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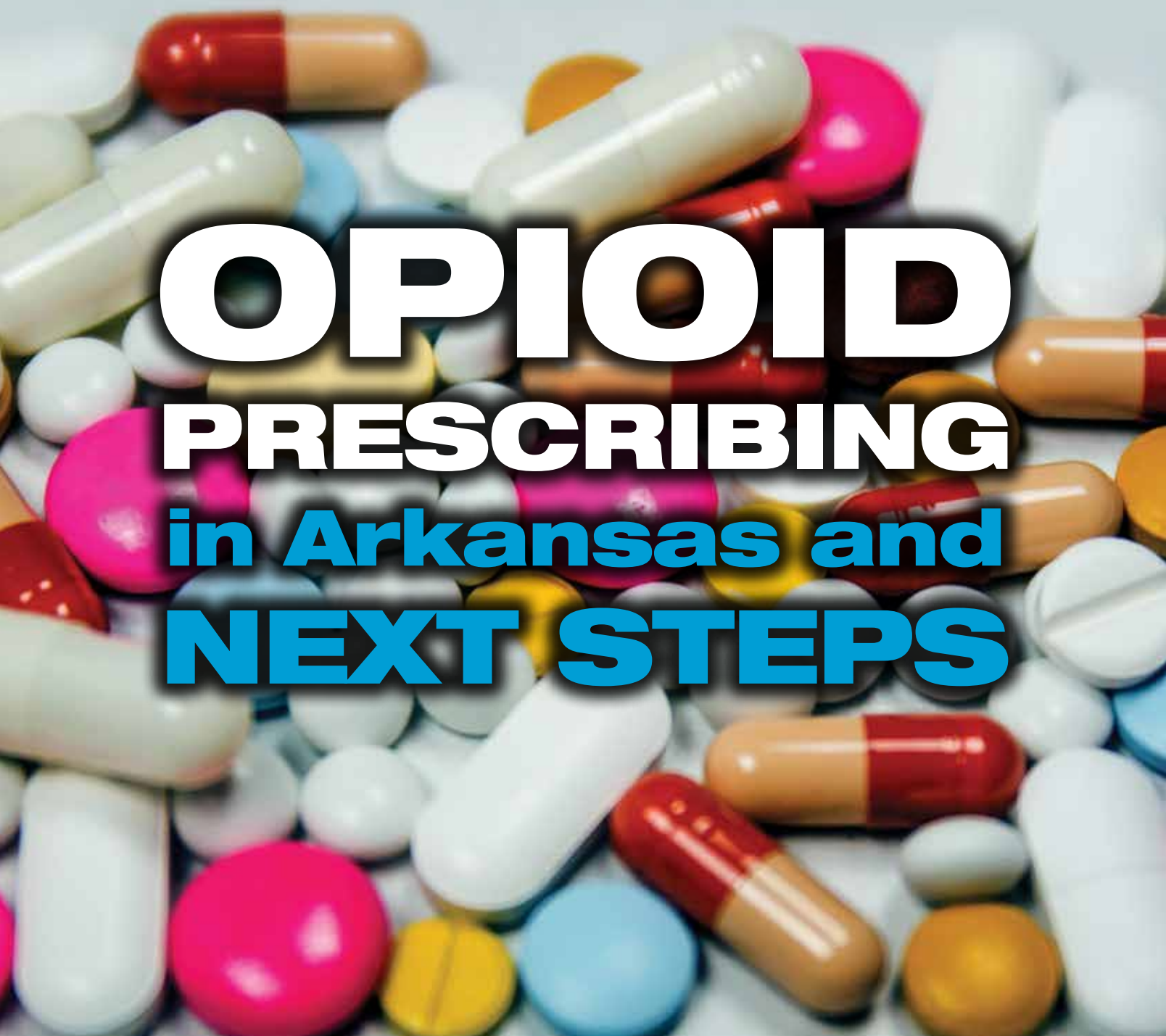

OPIOID PRESCRIBING in Arkansas and NEXT STEPS

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OPIOID PRESCRIBING in Arkansas and NEXT STEPS

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Winner of the ASAE Excellence in Communications Award

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WHAT HAVE WE DONE FOR YOU LATELY?

Proposals For Prescribing Opioids to Arkansas Patients

DAVID WROTEN
EXECUTIVE VICE PRESIDENT

On Feb. 1, I attended a public hearing at the Arkansas State Medical Board. The hearing was to receive public comment on a proposed amendment to Regulation 2.4, which deals with prescribing excessive amounts of controlled substances. The primary purpose of the amendment is to define the term *excessive.* Prescribing excessive amounts of controlled substances is a violation of the Medical Practices Act, but what has been missing is a working definition of exactly how much is too much.

The main focus of the amendment is, justifiably, the prescribing of opioids. That may also explain why the room was full. Among those testifying were a good mix of physicians and patients. The patients were mostly those who have had serious, often heartbreaking, injuries (one gentleman spoke of waking up in the hospital after being hit head on by an 18-wheeler) who are destined to live out their lives in some level of pain. They all spoke of fear that their physicians would be unable or unwilling to continue caring for them out of concern that this rule would put their physician licenses in jeopardy.

What became clear early in the meeting was that there is misunderstanding and confusion about the provisions in the rule and much of the "fear" is unfounded, both from patients and physicians. Tweaking the rule in a couple of places and good communication from the Board should help alleviate some of these concerns.

The rule defines excessive as "any amount without a detailed medical justification for the prescription, documented in the medical record." If there is documented medical justification, at least for opioids, *excessive* is defined as "exceeding the CDC Guidelines for Prescribing Opioids for Chronic Pain." For starters, that means ≥ 50 morphine milligram equivalents per day (MME). However, the proposed rule also says that ≥ 50 MME ***will not*** be considered excessive if the prescriber documents several requirements listed in the proposal. Among those requirements are objective findings establishing pain-generating pathology, specific reasons for exceeding the 50 MME, informed consent, clinical rationale, regular drug screens and a pain treatment agreement (when initiating chronic opioid therapy). These items are not required if the daily dosing is less than 50 MME.

One provision that has generated much confusion among physicians is the requirement to consult a pain management specialist if the proposed level of opioid prescribing is ≥ 90 MME. Some have thought this meant the patient had to be ***referred*** to a pain management specialist. That is not the case. The rule refers to documenting that the prescriber ***consulted*** the pain management specialist. There was also considerable testimony on what exactly qualifies as a "pain management specialist." In fact, of the numerous calls to AMS about this proposal, that was the most common question. My prediction, based on comments from the hearing, is that this provision is likely to be removed.

The other major provision in the proposed rule establishes a threshold for treatment of acute pain. For acute pain, *excessive* would be defined as an initial prescription written for more than seven days, ***without detailed medical justification in the medical record*** (same applies for subsequent prescriptions). So again, as long as the documentation supports a prescription for longer than seven days, this should not be a problem for most physicians.

What's next? The board will consider the comments submitted during the public comment period (and today's hearing) and either move forward with the rule as is or make changes. A vote on the rule is expected to take place at the board's April meeting. If adopted, it must be approved by interim legislative committees before it can become effective. We are still several months away from anything final. AMS

THE Journal
OF THE ARKANSAS MEDICAL SOCIETY

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COMMENTARY

Patient-Centered Care

Appathurai Balamurugan, MD, DrPH, MPH

We are all familiar with patient-centered care, but sometimes we may not realize where our patient's center lies. Patients do not live in a vacuum, and for many, their family is central to their well-being. In our daily clinical practice, we often see patients who are accompanied by someone during their visit. This someone could be a family member or a friend. A common misconception is that they are merely there to assist with transportation for the clinic visit. That may be true at times, but many times it is not the case. Several of our patients seek a family member's support or a friend's support to do tasks such as home blood pressure or blood glucose monitoring, medication assistance, or appointment scheduling. Patients may also seek help with making decisions and coping with symptoms and stress due to their condition. Identifying this family member who plays a central role in the patient's care and engaging them in said care would be an important step. Engaging family members to support individuals with chronic diseases such as diabetes, hypertension, and other cardiovascular diseases has been shown to result in better outcomes. Family can be a vital source of continuity and care coordination across episodes and settings of care.

> *One might offer family group education sessions on chronic disease management with care managers during evenings or weekends when the family members can attend along with the patient.*

There are clinical practice models that connect patients and their families to clinical, public health, and community support to help them manage their condition better. These models can guide family members in setting goals for supporting patient self-care behaviors; train family members in supportive communication techniques; and provide families with tools and infrastructure to assist in monitoring clinical symptoms and medications. In supporting self-management, family members may facilitate, remind, motivate, and partner in behavior change. This can begin by including the family member in the patient's care plan. This puts some accountability both on the patient and the family member. This can be elaborated with skills training for family members on checking blood pressure or blood glucose or by training family members in education strategies such as teach-back method. One might offer family group education sessions on chronic disease management with care managers during evenings or weekends when the family members can attend along with the patient. One can connect patients and family members with community resources such as county cooperative extension services that offer cooking demonstrations, grocery shopping tours, and yoga/exercise sessions.

