smart, Douglas F., MD
Smith, Douglas B., MD
Smith, George W., MD
Smith, John D., MD
Smith, Phillip L., MD
Smith, Ronald D., MD
Smith, Bruce L., Jr., MD
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Smith, Melanie F., MD
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Smith, Michael, MD
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Smith, Jerakaycia Dawn, MD
Smolarz, Casey M., MD
Snead, Gregory Ryan, MD
Sneed, Jane M., MD
Sneed, Thomas B., MD
Snider, James R., MD
Snodgrass, Phillip A., MD
Snodgrass, Scot J., MD
Snowden, Jessica Nichols, MD
Snyder, Norman I., MD
Snyder, Steven D., MD
Sokolow, David Philip, MD
Solomon, J. Alan, MD
Somers, A. Jack, Jr., MD
Sorrels, John W., MD
Sorsby, Stephen, MD
Sosebee, William S., MD
Sosnoff, David Ryan, DO
Spades, Sebastian A., III, MD
Spann, Aaron, MD
Spear, Jeffrey, MD
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Speed, Darrell L., MD
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Speer, Hoy B., Jr., MD
Speights, Shane R., DO
Spence, Don K., MD
Spencer, Clay R., MD
Spencer, Gene, Jr., MD
Spond, Matthew Frank, MD
Springer, William Y., MD
Springer, Dan J., MD
Sra, Surinder P., MD
St. Amour, Thomas E., MD
St. Clair, John T., Jr., MD
St. Clair, Kevin L., MD
St.Pierre, Mark A., MD
Stack, Brendan C., Jr., MD
Staggs, David L., MD
Stainton, Robert M., Jr., MD
Stair, J. Michael, MD
Stallings, Joe H., Jr., MD
Stallings-Archer, Kandi Alicia, MD
Stancil, Vicki, MD
Stanford, Kendall L., MD
Stanley, James, MD
Starnes, Harrison Benjam, MD
Steele, Jeffery W., MD
Steele, Robert, MD
Steely, Donald E., MD
Stefans, Vikki A., MD
Steiger, Charles A., MD
Steliga, Matthew, MD
Stephens, Kenneth, MD
Stern, Scott J., MD
Sternberg, Jack J., MD
Stevenson, Richard, MD
Steward, Katherine R., MD
Stewart, David L., MD
Stewart, Jerry R., MD
Stewart, Garry L., MD
Stewart, Jason G., MD
Stewart, Jeffrey P., MD
Stewart, Alvin Frank, MD
Stibich, Adam S., MD
Still, Lindsay Michell, MD
Stinnett, Scott G., MD
Stinnett, Thomas C., MD
Stipanuk, Gerald, MD
Stokes, B. Douglas, MD
Stolz, Gerald A., Jr., MD
Stolzy, Sandra, MD
Storey, Mark R., MD
Storeygard, Alan R., MD
Storm, Elizabeth A., MD
Stough, Dow B., IV, MD
Stout, Michael D., MD
Stout, Paul W., MD
Strain, David Vincent, MD
Strickland, Stanley L., MD
Strickland, Natalie Renee, MD
Stringfellow, Jerry B., MD
Stripling, Mark C., MD
Strode, Steven W., MD
Strong, Aaron Copple, MD
Stroope, George F., MD
Stroud, James D., MD
Stroud, Michael H., MD
Stroud, Steven Dean, MD
Strub, Graham Michael, MD
Stubblefield, Sandra C., MD
Studdard, James D., MD
Suarez, "V, IViana, MD
Sublett, Jackie, II, MD
Subramanium, Anandaraj, MD
Sudbrink, David W., MD
