

Hepatitis C in Arkansas: Updates on Epidemiology, Testing and Treatment





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ON THE COVER

Hepatitis C in Arkansas: Updates on Epidemiology, **Testing and Treatment**

By Alexandria Beebe, MPH(c); Taylor Quattlebaum, MPH (c); Rachel E. Gicquelais, MPH, PhD (c); Namvar Zohoori, MD, PhD, MPH; Dirk T. Haselow, MD, PhD; Nathaniel H. Smith, MD, MPH; and Naveen Patil, MD, MHSA, MA



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BY SANDY JOHNSON, MD

A Closer Look

at Quality



Volume 111 • Number 12

May 2015

Established 1890. Owned and edited by the Arkansas Medical Society and published under the direction of the Board of Trustees

Advertising Information: Penny Henderson, (501) 224-8967 or penny@arkmed.org. #10 Corporate Hill Drive, Suite 300, Little Rock, Arkansas 72205.

Postmaster: Send address changes to: The Journal of the Arkansas Medical Society, P.O. Box 55088, Little Rock, Arkansas 72215-5088.

Subscription rate: \$30.00 annually for domestic; \$40.00, foreign. Single issue \$3.00.

The Journal of the Arkansas Medical Society (ISNN 0004-1858) is published monthly, except twice in the month of August by the Arkansas Medical Society, #10 Corporate Hill Drive, Suite 300, Little Rock, Arkansas 72205. (501) 224-8967.

Printed by The Ovid Bell Press Inc., Fulton, Missouri 65251. Periodicals postage is paid at Little Rock, Arkansas, and at additional mailing offices.

Articles and advertisements published in The Journal are for the interest of its readers and do not represent the official position or endorsement of The Journal or the Arkansas Medical Society. The Journal reserves the right to make the final decision on all content and advertisements

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Combatting Prescription Drug Abuse – AMS Efforts



DAVID WKUIEN EXECUTIVE VICE PRESIDENT

ou will be hearing a lot over the next few months about the bills passed by your AMS during the recently completed session of the General Assembly. One such bill is the Combatting Prescription Drug Abuse Act. With an epidemic of prescription drug abuse/diversion facing our nation and state, the AMS leadership felt it was critical that physicians take a stand and start doing something positive to address this problem. In 2012 alone, 259 million prescriptions were written in the US for pain medication. Representative Steve Magie and Senator Missy Irvin were the lead sponsors of a bill containing the following provisions supported by the AMS:

Changes to the Prescription Drug Monitoring Program. Physicians and other prescribers will now be able to delegate access to the database to persons under their supervision or employment. If funds are available, the PDMP will also develop algorithms that will alert prescribers if any of their patients are prescribed opiates/opioids by more than three physicians within any 30 day period. Licensing boards will have the added authority to require licensees with prescribing violations to register with the PDMP and to require that they access a patient's PDMP record prior to writing a prescription for opiates/opioids.

Prescribing Guidelines for Emergency Departments. Hospital Emergency Departments will be required to adopt guidelines on opiate/ opioid prescribing in the Emergency Department. At a minimum, the guidelines will address treatment of chronic, non-malignant pain, acute pain, limits on amounts or duration of opiate/opioid prescriptions, and identify situations where opiate/opioid prescriptions should be discouraged. The legislation specifically states that the guidelines shall not be construed as establishing a standard of care. Best of all, model guidelines are already available and in use in some emergency departments. These were written and approved by Arkansas' major health care organizations including AMS, AHA, ACEP, Health Department and others. However, the Act does not dictate any specific guidelines that must be adopted.

Prescribing Education. Within the first two years of being granted a license in Arkansas, prescribers will need to obtain a minimum of two hours of prescribing education approved by their respective licensing board. This provision applies to all prescribers newly licensed beginning in 2016. Approved programs will include information on prescribing rules, regulations, and statutes that apply to individuals licensed in the State of Arkansas.