A toolkit for making decisions about whether to involve a family member or friend in a patient's care can be found in the U.S. Department of Health and Human Services document, "Decision Guide Consumer Centered Family Consultation" (access at https://www.integration.samhsa.gov/about-us/Decision_Guide_CCFC.pdf). This toolkit offers a step-by-step guide to providers to assess and engage a family member in a patient's care. Additional resources including the Six Steps to Creating a Culture of Person and Family Engagement in Health Care can be found through the Patient-Centered Primary Care Collaborative website (https://www.pcpcc.org/sites/default/files/resources/PCPCC-%20Planetree%20PFE%20Culture%20Change%20Toolkit%20050517.pdf).

Enlisting and empowering patients and their family member as partners in care requires leadership support from the provider and the health system that the provider and practice fits in. Engaging family members in care of the patients would facilitate shared decision-making, cultural awareness, and compassionate interactions. Staff training to engage family members in care will be quintessential. Finally, a core group of patients and family members could be recruited to serve as an advisory board for the practice. The group would provide feedback on current practices, areas needing improvement, and new initiatives. This will be a step in the right direction towards creating medical neighborhoods.

The views expressed in this commentary are that of the author, and not necessarily those of the Arkansas Department of Health. AMS

Special section where the JAMS will feature short dermatology cases.

Derm Dilemma

Blake St. Clair, MD *Author*
Kevin St. Clair, MD *Editor*

This approximately 4 cm slightly pruritic solitary plaque on the back of a 57-year-old caucasian man has been slowly enlarging for the past few years. Over-the-counter 1% hydrocortisone cream has alleviated the itching to some degree, but the lesion has not resolved. What is the next most appropriate step in evaluation or treatment?

A. Suggest over-the-counter topical terbinafine twice daily for two weeks, as this most likely represents tinea corporis

B. Skin biopsy, as this lesion is suggestive of a superficial variant of skin cancer

C. Prescribe a mid-potency topical corticosteroid twice daily for a maximum of 14 consecutive days, as this plaque is probably nummular dermatitis

D. Prescribe topical calcipotriene twice daily for seven days, as psoriatic plaque is the most likely diagnosis

E. Skin biopsy, as this lesion is most suggestive of extragenital lichen sclerosis et atrophicus (L,S, and A)

Answer:

B. The most likely diagnosis for this solitary, very slow growing, non-indurated, scaly and crusted plaque is superficial basal cell carcinoma. Skin biopsy is necessary to confirm the diagnosis and to differentiate it from another superficially invasive skin cancer that typically involves non-facial skin, squamous cell carcinoma in situ. Treatment options for either of these indolent, unaggressive cutaneous neoplasms include destruction by curettage and electrodesiccation, primary excision for small tumors, or less commonly topical therapy with imiquimod or five-fluorouracil or photodynamic therapy utilizing aminolevulinic acid.

Tinea corporis may present as a slowly, centrifugally enlarging solitary patch, but generally has an elevated, scaly border, central clearing, and dermatophyte hyphae visible upon microscopic examination of scrapings prepared with potassium hydroxide.

Neither nummular dermatitis nor psoriasis would be expected to manifest as solitary truncal plaques for years. Extragenital L,S, and A can be solitary, but manifests most frequently as a painful, white, atrophic, shiny-surfaced plaque of prepubertal girls, postmenopausal women, and males between the second and sixth decade of life. AMS

Opioid Prescribing in Arkansas and Next Steps

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Introduction

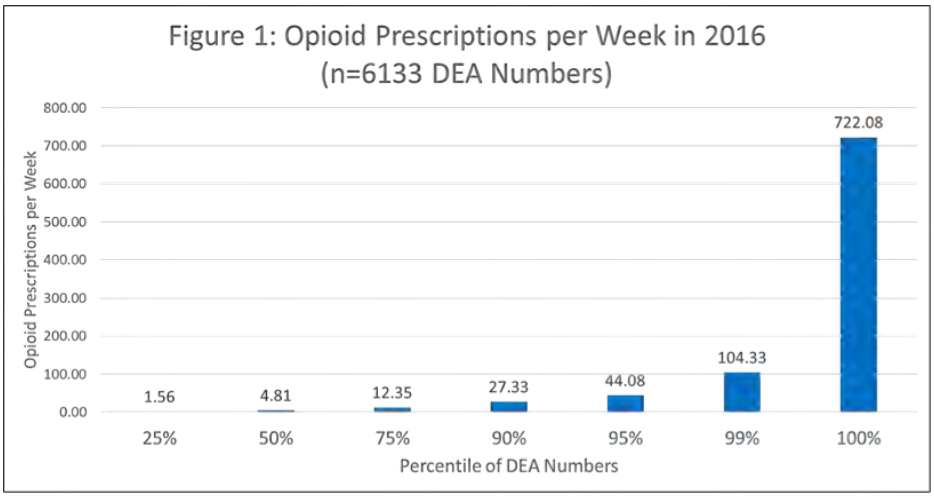
In 2016, 11.7 billion opioids were prescribed in the United States.[1] According to the Centers for Disease Control and Prevention (CDC), Arkansas's 2016 opioid prescription rate of 114.6 prescriptions per 100 persons is second only to Alabama (121 prescriptions per 100 persons).[2] Moreover, 66 of 75 Arkansas counties had an opioid prescribing rate higher than the national average of 66.5 pills per 100 persons, with one county prescribing nearly two prescriptions per person (1.77 opioid prescriptions per person), suggesting that the high rates of opioid prescribing are nearly ubiquitous across the state with some areas having exceptionally high rates of prescribing.[2,3]

In an effort to combat misuse, abuse, and diversion of controlled prescription medications, every state has created, or is in the process of creating, a prescription monitoring program (PMP).[4,5] PMPs are electronic systems used to collect information on the controlled substances dispensed to patients including data about prescriber, type of medication, dose, days' supply, dispensing pharmacy, and payer-source used.[6] Arkansas's PMP was authorized by the Arkansas Legislature's Act 304 of 2011,[7] and became functional on March 1, 2013. Currently, the AR PMP has interstate data sharing agreements with 25 other states in order to obtain information on resident Arkansans who receive controlled substances from out-of-state. The goals of the Arkansas PMP are to 1) enhance patient care by ensuring legitimate use of controlled substances in health care; 2) help curtail the misuse and abuse of controlled substances; 3) assist in combating illegal trade and diversion of controlled substances, and 4) provide access to prescription information for health care providers, law enforcement agents, and other authorized personnel/agencies.

Using the Arkansas PMP data for 2016, we sought to evaluate opioid prescribing in the state. The specific objectives for these analyses and this article are: (1) to provide a deeper understanding of the volume of opioids prescribed in Arkansas, (2) to characterize high-dose opioid prescribing within the state, and (3) to describe steps to be taken by the Arkansas Department of Health (ADH), UAMS, and others to help support Arkansas prescribers as they seek to improve the safety of opioid use in Arkansas.

Methods

Data for these analyses were obtained from the ADH for the 2016 calendar year after approval from the UAMS Institutional Review Board and the ADH Science Advisory Committee. To achieve the



objectives for this work, it was necessary to conduct analyses at the prescriber level. We identified Arkansas prescribers based upon a unique DEA number in the PMP and wanted to exclude prescribers who infrequently prescribe controlled substances or do not prescribe opioids. To build this sample of prescribers, we applied the following inclusion criteria: (1) had an in-state zip code, (2) prescribed at least one controlled substance per month in 2016, and (3) prescribed at least one opioid prescription in 2016.

Study Measures

Among these prescribers who meet the criteria, we identified the number of opioid prescriptions per prescriber. Next, prescribing of high-dose opioids was assessed by identifying the number of high-dose opioid prescriptions per prescriber. A high-dose opioid was defined as a prescription that provided ≥ 90 morphine milligram equivalents (MME) per day based upon the opioid strength, a morphine equivalent conversion, quantity, and days supplied for each prescription. For more information on how MMEs are calculated, the website referenced provides an overview of its calculation.[8] The threshold of high-dose was derived from the new CDC guidelines on treatment of chronic pain.[9] To meaningfully scale the number of opioids and number of high-dose opioids prescribed, we converted these measures into the average number of prescriptions written per week. Since much of the high-volume prescribing was congregated in the top 5% of opioid prescribers, we report the provider specialty of the top 300 prescribers.

Results

A total of 6,133 Arkansas prescribers met inclusion criteria. Fifty percent of prescribers wrote for less than five opioid prescriptions per week, and 95% wrote less than 45 opioid prescriptions per week (Figure 1). The top prescriber in the state wrote 37,548 opioid prescriptions, which translates into 722 opioid prescriptions per week, in 2016. These 37,548 opioid prescriptions, were written for 3,888 patients, which equates to an average of nine opioid prescriptions per patient in 2016.