Suen, James, MD
Suffridge, Phillip J., MD
Sukumaran, Sukesh, MD
"Sull, IVan, Charles D., MD
"Sull, IVan, Thomas, MD
"Sull, IVan, Elizabeth, MD
Sultana, Sania, MD
Susoreny-Velgos, Jennifer, DO
Sutterfield, Vikki, MD
Sward, Lindsey, MD
Swicegood, John R., MD
Swift, ShanRES, MD
Swindle, James Sanders, MD
Swymn, Jeremy, MD
Szabo, Joanne S., MD
Tackett, Jessica, DO
Taggarse, Amit Kishore, MD
Taggart, Sam D., MD
Tait, Mark, MD
Talbert, Michael L., MD
Talley, H. Aubry, MD
Tamas, David E., MD
Tamayo-Enriquez, Gerardo, MD
Tamboli, Cyrus Pesi, MD
Tanaka, George, MD
Tangunan, Priscilla L., MD
Tantchou, Pierrette, MD
Tariq, Sara G., MD
Tas, Emir, MD
Tas, Vildan, MD
Tasneem, Sara, MD
Tata, Nazneen, MD
Tate, Sidney W., MD
Tate, Julie, MD
Taylor, David R., MD
Taylor, Christopher, MD
Taylor, Robert D., MD
Taylor, Tommy G., MD
Taylor, Chad, MD
Taylor, Maxwell, MD
Taylor, John Roland, III, MD
Teal, Linda N., MD
Tedder, Michael E., MD
Teeter, Stanley D., MD
Templeton, Gary L., MD
Teo, Esther Huah-Chi, MD
Terry, Julian, MD
Terry, Philip, MD
Thanendrarajan, Sharmilan, MD
Thapa, Purushottam B., MD
Thapa, Sushma K., MD
Tharian, Benjamin, MD
Tharp, John G., MD
Tharp, Shane J., MD
Thaxton, Dylan Paul, MD
Thaxton, Mary, MD
Thibault, Frank G., Jr., MD
Thihalolipavan, Sudarone, MD
Thomas, Jerry L., MD
Thomas, A. Henry, MD
Thomas, Billy R., MD
Thomas, Brad A., MD
Thomas, Gary A., MD
Thomas, Tamara Onika, MD
Thomas, W. Al, MD
Thomas, Reed, MD
Thompson, Barry V., MD
Thompson, S. Berry, Jr., MD
Thompson, Bobby A., MD
Thompson, Bruce A., MD
Thompson, Joseph W., MD
Thompson, Tommy Clay, MD
Thompson, Tonya M., MD
Thorn, Garland M., Jr., MD
Throneberry, J. Bart, MD
Thrower, Rufus, MD
Thummalakunta, Laxmi
Narasimha, MD
Thurlby, Jefferson, MD
Thurman, Regina E., MD
Tidwell, Kenneth, Jr., MD
Tilley, James B., MD
Tilley, Roger L., MD
Tilley, Ronald, MD
Tilley, Steve, MD
Tillmanns, Todd David, MD
Tingle, Sarah, MD
Tinnesz, Thomas J., MD
Tippin, Philip, MD
Tippin, Zachary, MD
Tirado, Emilio, MD
Titus, Janet L., MD
Tjandra, Sarikun, MD
Tobey, Nathan, MD
Togami, Julia C., MD
Tolleson, Claudia M., MD
Tommey, C. E., MD
Tommey, Robert C., MD
Tompkins, Esther Helen, DO
Totten, Matthew B., MD
Tracy, C. Clyde, MD
Tracy, Phillip A., MD
Tracy, W. Lee, MD
Travis, Patrick M., MD
Treece, BranRES A., MD
Treptow, Douglas A., MD
Trice, James, MD
Trigg, Laura L., MD
Tripathi, Samidha, MD
Tuck, Rebecca, MD
Tucker, Charles, MD
Tucker, W. Everett, MD
Tucker, James, MD
Tucker, James C., MD
Tucker, R. Stephen, MD
"Tuk, IVakala, P. Reddy, MD
Tukaye, "Deepali N, IVas, MD
Tullis, Joe M., MD
Tulunay Ugur, Ozlem, MD
Tumlison, Joel, MD
Turano, Jodi, DO
Turley, Jan T., MD
Turnage, Richard H., MD