Uniformity Among Licensing Boards. This provision requires other licensing boards who license individuals with prescriptive authority (i.e. Board of Nursing) to adopt rules that are at

The Act contains a definition of chronic, non-malignant pain to be used for purposes of the above requirements that was developed in cooperation with AMS leadership and members specializing in pain management. least as stringent as those of the Arkansas State Medical Board relating to the use of narcotics (not limited to Schedule II) for the treatment of pain not associated with malignant or terminal illness.

Treatment of Chronic, Non-malignant Pain. This provision will require all licensing boards to have rules for treatment of chronic, non-malignant pain that, at a minimum require the prescriber to check the patient's prescription history on the PDMP at least once every six months; have a signed treatment agreement detailing the prescriber's expectations for the patient's behavior; and a requirement that the patient be examined by a physician at least once every six months, if the prescriber is a "non-physician" such as an APRN or PA.

The Act contains a definition of chronic, non-malignant pain to be used for purposes of the above requirements that was developed in cooperation with AMS leadership and members specializing in pain management. The act excludes treatment for patients with a terminal condition and those enrolled in hospice, palliative care programs, or residents of health care facilities. The definition is as follows:

Pain requiring more than three consecutive months of prescriptions for (a) opiates/opioids that are written for more than the equivalent of 90 tablets, each containing 5 milligrams of hydrocodone, or (b) a morphine equivalent dose of more than 15 milligrams per day.

There is more work to be done on this front, but this new Act is a starting point to address a problem that kills 46 people every single day in the United States. AMS



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IN MEMORIAM

Arkansas Foundation for Medical Care (AFMC) remembers the life of **Judith McGhee, MD, MPH,** whose legacy of health care improvement will live on for years to come.



Thank you, Dr. McGhee, for your lifetime of service.







©COMME

BY SANDY JOHNSON, MD

Show Me The Numbers

y husband Brad (the father of our children, my business partner, the love of my life, etc) and our wonderful children are numbers people. They like to know exactly how many miles to our destination, how many calories they burn, how much to tip to the penny at a restaurant to make sure it is 22% of the bill. When cooking, they will follow a recipe exactly. I am definitely the odd one in the family. I estimate how much of a cup of flour to use when cooking; if I follow a recipe at all. I round my numbers up or down to make the math easier. I don't balance my checkbook. All of this drives them crazy. To emphasize my point even more, they all wear fitness trackers and I gave mine away months ago. My rationale is that I love exercising and moving. I did not have trouble meeting the fitness goals. I just completed my eighth marathon. I don't need something to tell me I just took my 10,000th step for the day. I like to think of myself as a quality not a quantity person. They just think I am bizarre.

Numbers however are important in life. Not just the actual numbers either but how we process those numbers. I am not going to digress and discuss common core or the changes in math education. I am not going to discuss counting bullet points for evaluation and management visits. I am not even going to discuss the numbers for meaningful use.

Maybe we should encourage people to track their sleep, diet, weight, exercise/ activity, and laboratory values on their own. The purpose of this editorial is to garner any interest from the members of Arkansas Medical Society regarding numbers. More precisely, the numbers and data one obtains by wearing activity trackers or using health and fitness apps. Fitness trackers and apps are a common part of our personal life now and provide us with

data. Brad uses the Withings app to monitor his data. He tracks his food intake by entering every morsel into his "my fitness pal" app on his phone. His calorie output and activity is tracked by wearing his Fitbit. His blood pressure is tracked with his Withings blood pressure monitor. He tracks his sleep. His weight is tracked with a Withings scale that he bought me for Christmas 3 years ago. Yes you read that right—my husband bought me a scale for Christmas that connects wirelessly to his phone so that he can track my (and his) weight. As I previously stated, he is a numbers guy.

To help support his claims of the benefits of tracking his numbers, we googled the benefits of these trackers. There are sundry articles written about the accuracy, reliability and predictability of some of the various devices. There are articles to support the improvement in the quality of life of individuals who use these apps and trackers. We have also read where some physicians, companies, insurance providers, etc., are collecting this data and using it to help people make better decisions regarding their health care. He also read where one insurance company is offering discounted premiums to people who use these apps and make improvements in their personal health.