Figure 2. illustrates the distribution of high-dose prescribing in the state on a weekly basis per prescriber. Seventy-five percent of opioid prescribers in the state wrote less than one high-dose opioid prescription per week in 2016. In fact, 95 percent of opioid prescribers in Arkansas wrote for less than four high-dose opioid prescriptions per week in 2016. However at the top of the distribution, at least one prescriber wrote for, on average, 128 high-dose opioid prescriptions per week; this totaled 6,667 high-dose opioid prescriptions written in 2016. These prescriptions were written for 943 patients which equates to an average of seven high-dose prescriptions per patient per year.

The top 300 opioid prescribers wrote 36.9% (1,379,313 of 3,737,554) of the opioid prescriptions written in the state. The mean and median number of opioid prescriptions written by the top 300 opioid prescribers were 4,597.7 and 3509.5, respectively. Table 1 shows the specialties of the top 300 prescribers based on training. The majority (68.3%) of the top 300 prescribers were trained in some form of general practice (for example: family medicine, internal medicine, medicine/pediatrics combination).

Discussion

These data indicate that a substantial portion of the opioid prescribing in Arkansas comes from a small portion of prescribers. This finding suggests that the state's relatively high opioid utilization rate is largely being driven by the top 5% of prescribers. It should be noted that there may be inherent limitations in how prescribers could be identified in the PMP data using a DEA number. For example, the highest prescriber (based upon DEA number) wrote 37,548 opioid prescriptions, which translates to one opioid prescription written every four minutes in 2016, assuming 260 work days in a week and an eight-hour workday. This high level of prescribing likely represents a scenario with multiple health care providers and one DEA holder signing prescriptions.

Furthermore, the majority of top prescribers have general practice/primary care roots. This is to say, in recognition of the identification of specialty process used at the time of this data, that the majority of top prescribers were trained in general practice/primary care. This does not mean, however, that these prescribers self-identify as general practitioners, but instead could identify, for example, as a Hospice and Palliative care provider. The PMP transferred to a new sys-

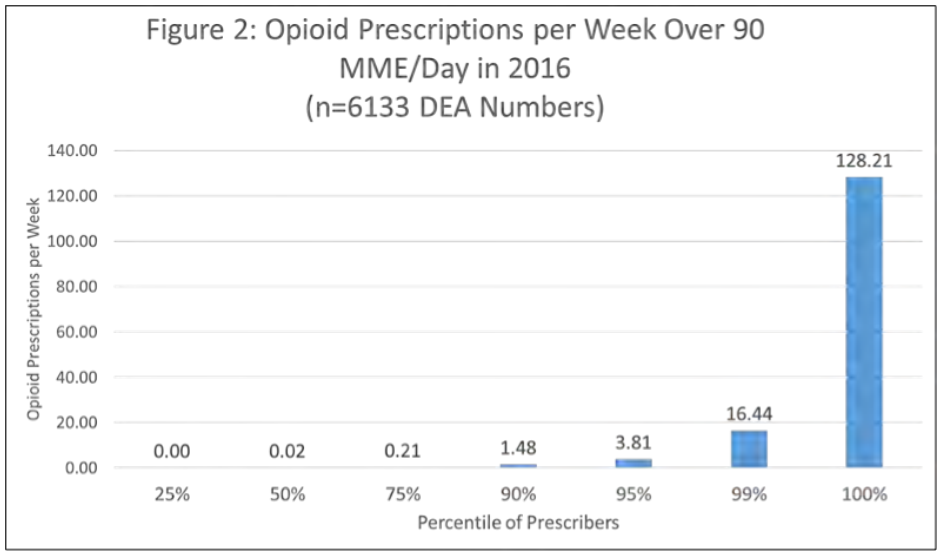


Table 1: Top 300 Opioid Prescribers (DEA Numbers) by Specialty

Specialty	Number of DEA Numbers	Percent
General Practice (Family, Internal, Pediatrics)	205	68.33
Anesthesiology/Pain	39	13.00
Surgery (Neurosurgery, General, Oral, Ortho)	12	4.00
Physical Medicine and Rehabilitation	10	3.33
APN	7	2.33
Geriatrics	5	1.67
Hospital/Clinic DEA	5	1.67
Hematology/Oncology	4	1.33
Rheumatology	3	1.00
Emergency Medicine	2	0.67
Neurology	2	0.67
Out-of-State Physician at VA	2	0.67
Adolescent Medicine	1	0.33
Hospice and Palliative Care	1	0.33
Osteopathic	1	0.33
Psychiatry	1	0.33

tem in November of 2017, and that system allows prescribers to self-identify from the list developed by the National Provider Identifier (NPI) records. Moving forward, analyses on self-identified specialties will be possible.

Stakeholders in the state are moving forward to help improve opioid prescribing. Specifically, three initiatives are underway. First, the Arkansas State Medical Board will issue new prescribing guidelines for acute and chronic pain in the spring of 2018. These guidelines, based on the recent CDC guidelines,[7] will help support appropriate opioid prescribing in the state. Second, UAMS will provide online materials about appropriate opioid prescribing starting in March 2018. Third, ADH will begin sending Peer Comparison Reports in April 2018, as required by Act 820 of 2017. These individualized reports will provide information regarding current prescription volume, prescribing behavior and PMP use. Comparison of these measures to other prescribers in the same, self-identified NPI specialty will be included in the Peer Comparison Reports. These reports will enable prescribers to track their prescribing behavior over time and to compare it to other prescribers. Each prescriber report will be electronically delivered on a quarterly basis directly to the prescriber AR PMP dashboard (the main page after logging into the AR PMP system). The purpose of these reports is to give prescribers an idea of how they compare to their peers overall as well as peers within their same specialty in regards to opioid prescribing. A number of states have begun this work.[10] Currently, the PMP works with the Medical Board to develop reports to monitor opioid prescribing by their licensees. Previous reports have included information about the top prescribers according to prescription volume, morphine equivalent dose, prescribing rates, and highly diverted drug combinations. The Peer Comparison Reports, therefore, add the ability for prescribers to self-monitor and self-correct, if needed. More detailed information on the reports and the metrics used can be found at: http://www.healthy.arkansas.gov/programs-services/topics/prescription-monitoring-program.

It is important that the state move forward in a concerted effort to curb the opioid epidemic where, as of 2016, Arkansas was second in the nation in regards to opioid prescribing rates. We hope that the upcoming initiatives discussed will aid in that effort.

References

1. An Analysis of the Impact of Opioid Overprescribing in America NON-DEPENDENCE. 2017. http://www.planagainstpain.com/wp-content/uploads/2017/09/PlanAgainstPain_USND.pdf. Accessed January 10, 2018.
2. U.S. County Prescribing Rates, 2016 | Drug Overdose | CDC Injury Center. https://www.cdc.gov/drugoverdose/maps/rxcounty2016.html. Accessed December 19, 2017.
3. U.S. Prescribing Rate Maps | Drug Overdose | CDC Injury Center. https://www.cdc.gov/drugoverdose/maps/rxrate-maps.html. Accessed December 19, 2017.
4. Governor Eric Greitens Announces Statewide Prescription Drug Monitoring Program | Governor Eric R. Greitens. https://governor.mo.gov/news/archive/governor-eric-greitens-announces-statewide-prescription-drug-monitoring-program. Accessed December 19, 2017.
5. Prescription Drug Monitoring Program Training and Technical Assistance Program. Status of Prescription Drug Monitoring Program. http://www.pdmpassist.org/pdf/PDMP_Program_Status_20170824.pdf.
6. The National Alliance for Model State Drug Laws (NAMSDL). http://www.namsdl.org/. Accessed December 19, 2017.
7. Arkansas Prescription Monitoring Program » Home. http://www.arkansaspmp.com/. Accessed December 19, 2017.
8. Centers for Disease Control and Prevention. Calculating Total Daily Dose of Opioids for Safer Dosage. Centers for Disease Control and Prevention. https://www.cdc.gov/drugoverdose/pdf/calculating_total_daily_dose-a.pdf. Published 2017. Accessed December 20, 2017.
9. Dowell D, Haegerich TM, Chou R. CDC Guideline for Prescribing Opioids for Chronic Pain — United States, 2016. *MMWR Recomm Reports.* 2016;65(1):1-49. doi:10.15585/mmwr.rr6501e1er.
10. Prescription Drug Monitoring Program Training and Technical Assistance Center. Prescriber Report Cards. http://www.pdmpassist.org/pdf/Report_Card_TAG_20170217_revised_final.pdf. Accessed December 20, 2017. AMS

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Strategies to Improve Maternal Mortality and Morbidity

BY MICHELLE MURTHA, RN

Women in the United States are more likely to die from childbirth or pregnancy-related causes than other women in high-income countries, according to the Centers for Disease Control and Prevention (CDC). More than 700 women die each year in the United States due to pregnancy and childbirth-related complications, ranking us 46th for maternal mortality, behind all other developed nations. The CDC's National Vital Statistics System ranks Arkansas with the third-highest maternal mortality rate in the nation. Arkansas has 35 maternal deaths per 100,000 live births, compared to the national average of 20 deaths per 100,000 live births.