Turner, April, DO
Turner, Clinton Charles, MD
Turner, Jennifer M., MD
Turner, Kenneth B., MD
Turner, ShanRES, MD
Tuttle, Larry D., MD
Tvedten, Tom, MD
Tyler, Richard L., MD
Ulmer, Sue, MD
Umbarger, Bradley R., MD
Umeora, MaryJoanne
Chin, MD
Utley, L. Thomas, MD
Uwaydat, Sami Hilmi, MD
Valach, Daniel P., MD
Vallery, Samuel W., MD
Van Hemert, Rudy L., MD
Van Rhee, Frits, MD
Van Zandt, Janelle, MD
Vancil, Tobias J., MD
Vander Schilden, John L., MD
Vanderburg, Edward, MD
Vanderpool, Roy E., MD
Vanderpool, R. Douglas, MD
VanHook, Robert, MD
Vargas, Victor G., MD
Vargas, Fernando Brian, MD
Vasudevan, Kanaka, MD
Vasudevan, P., MD
Veerapandiyan, Aravindhan, MD
Veerapaneni, Karthika
Durga, MD
Veeraputhiran, Muthu
Kumaran, MD

Venkata, Anand Narasimha, MD
Verma, Rashmi, MD
Vermont, Charles A., MD
Verser, Michael W., MD
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Vice, Mark A., MD
Vickery, Jason E., MD
Viegas, Mark, MD
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Virmani, Misty LaNell, MD
Virmani, Tuhin, MD
Vista, Ramon, Jr., MD
Viswanathan, Nisha, MD
Vogel, Robert G., MD
Voicu, Laura Ann, MD
Voinea, Alina M., MD
Voise, Nathan, DO
Vold, Steven D., MD
Vollman, Don B., Jr., MD
Vonlanthen, Maryelle G., MD
Vovor-Dassu, Komi Elikplim, MD
Vowell, Don R., MD
Vowell, Nannette, MD
Vuong, Mai, MD
Vural, Emre A., MD
Vyas, Keyur S., MD
Waanders, Nicholas, MD
Wadley, David L., MD
Wagenhauser, Karl, MD
Wagner, Stephen, MD
Wagner, Tommy W., Jr., MD
Wah, John C., MD
Wahman, Gerald E., MD
Walden, Thomas E., MD
Walden, Justin Keith, MD
Waldrip, William J., III, MD
Walker, Brent, MD
Walker, Lee W., MD
Walker, Meredith M., MD
Walker, Randy D., MD
Wall, Brandon J., MD
Wallace, Thomas R., MD
Wallace, Aaron Jack, MD
Wallace, Henry C., MD
Wallace, Thomas, MD
Walley, Lindsey N., MD
Walsh, Benjamin, MD
Walsh, Bradley J., MD
Walsh, D. Scott, MD
Walter, Donnal, MD
Walters, William, MD
Walters, Andrew, MD
Walton, Robert B., MD
Wang, Dai-Yuan, MD
Wang, Jack, MD
Wang, Xiaofei, MD
Waqas, Muhammad, MD
Ward, Hiram T., MD
Ward-Jones, Susan, MD
Ware, Gerald T., MD
Warner, Milo N., DO
Warner, David, MD
Warner, Robert L., Jr., MD
Warr, James, MD
Warr, Shelley J., MD
Warren, E. Taliaferro, MD
Washington, Erma S., MD
Watkins, Charles J., MD
Watkins, Julia M., MD
Watkins, W. Bryan, MD
Watkins, Joseph Wesley, IV, MD
Watson, Daniel W., MD
Watson, Donya, MD
Watson, Kirk D., MD
Watson, Jessica, MD
Wayne, Brian S., MD
Wayne, Rachel L., MD
Weathers, Tiffany, MD
Weaver, William J., MD
Weaver, Robert H., MD
Weaver, Michael, MD
Webb, Christopher G., MD
Webb, John W., MD
Webb, R. Timothy, MD
Webb, Sherilyn M., MD
Webber, David L., DO
Weber, Edward R., MD