To prepare for this editorial, I did a PubMed search. There are many scientific articles also pertaining to this topic. While I did not look at the actual numbers in any of these studies, they all concluded that these apps and trackers provide positive health benefits. There is also positive reinforcement when people see these numbers regularly. In general, the scientific literature supports these trackers and apps.

Even though I am not wearing a tracker, I now agree that tracking these numbers is valuable. Whenever anyone takes control of their health, everyone wins. Knowledge is power. Looking back, this is not a novel idea. I remember watching my grandparents track their blood pressure on a notebook using a home blood pressure monitor. Patients with diabetes who track their glucose tend to fare better than those than people who bury their head in the sand and take a languid approach to their condition.

As health care professionals, maybe we should be empowering ourselves, our loved ones, and our patients with numbers. Maybe we should encourage people to track their sleep, diet, weight, exercise/activity, and laboratory values on their own. Maybe that would help us all take ownership in our health and make better life choices. Maybe that would help the obesity epidemic in our country.

When you add it all up, knowing the quantity does improve the quality. Or as Brad says, if you cannot count it then it does not count.

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Sandy Johnson, MD AMS

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Hepatitis C in Arkansas: Updates on Epidemiology, Testing and Treatment

By Alexandria Beebe, MPH(c)^{1,2}; Taylor Quattlebaum, MPH (c)^{1,2}; Rachel E. Gicquelais, MPH, PhD (c)³; Namvar Zohoori, MD, PhD, MPH^{1,2}; Dirk T. Haselow, MD, PhD^{1,2}; Nathaniel H. Smith, MD, MPH¹; and

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Abstract

epatitis C infection is the most common blood-borne infection in the United States with an estimated 2.7 million individuals suffering from chronic infection. Of those who are infected with Hepatitis C virus, 75-85% develop chronic infection. Without treatment for chronic infection, individuals can develop liver diseases, such as cirrhosis and hepatocellular carcinoma, during many years of asymptomatic infection. To examine the burden of Hepatitis C virus infection in the state, the Arkansas Department of Health created an epidemiologic profile based on data collected in 2013 from several data sources, including the department's Hepatitis C surveillance program. In order to make more Arkansans aware of their infection, the local health units in all 75 counties of the state recently began screening individuals at risk for the disease, including persons born during the years 1945-1965. Despite recent advances in treatment efficacy, identifying infected individuals and connecting patients to affordable HCV treatment and care remain priorities.

Background

Since its discovery in the late 1980s, Hepatitis C has become the most common blood-borne infection in the United States (U.S.) and is now the leading cause for both liver transplantation and hepatocellular carcinoma.^{1,2} Hepatitis C virus (HCV) is a blood-borne infection that, prior to 1992, was commonly spread through organ transplants and blood transfusions. While this is still a common method of transmission outside of the developed world, blood supply screening has effectively eliminated this mode of transmission in the U.S. Currently, the primary method of transmission is through injection drug use. HCV is less frequently spread through occupational exposure to an infected individual's blood, tattooing, sex, or vertical transmission (mother to child).

After initial infection with HCV, only 20-30% of persons develop symptoms of acute HCV infection such as fever, fatigue, nausea, vomiting, abdominal pain, and jaundice, and signs such as abnormal