Maternal mortality is increasing, but serious morbidity is increasing even faster. The CDC reports more than 60,000 new mothers annually experience serious or life-threatening complications. From 1993 to 2014, the serious-complication rate more than doubled. New mothers needing resuscitation from heart failure increased by 175 percent; the need for endotracheal tubes and treatment of sepsis both increased by 75 percent. Cesarean births (C-sections) have increased from less than 5 percent in the 1960s to 33 percent in 2016 — about twice the rate in European countries. C-sections increase the risk for hemorrhages, blood clots, infections and uterine ruptures in subsequent pregnancies. The rate of women who have their labor induced has more than doubled in the last 20 years. Induction leads to more prolonged labor, increasing the risk of hemorrhage.

The reasons for this increase appear to be a combination of factors including access to care; pre-existing chronic conditions like pre-pregnancy obesity, hypertension, diabetes and cardiovascular disease; increases in maternal age and drug addiction; and the use of tobacco products and alcohol.

The risk of pregnancy-related deaths for black women is three to four times higher than for white or Hispanic women. Even healthy women who give birth are at risk for these complications.

The leading causes of maternal death are hemorrhage, hypertensive disorder, pulmonary embolism, amniotic fluid embolism, infection and pre-existing chronic conditions mentioned above.

The most common preventable errors that lead to maternal mortality and morbidity include: failure to adequately control blood pressure in hypertensive women, failure to diagnose and treat pulmonary edema in women with preeclampsia, and insufficient attention to vital signs or hemorrhage following Cesarean birth.

The cost of caring for severe maternal morbidity costs billions of dollars a year. Treating just one complication — preeclampsia — exceeds $1 billion annually, according to a 2017 report from the *American Journal of Obstetrics and Gynecology.*

ARKANSAS' STRATEGY

The postpartum period is a critical time to ensure women and their newborns are healthy. It is important for women, family members and health care professionals to be educated about the warning signs that can potentially lead to maternal death.

Efforts to reduce maternal mortality and morbidity in Arkansas started in the hospital with maternal safety bundles, developed and endorsed by national multidisciplinary organizations.

Maternal safety bundles include action measures for:

- Obstetrical hemorrhage
- Severe hypertension/preeclampsia
- Prevention of venous thromboembolism
- Reduction of low-risk primary Cesarean births/support for intended vaginal births
- Reduction of peripartum racial disparities
- Postpartum care access and standards

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EDUCATE MOTHERS TO REDUCE PROBLEMS

Education of new mothers and their family is vital to reduce and prevent maternal mortality and morbidity. Moms need to be aware of the many changes their body goes through during pregnancy and delivery, and that there will be discomfort, soreness and fatigue. However, some discomforts and warning signs may need medical attention.

New mothers should be encouraged to trust their instincts about their bodies and pay attention to these warning signs:

- Bleeding that's heavier than during normal menstrual period or that gets worse
- Discharge, pain or redness that does not go away or gets worse
- Feelings of sadness that last longer than 10 days after giving birth
- Fever higher than 100.4 F
- Pain or burning when going to the bathroom
- Pain, swelling and tenderness in legs, especially the calves
- Red streaks on breasts or painful lumps in a breast
- Headache that does not get better after taking medicine or headache with vision changes
- Severe pain in lower stomach, feeling nauseous or vomiting
- Foul-smelling vaginal discharge

Critical warning signs include:

- Bleeding that can't be controlled
- Chest pain
- Trouble breathing
- Shortness of breath
- Seizures
- Signs of shock such as chills, clammy skin, dizziness, fainting or a racing heart
- Mother has thoughts of hurting herself and/or the baby

ARKANSAS' EFFORTS TO DECREASE MATERNAL MORTALITY

The University of Arkansas for Medical Sciences (UAMS) Antenatal and Neonatal Guidelines, Education and Learning System (ANGELS) and Center for Distance Health (CDH) hosted the Perinatal Outcomes Workgroup by Education and Research (POWER) networking event in April 2017 for every Arkansas facility that provides obstetric services.

The training focused on implementing patient safety bundles for two leading causes of maternal mortality: Postpartum Hemorrhage Safety Bundle and Hypertensive Emergencies in Pregnancy Safety Bundle. Each facility participating in POWER received components of both safety bundles, including web addresses of national groups spearheading the implementation of safety bundles, supporting literature and hyperlinks to other supporting literature. POWER began working with participating facilities to identify aspects of the bundle they already had in place and the aspects that needed to be developed. The facilities also identified potential barriers to safety bundle implementation. The goal is for every facility to successfully implement both safety bundles and assign a staff mentor to facilitate the process. Regular virtual meetings assess progress and identify areas needing support.

Under the direction of Arkansas Medicaid, AFMC's Medicaid Quality Improvement team will focus on educating new mothers about post-birth warning signs specific to maternal mortality. The focus groups will include hospital emergency and obstetric departments, hospital prenatal classes, OB/GYN providers, nurses and clinic staff, home visitors and community health units. Teaching all women to recognize potentially life-threatening signs of post-birth complications can save lives. ▲

Mrs. Murtha is an AFMC quality manager.

REFERENCES

- Centers for Disease Control and Prevention. Meeting the Challenges of Measuring and Preventing Maternal Mortality in the United States. Retrieved from https://www.cdc.gov/cdcgrandrounds/archives/2017/november2017.html
- Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN) Postpartum Discharge Education Program. (2017) *POST-BIRTH Warning Signs: The Nurse's Role in Preventing Maternal Morbidity and Mortality.* Retrieved from http://www.awhonn.org/?page=POSTBIRTH
- Building U.S. Capacity to Review and Prevent Maternal Deaths. (2017). *Report from maternal mortality review committees: a view into their critical role.* Retrieved from https://www.cdcfoundation.org/sites/default/files/upload/pdf/MMRIAReport.pdf
- Centers for Disease Control and Prevention. *At A Glance 2016: Maternal Health: Advancing the Health of Mothers in the 21st Century.* Atlanta, GA: CDC, Division of Reproductive Health; 2016. https://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2016/aag-maternal-health.pdf
- Centers for Disease Control and Prevention. Saving Mothers, Giving Life: Maternal Mortality. Phase 1 Monitoring and Evaluation Report. Atlanta, GA: CDC, U.S. Department of Health and Human Services; 2014. https://www.savingmothersgivinglife.org/docs/Maternal_Perinatal_Outcomes.pdf
- American College of Obstetricians and Gynecologists and the Society for Maternal–Fetal Medicine, Kilpatrick SK, Ecker JL. Severe maternal morbidity: screening and review . Am J Obstet Gynecol. 2016;215(3):B17–B22. https://www.acog.org/Resources-And-Publications/Obstetric-Care-Consensus-Series/Severe-Maternal-Morbidity-Screening-and-Review
- American College of Obstetricians and Gynecologists, Association of Women's Health, Obstetric and Neonatal Nurses, The Joint Commission, Society for Maternal-Fetal Medicine. Severe maternal morbidity: clarification of the new Joint Commission sentinel event policy. Washington, DC: American College of Obstetricians and Gynecologists, AWHONN, SMFM; Oakbrook Terrace (IL): Joint Commission; 2015.

CASE STUDY

Female Bisexuality: Health Implications of Identity

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Abstract:

Bisexual women are often grouped with lesbians for the purposes of medical and social science research. We argue that bisexuality is a distinct identity with unique health implications, and that bisexual women's sexual and medical histories more closely approximate those of heterosexual women than those of lesbians. We reviewed the relevant literature on GLB health before analyzing reports from governments and non-profit research firms. Behavior and identity did not always match and confused health recommendations. Our results show that bisexuality is a distinct identity, and that bisexual medical and sexual histories more closely approximate heterosexual ones than lesbian ones.

INTRODUCTION

Many guidelines and studies group bisexual women with women who identify as lesbian under the umbrella term "women who have sex with women" (WSW) rather than operationalizing their sexual identity as distinct. We hypothesize, however, that (1) bisexuality is a distinct identity with its own unique health implications, (2) that bisexual women's sexual and medical histories more closely approximate those of heterosexual women than those of lesbians, and (3) that there is an ordered "health care hierarchy" in which bisexuals fall between lesbians and heterosexual women. This paper presents original research, as well as drawing on current sociology and anthropology literature, public health studies, and medical research to provide additional support.