Weber, Michael J., MD
Webster, Sarahrose, MD
Weed, Wendell W., MD
Weedman, James B., MD
Wei, Jeanne Y., MD
Weiler, Luke, MD
Weiner, Steven Lyle, MD
Weinstein, Robert S., MD
Weiss, John B., MD
Weiss, David W., MD
Weisse, John J., MD
Wejinya, Adesua, MD
Welch, Samuel B., MD
Wellons, James A., Jr., MD
Wells, John D., MD
Wende, Raymond A., MD
Wendel, Mark A., MD
Wendel, Paul J., MD
Wenger, Alyssa N., MD
Wenger, Kristina, MD
Wenger, Aaron Samuel, MD
West, Lillian Chinyer, MD
Westbrook, Kent C., MD
Westbrook, Michael R., MD
Westbrook, September A., MD
Westfall, Christopher T., MD
Wewers, Darin, MD
Whaley, Heather, MD
Wharton, Joe H., MD
Wheeler, J. Gary, MD
Wheeler, Richard P., MD
White, Phillip L., MD
White, Robert B., MD
White, Aaron E., MD
White, Anthony T., MD
White, Bradley A., MD
White, Bruce, MD
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White, William M., MD
White, Alexis Colbea, MD
Whiteley, Andre B., MD
Whiteside, Thomas, MD
Whiting, Tom D., MD
Whorton, Gregory V., MD
Widner, Aimee, MD
Wiedower Eble, Amy C., MD
Wiegel, Micah David, MD
Wikman, John H., MD
Wilbanks, Lindsey, MD
Wilber, Stephen R., DO
Wilder, Diane D., MD
Wilkerson, Danny L., MD
Wilkes, Byron, MD
Wilkie, Julie A., MD
Wilkin, Michael Neal, MD
Wilkins, James D., MD
Wilkins, Ngozidilenna, MD
Wilkins, John, MD
Williams, W. Curtis, MD
Williams, C. David, MD
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Williams, G. Doyne, Jr., MD
Williams, Alan, MD
Williams, Alonzo D., MD
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Williams, Chrysti Lyn, MD
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Williamson, Adrian, III, MD
Williford, Dustin, MD
Willis, Charlotte R., MD
Willis, Erin W., MD
Wills, Pamela J., MD
Wills, Paul I., MD
Wilson, Jack C., MD
Wilson, James W., MD
Wilson, John L., MD
Wilson, Frank J., Jr., MD
Wilson, Joe T., Jr., MD
Wilson, Alan K., MD
Wilson, Michael R., MD
Wilson, Michael P., MD
Wineland, Andre M, MD
Winston, Scott D., MD
Winterstern, Aaron Michael, MD
Wirges, Marla, MD
Wirges, Richard, Jr., MD
Wise, Vance E, MD
Wolter, Keith, MD
Wong, Henry Keung, MD
Wong, Kathleen M., MD
Wong, Wilson, MD
Wood, Gregory D., MD
Wood, Mark C., MD
Wood, Michael D., MD
Wood, Russell H., MD
Wood, Amanda, MD
Woodruff, Adam Brian, MD
Woodruff, Stephen O., MD
Woodward, Philip A., MD
Wooldridge, Terry, MD
Workman, W. Wayne, MD
Worley, Linda, MD
Worley, Mark, MD
Wren, Mark, MD
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Wright, Charles C., MD
Wright, Christopher Jam, MD
Wright, James C., DO
Wright, John W., MD
Wright, Kristen N., MD
Wright, Lonnie B., MD
Wright, Melissa, MD
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