alanine aminotransferase, aspartate aminotransferase, and bilirubin levels.3 Spontaneous elimination of the virus occurs in approximately 15-25% of those who are exposed to the virus without any intervention or treatment.³ The remaining 75-85% develop chronic HCV infection.³ Studies show that approximately 45-85% of chronically infected persons are unaware of their infection.³ Over time, the hepatitis C virus attacks and kills liver cells, leading to liver disease in 60-70% of those infected, with 5-20% developing cirrhosis and 1-5% dying from chronic liver diseases, such as cirrhosis or liver cancer.3 Accordingly, HCV infection is often termed the "silent killer". In Arkansas, there are approximately 30,000 adults living with chronic Hepatitis C.⁴ It is estimated that there are approximately 2.7 million chronically infected individuals in the U.S and up to 150 million around the world.^{5,6} There are at least six genotypes of HCV (labeled 1-6) and multiple subtypes of each genotype. According to the Arkansas Department of Health (ADH) HCV surveillance data, for genotype results reported in Arkansas over the last two years, nearly 75% of infections were genotype 1 while genotypes 2 and 3 each accounted for around 12-13% of the remaining infections.7 These numbers are similar to those found nationally, with HCV genotype 1 being the most common in the U.S.³

HCV testing is recommended for individuals who have known risk factors for infection (current or past injection drug users, those who received blood transfusions, those who underwent organ transplants, those who were potentially exposed to the blood of an infected individual, children born to mothers who are infected, or those who received a tattoo with non-sterile instruments).8 In 2012, the Centers for Disease Control and Prevention expanded testing recommendations to include all individuals born between 1945 and 1965. Persons born in this age group account for 75% of the total burden of HCV in the U.S. and have likely been infected for several years, which makes them most at risk to develop cirrhosis and liver cancer in the near future. Further, many are unaware of their infection status. Reasons for the high rate of infection in this age group are not fully understood.⁹ As improved treatment options become available. the identification of infected individuals will become increasingly important in the prevention

of future morbidity and mortality associated with chronic HCV infection.

HCV treatment options available before 2011 required interferon injections that were associated with many side effects such as flulike symptoms, fatigue, depression, and gastrointestinal issues. Further, these drugs only cured HCV infection in approximately 50% of treated persons, as measured by sustained virologic response (SVR), an indicator of HCV cure where the virus is not detected at 24 weeks after completion of therapy.^{10,11} In late 2014, several new treatment options became available, offering all-oral treatment regimens with SVR rates above 90% and far fewer side effects. While this is a promising new development, the new treatments are incredibly expensive. For example, the new drug Sovaldi licensed in 2014 costs \$84,000 for a twelve-week course of therapy, which equates to about \$1,000 per pill.¹² Further, this price does not include the cost of other drugs, such as ribavirin, included in the treatment regimen or costs of other healthcare services required while on treatment. Widespread availability of new treatment options has been stunted while insurers and policymakers assess the feasibility and cost of rolling out new treatment programs.

Arkansas

Prior to 2013, there was limited knowledge of the burden of HCV infection in Arkansas. Acute HCV cases that were reported to ADH as part of the state's mandatory notifiable disease reporting were followed-up as part of the department's acute HCV surveillance activities. With only 20-30% of those who are acutely infected with HCV ever showing symptoms and with no staff dedicated specifically for HCV surveillance, there were very few cases identified before 2013.

Despite being focused primarily on cardiovascular health, the Arkansas Cardiovascular Health Examination Survey (ARCHES), a crosssectional survey conducted in 2006-2008, provided some data on HCV in Arkansas as HCV antibody testing was included in the blood work conducted as part of the survey.13 The ARCHES study showed that 1.8% of adult, noninstitutionalized Arkansans were either currently infected with HCV or had been infected at some point in the past. Since 75-85% of acutely infected individuals develop chronic HCV infection, ARCHES results suggest that chronic HCV prevalence in Arkansas is approximately 1.4%, which is close to the national prevalence of 1.0%.5 As part of the ARCHES study, a multiple logistic regression analysis was conducted to determine risk factors associated with HCV infection in Arkansas.⁴ The ARCHES study revealed that individuals who injected drugs were 24.4 times more likely to have ever had HCV infection compared with individuals who did not inject drugs (Table 1).4 Additionally, Arkansans who ever had sex with an injection drug user (IDU) or someone infected with HCV were 11.4 times more likely to have ever had HCV than persons without an IDU or HCV-infected sex partner.⁴ Much like the nationwide trend. ARCHES results demonstrate that injection drug use is the most common risk factor associated with HCV in Arkansas. These results are subject to a number of limitations. The survey only involved non-institutionalized individuals who were at least 18 years of age, so those who were incarcerated, living in mental health institutions, or less than 18 years of age were not included. Second, the only test