Risk Factors and Behaviors among Different Sexual Identities

Little is known about the similarities or differences between the health of lesbians and bisexual women, so information is lacking on how to focus preventative efforts specific to these two distinct identities. Lesbians show especially low levels of access to gynecological care.[1] Lesbians' odds of having a Papanicolaou test – also known as a Pap smear – are about half those of the female population at large; bisexual women, however, had the highest odds of having a Pap test, even when compared with heterosexual women.[2]

This difference in utilization of Pap tests supports the case for a distinction between lesbians and bisexual women when addressing their health care needs. The main risk of not receiving Pap tests is that cervical cancer – the main sequela of HPV, which is being tested with a Pap test – may go undetected in its earlier stages – i.e., when it has the highest chance of being successfully treated. Therefore, lesbians are at higher risk for cervical cancer than both heterosexual women and bisexual women.

Condition/Test	Lesbians (%)	Bisexuals (%)	Heterosexuals (%)
Mammogram[8]	58.3	44.6	58.8
Pap test[8]	89.9	93.7	94.2
Abnormal Pap result[4]	18.6	31.3	14.3
HIV test[8]	72.2	66.7	49.0
Asthma[8]	18.2	24.4	18.4
Arthritis[8]	16.4	15.3	15.6
Rape[9]	13.1	46.1	17.4
Health insurance[8]	98.6	94.1	97.6
Lack of primary care provider[8]	7.8	17.6	10.4

Table 1: Rates of health-related characteristics by percent (%) among three major female sexual identities: lesbian, bisexual, heterosexual.

Separation of Sexual Identity for Health Care

Current literature shows that bisexual women have "similar sociodemographic profiles to [heterosexual] women," though they have more diverse sexual networks.[1] In fact, bisexual women report larger numbers of male partners over their lives than heterosexual women. This finding has significant health implications because WSM have higher rates of STIs than WSW.[3]

Bisexual women should not, however, simply be placed in the same category as heterosexual women for the purposes of health care, as there are several key differences in these two populations. Bisexual women are more likely to test positive for *Chlamydia trachomatis* than heterosexual women, and are significantly less likely to be aware that HPV can be transmitted by sex with men.[4] Furthermore, while bisexual women are more likely to have had a Pap test, they are also more likely to have reported abnormal results.

Bisexual women tend to have more sexual encounters with partners who are considered unimportant, and who are involved in other relationships.[1] In addition, bisexual women are more likely than heterosexual women to find sexual partners using the internet. Because bisexual women may engage in anonymous and at-risk sexual networks by using the internet to find partners, the diversity of their sexual life may be underreported; therefore, they may be less often advised to undergo screening for STIs/HIV.

Health Testing and Recommendations

In addition to the problematic assumption that lesbians and bisexual women fit into one sexual behavior category, many data sources do not include sexual identity as a demographic vari-

able at all, thus misinforming health testing and recommendation protocol. One in five WSW has been told that she didn't need a Pap test; of those who requested one, one in 50 were refused.[5] If extrapolated to the estimated population of WSW, that would mean that about 37,000 women took steps to obtain a potentially beneficial Pap test but were denied that service by their providers based on their sexual identity.

College-Aged Women as a Model Population

College-aged women are an important demographic for a needs assessment regarding women's health for several reasons: high levels of sexual activity, high risk for contraction of sexually transmitted infection (STIs), high numbers of abortions,[3] and high usage of oral contraceptives. College-aged women are also at increased risk for contracting human papilloma virus (HPV).[6]

In addition to risk factors for college-aged women, several disparities in women's health care have been established in previous literature. Non-heterosexual-identifying women face barriers to health care access, with lesbian women being much less likely to have had a gynecological examination in the past year than women of other sexual identities.[7] There has been little to no research done linking women's health disparities with medical history, especially when considering a focus on college-aged women.

METHODS

In the preliminary phase of research, we sought to assess women's health access among college students. A campus-wide survey was conducted at a small, private college in the mid-South. Students were contacted via email with a link to a self-administered survey created using SurveyMonkey. Questions in the survey focused on gender, sexual identity, sexual history, medical history, and perceived risk for women's health issues such as pregnancy, STIs, or cancer. The survey was created to take no more than 30 minutes of the respondents' time. A consent page prefaced the series of questions; respondents were required to agree to the information about confidentiality and the nature of the research to progress to the survey questions. Names and other identifiers of survey respondents were kept confidential by nature of the online software.

Electronic results from SurveyMonkey were processed using IBM SPSS 21 to obtain Pearson correlation coefficients. Each of the independent variables – gender, sexual identity, age, insurance status, and receipt of gynecological exam – were cross-tabulated with the dependent variables – utilization of health services, insurance status, referral follow-up, sexual relations, receipt of gynecological exam, pregnancy, female-specific cancers, and STI/HIV testing.

We also analyzed existing data sets from the following sources: peer-reviewed books and journal articles related to female same-sex behavior and/or health outcomes of that behavior; and published reports by HHS, the CDC, the Census Bureau, the Pew Research Center, and ACOG. State reports on lesbian and bisexual health were also used as primary data sources.

The above-mentioned data sets were qualitatively coded, and any references to rates of health-related conditions, tests, or statuses were compiled by sexual identity. These included diseases, tests and screenings, insurance status, and establishment with a primary care physician. For each of these references, a standard deviation for the rates was calculated using Microsoft© Excel® 2007 spreadsheet software to test each set of rates against the three main hypotheses, as described below.

RESULTS

One of the most significant results from the campus-wide survey was that bisexual-identifying women were 34.6% more likely to have had sexual relations with a man in the past six months than with a woman.

The prevalence of certain health characteristics in shown by the percentage rate of each characteristic among each of the sexual identities. The hypotheses of this project were assessed as follows.

Hypothesis 1: Bisexuality is a distinct sexual identity from lesbianism; therefore, bisexual women will show significantly different rates of health-related characteristics than lesbians.

(1)

Hypothesis 2: Bisexual women's sexual and medical histories more closely approximate those of heterosexual women than those of lesbians.

(2)

Hypothesis 3: Bisexual women's sexual and medical histories more closely approximate those of heterosexual women than those of lesbians, creating an ordered "health care hierarchy."

(3)

$$Rate_{lesbian} < Rate_{bisexual} < Rate_{heterosexual}$$

or

(4)

$$Rate_{lesbian} > Rate_{bisexual} > Rate_{heterosexual}$$

DISCUSSION

The finding that bisexual women were more likely to have sexual relations with men is significant in relation to other data showing that those who strictly engaged in female-female relations have a very low rate of STIs.[3] This finding suggests that because lesbian women tend to have sexual relations exclusively with women, they would be at lower medical risk than heterosexual women, at least with regards to STIs and HPV. The findings also support the idea of a "health care hierarchy" in which heterosexual women have the highest level of health care utilization, while lesbians have the lowest level, with bisexual women in between but closer to heterosexual women.

Quantitative analysis revealed specific information by considering data that separated lesbians from bisexual women. Bisexual women are less likely to have a PCP and to have had a mammogram in their lifetime. They also have a higher rate of abnormal Pap test results, are more likely to have asthma, and are much more likely to have been raped than lesbians or heterosexual women. Lesbians, on the other hand, were twice as likely as their bisexual and heterosexual counterparts to have type-2 diabetes.

- Hypothesis 1 was supported by 90% of the health characteristics in the data set (see Table 1); SD = 0.32.
- Hypothesis 2 was supported by 70% of health characteristics considered; SD = 0.48.
- Hypothesis 3 was only supported by 20% of the health characteristics; SD = 0.42.

In other words, the first two hypotheses are supported by a majority of the data while the third hypothesis is not well supported. Therefore, the results of this project support the idea that bisexuality is a distinct sexual identity with unique health implications, and that bisexual women's medical and sexual histories more closely approximate those of heterosexual women than those of lesbians. This approximation has not been established in previous literature, and future research using larger data sets and more detailed sexual and medical information could verify this relationship and provide more detailed information.

CONCLUSION

The support this data gives to the notion that bisexuality is a distinct sexual identity could influence researchers to separately consider lesbian and bisexual responses in their data sets. This would yield more holistic and useful results by which clinical guidelines would be made. The more informed recommendations could promote certain tests as specific for lesbians and not for bisexual women and vice-versa. These new protocols could begin to address the disparities uncovered in the literature review and qualitative and quantitative analyses.

REFERENCES

1. Chetcuti, Natacha, Nathalie Beltzer, Nicolas Methy, Caroline Laborde, Annie Velter, Nathalie Bajos, and the CSF Group. "Preventive Care's Forgotten Women: Life Course, Sexuality, and Sexual Health among Homosexually and Bisexually Active Women in France." *Journal of Sex Research* 50(6):587–97. 2013.
2. Boehmer, Ulrike, Xiaopeng Miao, Crystal Linkletter, and Melissa A. Clark. "Adult Health Behaviors Over the Life Course by Sexual Orientation." *American Journal of Public Health* 102(2):292–300. 2012.
3. Rosenfeld, Jo Ann, ed. *Handbook of Women's Health: An Evidence-Based Approach*. Cambridge University Press. 2001.
4. McNair, Ruth, Jennifer Power, and Susan Carr. "Comparing Knowledge and Perceived Risk Related to the Human Papilloma Virus among Australian Women of Diverse Sexual Orientations." *Australian and New Zealand Journal of Public Health* 33(1):87-93. 2009.
5. Hunt, Ruth, and Julie Fish. "Prescription for Change: Lesbian and Bisexual Women's Health Check 2008." London, England, United Kingdom: Stonewall - The Lesbian, Gay, and Bisexual Charity. Leicester, England, United Kingdom: De Montfort University. 2008.
6. Daley, Ellen M., Cheryl A. Vamos, Eric R. Buhi, Stephanie K. Kolar, Robert J. McDermott, Natalie Hernandez, and Hollie J. Fuhrmann. "Influences on Human Papilloma Vaccination Among Female College Students. *Journal of Women's Health* 19(10):1885-1891. 2010.
7. Lindley, Lisa L., Heather M. Brandt, Lucy Annang, Corrie L. Barnett, James W. Hardin, and Michelle Burcin. "Receipt of Routine Gynecological Examinations among Sexually Active Female Students in the United States." *Journal of Women's Health* 18(8):1195-1200. 2009.
8. Massachusetts Department of Public Health. "The Health of Lesbian, Gay, Bisexual and Transgender (LGBT) Persons in Massachusetts: A survey of health issues comparing LGBT persons with their heterosexual and non-transgender counterparts." Boston, MA: Commonwealth of Massachusetts, Executive Office of Health and Human Services, Department of Public Health. 2009.
9. Walters, Mikel L., Jieru Chen, and Matthew J. Breiding. "The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Findings on Victimization by Sexual Orientation." Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. 2013. AMS

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Prevalence and Characteristics of Primary Lung Cancer Among Large Lung Masses

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ABSTRACT

Background and objective: Lung mass has been traditionally defined as a focal pulmonary lesion > 3 cm and is considered malignant until proven otherwise. There is a lack of recent data on prevalence of primary lung cancer among lung masses. We attempt to establish the proportion of lung masses that are primary lung cancer and determine their CT characteristics.

Methods: Patients with a lung mass were classified in three groups: primary lung cancer, non-lung cancer malignancy, and benign or infectious causes; and CT findings were compared among them.

Results: About 63% of lung masses represented primary lung cancer, 18% were non-lung cancer malignancies, and 18% accounted for benign tumors and infectious pathologies. A mass that crossed anatomical boundaries on CT was more likely to represent lung cancer (OR 5.54 {1.47-20.86}, p=0.01).

Conclusion: Although lung carcinoma remains the most common pathology among lung masses, a significantly increasing proportion of masses now represent benign and infectious etiologies.

Keywords/MeSH terms: Biopsy, needle; diagnostic imaging; granuloma/pathology; lung neoplasms; lung/radiography.

INTRODUCTION

Solitary pulmonary nodule (SPN) has been well defined in literature as a spherical, well-circumscribed, radiographic opacity less than or equal to 3 cm surrounded by aerated lung; without associated adenopathy, atelectasis or pleural effusion.[1] Focal lesions larger than 3 cm are described as lung masses and are considered malignant until proven otherwise.[2] The prevalence of lung cancer among such masses was more than 90% in older studies, but there has been no recent re-evaluation.[3-4] Clinical models and calculators described for predicting the probability of lung cancer among SPN might not be applicable for lung masses.[5] Nodule size is a significant predictor for malignancy, but other predictors like margins and contours are difficult to delineate in large lung masses spanning across different lobes. Predictors based on computed tomography (CT) features of large lung lesions will encourage optimum use of non-invasive testing to complement tissue sampling and decrease the need for multiple sampling procedures. Knowledge of prevalence of lung cancer and benign pathologies among lung masses is necessary to avoid premature prognostication of patients with lung masses undergoing diagnostic workup. Hence, we investigated lung masses to determine prevalence of primary lung cancer and CT features predicting a higher risk of malignancy in a retrospective cohort study.

MATERIALS AND METHODS

This is a single center, retrospective observational study at a tertiary care hospital. The Institutional Review Board of UAMS approved this study (approval number 202086).

Population: Retrospective chart review was performed on all patients who underwent transthoracic needle aspiration (TTNA) or endobronchial ultrasound-guided trans-bronchial needle aspiration (EBUS-TBNA) at our institution between Jan. 1, 2009 and Dec. 31, 2012. Cases where thoracic CT scans were not available for review or size of lesion was not documented were excluded. Cases where a lung mass (>3 cm) was sampled were identified. These cases were categorized in three groups based on the final pathological diagnosis: (1) primary lung cancer; (2) non-lung cancer malignancy; and (3) benign or infectious pathologies.

Data collection: Detailed chart review was performed for the selected cases with a lung mass. Patient characteristics including age at diagnosis, sex, and smoking status were noted. Smoking status was classified as current smoker, former smoker and never smoker. Former smoking was defined as a history of smoking at least 100 cigarettes in lifetime but not at the time of diagnosis.[6] Thoracic CTs of all patients with lung mass were reviewed and presence or absence of specific features was noted. These findings were: presence of central cavitation, central necrosis, air-bronchogram, well-defined borders, satellite lesions, lymphadenopathy, pleural effusion, and if the mass crossed anatomical boundaries.

Statistical analysis: Number of patients in each group, namely group 1 (primary lung cancer), group 2 (non-lung cancer malignancy) and group 3 (benign or infectious pathologies) were noted. We conducted the analyses using proc freq and univariate methods for categorical and numeric variables respectively. The presence of above-

Table 1. Distribution of clinical characteristics of patients across the study groups

Clinical Attributes	Group 1 Lung Cancer	Group 2 Malignancy other than Lung Cancer	Group 3 Infectious/ Benign	P-Value*	Odds Ratio*
Median Age 58 (IQR 52-67)	58 (52-65)	53 (32-68)	64 (50-67)	0.4829	1.52 (0.47-4.88)
Smoking Status					
Never smoker	0	4	3		
Former smoker	11	1	5		
Current smoker	13	1	0		
Unknown	7	3	1		
Gender					
Female	10	4	3	0.6383	1.33 (0.4-4.49)
Male	21	5	6		

*p-values and Odds ratio were obtained by comparing lung cancer to all other pathologies combined (group 1 vs group 2 and 3). Smoking status could not be compared as there were 0 (zero) never smokers in lung cancer group. IQR denotes Interquartile range.

mentioned patient characteristics and CT features were compared between group 1 vs groups 2 and 3 combined. Chi-square test was used to determine statistical difference. A p value of less than 0.05 was considered statistically significant.

RESULTS

A total of 280 charts were reviewed excluding cases with incomplete information available. 49 of these patients had a lung mass (18%). The median age of patients with a lung mass was 58 years (IQR 52-67); about 35% were females; and 7(14%) were never-smokers. The median size of the mass was 5 cm.

Table 1 provides the distribution of clinical characteristics across each group. 31 of 49 (63%) lung masses were primary lung cancer. Nine (18%) cases represented malignancies which were not lung cancer. Five of these 9 masses were lymphoma. Benign tumors and infectious processes accounted for the 9 remaining cases.

Table 2 provides the comparison of the presence of specific CT features among the groups. These variables were compared between lung cancer and all other pathologies (group 2 and 3 combined). A mass that crossed anatomical boundaries on CT was 5.5 times more likely to represent lung cancer than any other etiology (p=0.01; 95% CI, [1.47-20.86]). The relation between the presence of satellite lesions and the likelihood of the mass to be lung carcinoma did not achieve a statistical significance (p=0.08; OR 2.77, 95% CI [0.82-9.3]). Among the clinical attributes compared, age and sex did not have any correlation with the pathology of the mass.

DISCUSSION

How often is a lung mass a lung cancer: the overall outlook

Size is one of the most important predictors of malignancy in a lung nodule.[5, 7-8] The presence of a lung mass, which, by definition is more than 3 cm in size, is very concerning for malignancy. However, much of our knowledge about prevalence of lung cancer among lung masses stems from older studies.[3-4] Greater than 90% of lung masses were lung cancer in both of these studies. The large reduction in proportion of lung masses representing lung cancer in our study compared to these studies from the 1980s could be explained by the significant decrease in smoking rates.[9] Another significant change in epidemiology of lung mass pathologies has been a higher rate of infectious processes. Human immunodeficiency virus (HIV) infection and immunosuppression are significant risk factors for many infectious processes that could present as nodules or masses.[10] Some infectious processes can lead to development of large lung masses even in an immunocompetent host.[11-12] About every one in five lung masses were benign or infectious in our study. The histologic appearances of some of these masses from our study are illustrated in figures 1a-c. Most benign and infectious masses had good outcomes with resection and appropriate antimicrobial therapy respectively. Also, most of the cases of non-lung cancer malignancies in our study were lymphomas, which generally have a better prognosis compared to primary lung carcinoma. These findings somewhat reduce the grim outlook usually associated with large lung nodules and masses. The concept of "false despair," which has been described mostly after diagnosis of a terminal illness, applies equally well to the phase of diagnostic workup. As opposed to the generalization "a lung mass is almost always malignant," knowledge of this data will aid pulmonary physicians and internists to appropriately counsel their patients until the pathological diagnosis is established and hopefully reduce patient anxiety.