Table 1. Risk factors for HCV in Arkansas from the ARCHES study⁴

Variable	Unadjusted Odds Ratio	95% Confidence Interval	Adjusted Odds Ratio	95% Confidence Interval
Annual Income < \$10,000	4.7	(1.5 - 14.7)	5.3	(1.6 – 18.1)
Ever injected drugs	38.7	(9.8 – 153.0)	24.4	(6.5 – 91.7)
Ever had sex with an injection drug user or someone with HCV	19.6	(6.2 – 61.7)	11.4	(3.7 – 35.3)
Born 1945-1965	5.9	(1.9 – 18.2)		

Table 2. Characteristics of HCV infected individuals between 13 – 29 years of age⁴

Characteristic	Number of Cases (Total N = 596)	%	Characteristic	Number of Cases (Total N = 596)	%
Age (Years)			Ever Injected Drugs in Lifetime		
13-19	28	4.7	Yes	378	63.4
20-24	209	35.1	No	71	11.9
25-29	359	60.2	Unknown	147	24.7
Sex			Ever in Jail or Prison in Lifetime		
Female	275	46.1	Yes	311	52.2
Male	321	53.9	No	60	10.1
			Unknown	225	37.8
Race			Ever Received a Tattoo From an Unregulated Source		
White	493	82.7	Yes	161	27.0
Black	15	2.5	No	80	13.4
Multi-Racial	6	1.0	Unknown	355	59.6
Other or Unknown	82	13.8	Ever Been Homeless		
Incarceration Status at Time of Testing			Yes	86	14.4
Incarcerated	266	44.6	No	208	34.9
Non-Incarcerated	330	55.4	Unknown	302	50.7

included in the study was an HCV antibody test, therefore results do not distinguish between a current infection (acute or chronic) or a past infection that had resolved.

In recent years, there have been several studies indicating a trend of an increasing number of HCV infections among individuals under 30 years of age. This increase was hypothesized to be attributable to increases in prescription opioid abuse and injection drug use.^{14,15,16} Based on these studies, ADH officials decided that the primary focus of surveillance activities in Arkansas should be on persons aged less than 30 years. Starting in January 2013, every HCV case that was reported to ADH for an individual under 30 years of age was followed-up by faxing a form to the reporting physician requesting information on HCV test results and risk factors. Completed forms were then reviewed and entered into a database. In 2014, ADH received a grant from the Association of State and Territorial Health Officials (ASTHO) to create an epidemiologic profile of Hepatitis C infection in the state of Arkansas, and the 2013 HCV surveillance data was included in the profile to describe the burden of HCV infection among persons under 30 years of age. The characteristics of Arkansans aged 13-29 years who were reported as HCV positive to ADH and had a follow-up form faxed and completed can be seen in Table 2. Notably, 82.7% of cases were Caucasian, 63.4% reported that they injected drugs in their lifetime, and 52.2% were incarcerated at some point in time.⁴

While the primary focus of ADH surveillance is on Arkansans under 30 years of age, Hepatitis C is affecting Arkansans of all ages. As part of the epidemiologic profile prepared in 2014, ICD-9-CM and ICD-10 codes were analyzed for 3,604,442 hospitalizations that occurred between 2004-2012 as well as death certificate records for 398,123 deaths that occurred between 1999-2012. Hospitalization records documenting Hepatitis C infection have shown a statistically significant increase from a low of 2,837 in 2004 to a high of 4,141 in 2012 (crude hospitalization rate per 100,000 persons of 103.2 and 140.4, respectively). There was also an increase in the documentation of comorbid conditions such as chronic liver diseases and cirrhosis in those with reported HCV infection. As shown in Figure 1, Hepatitis C is now a leading cause or contributing factor in more deaths than HIV.⁴