Table 2. Comparison of the presence of specific computed tomography (CT) features across the groups

CT Findings	Group 1 Lung Cancer	Group 2 Malignancy other than Lung Cancer	Group 3 Infectious/ Benign	P-Value*	Odds Ratio*
Median Size in cm 5 (IQR 4-6)	6 (4-7)	5 (4-6)	4 (4-5)		
Air Bronchogram	10	3	3	0.66	0.95 (0.28-3.28)
Central Cavitation	8	2	3	0.69	0.9 (0.25-3.35)
Central Necrosis	15	4	3	0.37	1.47 (0.45-4.78)
Crosses Anatomical Boundaries	19	2	2	0.01	5.54 (1.47-20.86)
Lymphadenopathy	24	5	8	0.47	1.32 (0.35-4.99)
Pleural Effusion	9	4	4	0.92	0.5 (0.15-1.72)
Satellite Lesions	18	2	4	0.08	2.77 (0.82-9.3)
Well-Defined Borders	13	6	5	0.94	0.46 (0.14-1.5)

*p-values and Odds ratio were obtained by comparing lung cancer to all other pathologies combined (group 1 vs group 2 and 3). IQR denotes Interquartile range.

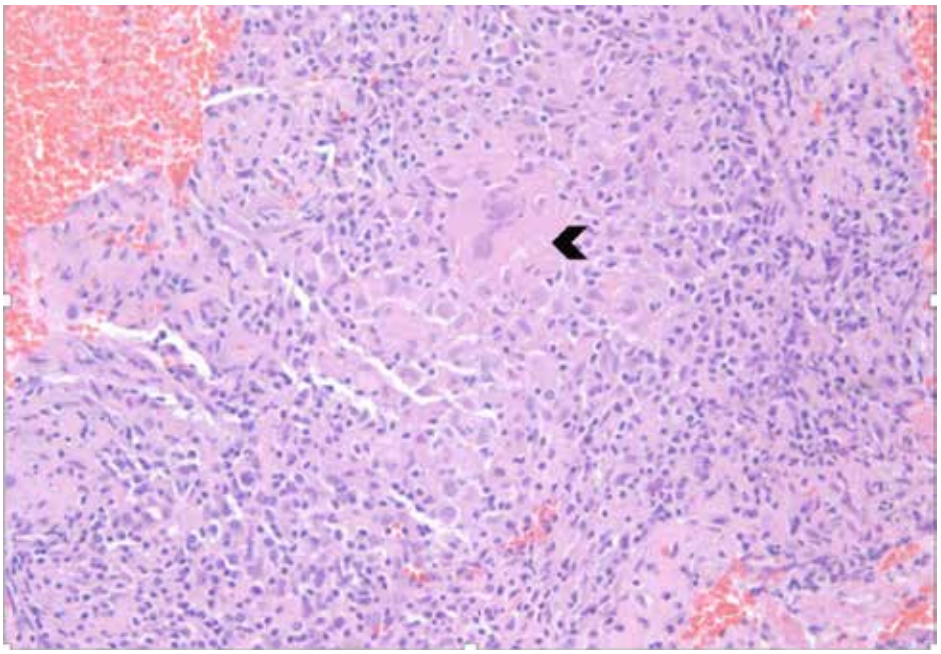

Figure 1a. *Granulomatous disease: One 20x field shows numerous histiocytes forming loose non-epithelioid, non-necrotizing granulomas. Mixed inflammation (lymphocytes, plasma cells and scant neutrophils) is present in the background with occasional giant cell formation (arrow head). [H&E]*

Prompt tissue diagnosis is imperative. Minimally invasive techniques have evolved with EBUS-TBNA and TTNA, which can diagnose and stage lung cancer. These minimally invasive procedures have a high sensitivity and the yields for both trans-bronchial and transthoracic needle sampling are higher for larger lung nodules.[13-15] Recently, ultrasound guided percutaneous fine needle aspiration (FNA) of peripheral lung lesions was investigated.[16] The procedure has yield and complication rates comparable to CT guided needle aspiration with the advantage of portability and convenience without radiation exposure. It is important to note that despite the lower complication rates of minimally invasive techniques, surgical resection remains the gold standard for workup of masses highly suspicious for malignancy. The choice of method depends on the cardiopulmonary risk factors of the patient, patient preference and institutional variability of feasibility of either approach.

Special considerations during work up of lung masses

The CT findings from our study can guide the choice of using further noninvasive testing to complement tissue sampling. A large mass has significantly different characteristics on imaging compared to a lung nodule. Our data indicates that necrosis is often present in large lung masses (44%) and does not implicate any increased risk of lung cancer. In such lesions, sampling of necrotic areas can result in an inconclusive specimen and lead to necessity of sometimes multiple sampling procedures. In a recent retrospective analysis, positron emission tomography (PET)/CT guided FNA has shown some degree of relationship to accuracy of results.[17] This approach could improve the yield of sampling in lung masses with necrotic areas.

Despite the high sensitivities of these minimally invasive procedures, approach to a "non-diagnostic" specimen remains a challenge. Studies that considered "non-diagnostic, non-specific, and inconclusive" results from TTNA as negative reported high negative predictive value (NPV) of the test for malignancy.[18-19] Although larger target lesions have been shown to provide adequate samples more often, this adequacy does not translate into an improvement of NPV.[18,20]

A repeat sampling must be performed by a same or different method in case of inconclusive results for a lung mass until a final diagnosis is established. The exception to above statement is that a granulomatous inflammation with no apparent cause (negative tissue, sputum, and serum work up for fungal or mycobacterial etiology; sarcoid; and granulomatosis with polyangiitis, etc.) can be followed with serial CT scans over time if history and clinical features dictate low risk of malignancy. The inflammatory groups in our study were sampled an average of three times before they were finally simply followed up, even though there were histologic and culture evidence of an alternative diagnosis. The large size of the mass was simply that disconcerting, and even the infectious disease physicians requested for a "better biopsy" in many cases. Geographical factors, when present, could

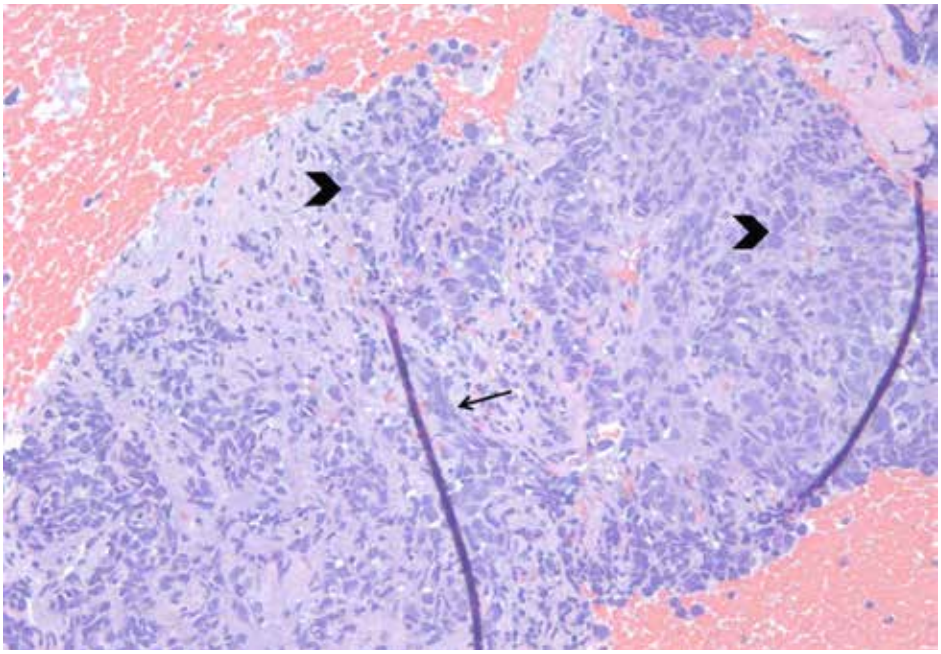

Figure 1b. *Small round blue cell tumor: One 20x field shows sheets and clusters of small round blue cells with scant cytoplasm infiltrating eosinophilic fibrous tissue. Marked crush artifact (arrow) along with nuclear pleomorphism and nuclear molding (arrow heads) is seen. [H&E]*

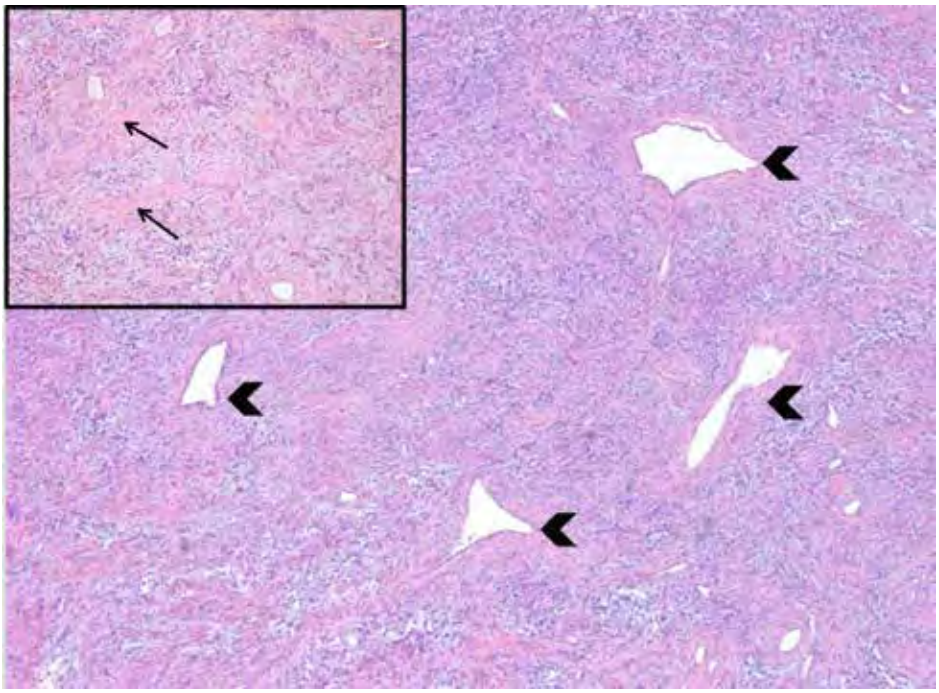

Figure 1c. *Solitary fibrous tumor: One 20x field shows the classic "patternless pattern" architecture. There are alternating hypocellular and hypercellular areas formed by bland and uniform oval to spindle cells in haphazard storiform –like arrangements. On low power (4x) the classic "staghorn-shaped" vessels (arrow heads) are scattered throughout the bland, fibroblastic cells which are intermixed with thick, hyalinized, brightly eosinophilic collagen bands (arrow). [H&E]*

support a trial of antifungal therapy for "granulomatous inflammation without a definitive diagnosis" despite absence of fungal elements on staining and culture.

Several limitations of our study need to be acknowledged. Being a single-center retrospective analysis, our data and power was limited; possibly undermining few CT features that might also predict an increased risk of malignancy in a mass. The data available to us was only from transthoracic or EBUS guided needle aspirations. Finally, our center is in the endemic area for fungal infections such as histoplasmosis and blastomycosis, which can explain a higher rate of infectious processes. However, it is important to note that HIV prevalence is lower in Arkansas compared to the national average, and no lung mass in our study was caused by an opportunistic infection.

Conclusion and future directions

Our study indicates that even though lung cancer is the most common pathology found in lung masses, its prevalence among such masses is considerably lower now as compared to the studies from the past. Certain CT features can predict an increased risk of lung cancer in a mass. Future studies should be aimed at developing evidence-based guidelines to improve accuracy of sampling techniques and minimizing repeat sampling procedures whenever possible. This study underscores a need for a large-scale reevaluation of the statement "a lung mass is almost always malignant," given that one of the major causal factors (smoking) is declining in prevalence.

REFERENCES

1. Gould MK, Fletcher J, Iannettoni MD, Lynch WR, Midthun DE, Naidich DP, et al. Evaluation of patients with pulmonary nodules: when is it lung cancer?: American College of Chest Physicians evidence-based clinical practice guidelines, 2nd ed. *Chest* 2007; 132: 108S – 130S.
2. Murrmann GB, van Vollenhoven FHM, Moodley L. Approach to a solid solitary pulmonary nodule in two different settings—"Common is common, rare is rare." *J. Thorac. Dis.* 2014; 6: 237–48.
3. Siegelman SS, Khouri NF, Leo FP, Fishman EK, Braverman RM, Zerhouni EA. Solitary pulmonary nodules: CT assessment. *Radiology* 1986; 160: 307–12.
4. Zerhouni EA, Stitik FP, Siegelman SS, Naidich DP, Sagel SS, Proto A V, et al. CT of the pulmonary nodule: a cooperative study. *Radiology* 1986; 160: 319–27.
5. McWilliams A, Tammemagi MC, Mayo JR, Roberts H, Liu G, Soghrati K, et al. Probability of cancer in pulmonary nodules detected on first screening CT. *N. Engl. J. Med.* 2013; 369: 910–9.
6. Centers for Disease Control and Prevention (CDC) - Indicator Definition - Disability and Health Data System (DHDS) - NCBDDD [Internet]. Updated: November 30, 2015. Available from: http://dhds.cdc.gov/guides/healthtopics/indicator?l=smokingstatus Accessed: December 20, 2015.
7. Henschke CI, Yankelevitz DF, Naidich DP, McCauley DI, McGuinness G, Libby DM, et al. CT screening for lung cancer: suspiciousness of nodules according to size on baseline scans. *Radiology* 2004; 231: 164–8.
8. Patel VK, Naik SK, Naidich DP, Travis WD, Weingarten JA, Lazzaro R, et al. A practical algorithmic approach to the diagnosis and management of solitary pulmonary nodules: part 1: radiologic characteristics and imaging modalities. *Chest* 2013; 143: 825–39.
9. Centers for Disease Control and Prevention (CDC)-Trends in Current Cigarette Smoking Among High School Students and Adults, United States. Updated: November 14, 2013. Available from: http://www.cdc.gov/tobacco/data_statistics/tables/trends/cig_smoking/ Accessed: December 20, 2015
10. Franquet T, Müller NL, Giménez A, Martínez S, Madrid M, Domingo P. Infectious pulmonary nodules in immunocompromised patients: usefulness of computed tomography in predicting their etiology. *J. Comput. Assist. Tomogr.* 2003; 27: 461–8.

Contact AMS for a complete list of references.

LIST OF ABBREVIATIONS

CT: computed tomography
SPN: solitary pulmonary nodule
IRB: Institutional Review Board
TTNA: transthoracic needle aspiration
EBUS-TBNA: endobronchial ultrasound-guided transbronchial needle aspiration
IQR: Interquartile range
CI: confidence interval
HIV: human immunodeficiency virus
FNA: fine needle aspiration
PET: positron emission tomography
NPV: negative predictive value AMS

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SVMIC Seminar

May 4
During the AMS Annual Session
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Registration materials for both events will be mailed in the near future.

OBITUARIES

HOT SPRINGS - **Michael Joseph Young, MD**, 61, passed away Friday, December 29, 2017. He practiced medicine as an orthopedic surgeon in Hot Springs since 1993 with the past six years at CHI St. Vincent Orthopedics Clinic. He loved his patients, his medical colleagues, and the honor and pleasure of working and operating with his brother Chris. He is survived by his wife, Mary Ann Willett Young; his daughters Jordan Young, Kate Young Keller (Carl Keller), Merritt Young (Cliff Biedenharn); and his beloved grandson Baer Biedenharn.

PIGGOTT - **Hillard Ray Duckworth, MD**, 91, passed away December 27, 2017. Dr. Duckworth is survived by his wife, Gwen Duckworth; children Thomas Duckworth (Terri) and Laura Duckworth French (Gary); six grandchildren; and three great-grandchildren. Dr. Duckworth graduated from the University of Arkansas Medical School, graduating from the Class of 1953 with honors. He completed his post-graduate training at St. Louis City Hospital in St. Louis, Mo., and established medical practices in Piggott, Ark., from 1955 until 2017. He was a 50-year member of the Arkansas Medical Society and the Greene-Clay County Medical Society and served as president and vice-president. He served his country in the Korean War and the U.S. Army Medical Corps Reserves. He will be sadly missed by the community and others and will leave a deep void in the medical community and his family.

MELBOURNE - **Harold Maury Tatum, MD**, passed away January 1, 2018. Dr. Tatum graduated from the University of Arkansas School of Medicine in 1955. He went on to join the U.S. Air Force, where he served as a flight surgeon in Michigan for two years. He served as a medical representative at one of the last above-ground nuclear detonations in 1956. He became the first full-time physician in Izard County in 1958 and served the residents of Melbourne for over 40 years. He is survived by his children Angel Tatum Craddock, Lisa Tatum, Lori Tatum Purtle, Maury Tatum Quo and Tobias Tatum as well as nine grandchildren and six great-grandchildren. AMS

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