In September of 2014, ADH began offering HCV antibody testing in the local health units (LHU) located in all 75 counties of the state. Testing is offered to individuals with at least one of the HCV risk factors (injection drug use, occupational exposure, etc.) and also to individuals born between 1945 and 1965.17 The goal of this initiative is to help more Arkansans become aware of their infection status before they develop complications associated with chronic HCV infection. Persons who test positive in the LHU are contacted and made aware of their infection status and referred to receive an HCV Polymerase Chain Reaction (PCR) test, Unlike the antibody test, the PCR test detects the presence of virus in the blood and therefore deciphers between current and past infection. The crucial next step is treatment for persons with HCV infection. Ideally, all persons with chronic hepatitis C would be referred for treatment, but with the substantial costs associated with current treatment options, it would be incredibly expensive to treat every chronic case in the state. Recently released recommendations from the American Association for the Study of Liver Diseases (AASLD) and the Infectious Diseases Society of America (IDSA) state that individuals already showing signs of liver disease, such as cirrhosis or other HCV related symptoms, should receive treatment first. Those who are not currently showing symptoms should be monitored and wait until future, less-costly therapies become available.18

Conclusion

The morbidity and mortality due to Hepatitis C virus infection is increasing in Arkansas and in the United States, with many people unaware of their infection due to the asymptomatic progress of the disease. In response to this public



Figure 1. Deaths indicating Hepatitis B, Hepatitis C, or HIV as a cause or contributing condition to death in Arkansas from 1999 – 2012.⁴

health problem, the Arkansas Department of Health has implemented a statewide screening system for all persons at risk for the disease to identify cases and subsequently connect them with care and treatment.

Acknowledgements

The authors thank the Association of State and Territorial Health Officials (ASTHO), specifically Catherine Cairns, MPH, and Elizabeth Rusebush, MPH, for providing oversight and funding for the ADH HCV Epidemiologic Profile. Further, the authors thank Monina Klevens, DDS, and Elizabeth Hughes, DrPH, from the Centers for Disease Control and Prevention (CDC) for providing technical assistance on the project. This report was supported in part by an appointment to the Applied Epidemiology Fellowship Program administered by the Council of State and Territorial Epidemiologists (CSTE) and funded by the Centers for Disease Control and Prevention (CDC) Cooperative Agreement Number 5U38HM000414-5. Finally, the authors thank colleagues at ADH who were pivotal in the development of the ADH HCV Epidemiologic Profile, including Joseph Bates, MD, MS, Stephanie Williams, BSN, NP, Donnie Smith, MA, J. Gary Wheeler, MD, MPS, Kellye McCartney, Ralph Wilmoth, MPH, MPA, Arrie Morris, MPH, Mohammad Umair Azam, MPH, Dylan Burks, MPH, Michael J.E. Grier, MPH, Ewelina Sulek,

MPH, Howraa Al-Mousawi, PhD, Betty Bohanna, Lynda Lehing, Chris Fisher, Abby Holt, MPH, Paul Johnson, Shalini Manjanatha, Theressia Mitchell, CTR RHIT, and John Senner, PhD.

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Arkansas Foundation for Medical Care[™] Lynda Beth Milligan, MD, FAAFP, CPE, CHCQM; Michael Moody, MD; David Nelsen, MD, MS; Steven Strode, MD, MEd, MPH; J. Gary Wheeler, MD, MPS

Newborn screening improvements in Arkansas

BY STEVEN CHASTEEN, MNSC, RN, CPHQ; WILLIAM E. GOLDEN, MD, MACP; and NATHANIEL SMITH, MD, MPH

ewborn screening is a public health activity carried out in every state in the nation and in most developed countries. Newborn screening can identify conditions that are present but not clinically evident in the newborn period. Early identification and subsequent treatment of selected disorders can prevent permanent mental or physical damage, or death in affected children. The goal of newborn screening is to identify newborns who have rare and clinically unapparent but treatable syndromes. This can prevent developmental impairments, delayed physical growth, severe illness and death.

Newborn screening has been under scrutiny by public health officials since a November 2013 article was published in the *Milwaukee Journal Sentinel*. The article reported that thousands of hospitals throughout the country were late in sending newborn blood samples to state labs that perform the screening tests. The *Journal Sentinel* analyzed nearly three million newborn screening tests from hospitals across the country to determine how long it took newborns' samples to reach state laboratories. The newspaper described cases from several states where late deliveries delayed diagnosis, including an Arkansas case where the hospital was late in sending a sample for testing. The newborn was critically ill by the time his blood sample reached the state lab, five days after collection, due to a state holiday followed by the lab being closed for inclement weather. It took an additional six days from receipt of sample by the lab until full testing was completed and the treating physician notified. The newborn experienced significant developmental delay from an easily treatable condition because of the delay in sending his blood sample for testing.¹

Arkansas hospitals were slow in sending newborn screening samples to the Arkansas Department of Health's (ADH) Public Health Laboratory for testing. At the end of the 2013 state fiscal year, only about 13 percent of the samples had been delivered within the specified period.

RECOMMENDED TIME PERIODS

The American Academy of Pediatrics recommends that blood specimens be collected after newborns are at least 24 hours of age.² Specimens collected prior to 24 hours of age can be used to screen for some disorders but are not reliable for amino acid disorders, cystic fibrosis, hypothyroidism and several others. Analyses of screening results suggest that a specimen taken on the second day of life is suitable for all testing. This small delay allows testing to be performed only once and has minimal effect on the outcome of the conditions of interest.

The American College of Medical Genetics recommends³ that newborns' samples arrive at a testing lab within three days after collection, with a fiveday maximum elapsed time between birth and the availability of test results. With some of these abnormal conditions, a newborn baby often appears healthy at birth, becoming extremely ill within days, leading to disability or death within a few weeks without treatment.

The Arkansas State Board of Health's Rules and Regulations Pertaining to Testing of Newborn Infants purpose is to assure that all Arkansas newborns have the opportunity to be screened for genetic metabolic illnesses. New rules go into effect May 2015. For healthy infants born in medical facilities, the optimum time for

THE ARKANSAS FOUNDATION FOR MEDICAL CARE, INC. (AFMC) WORKS COLLABORATIVELY WITH PROVIDERS, COMMUNITY GROUPS AND OTHER STAKEHOLDERS TO PROMOTE THE QUALITY OF CARE IN ARKANSAS THROUGH EDUCATION AND EVALUATION. FOR MORE INFORMATION ABOUT AFMC QUALITY IMPROVEMENT PROJECTS, CALL 1-877-375-5700. blood specimen collection is 24 to 72 hours after birth. The collected specimen should be submitted to the ADH's Public Health Laboratory in Little Rock within one business day, (previously 48 hours) of collection.

In Arkansas, the newborn screen is collected between 24 and 72 hours after birth. Blood samples from the newborn are collected by pricking the heel of the baby and collecting drops of blood on a piece of filter paper. The blood sample should be sent to the state lab within one business day.

The ADH laboratory tests newborn blood samples for 28 genetic disorders, providing an invaluable snapshot of information about the newborn's health. Some health disorders can cause serious lifelong damage within five days after birth. The earlier the lab processes the tests, the sooner families can be notified of health concerns and consult with their physicians about further testing or treatment.

Hospital and public health officials in many states, including Arkansas, have pledged to end delays by changing processes and improving how samples get to state labs. Arkansas offers a courier service to transport blood samples from county health units to the ADH lab at no charge to hospitals. Hospitals also have the option to utilize overnight delivery services. Recently the ADH lab added Saturday hours of operation for newborn blood samples.

TIMELY SUBMISSION IMPROVES 400%

In January 2014, the ADH, Arkansas' Division of Medicaid Services (DMS), Arkansas Foundation for Medical Care (AFMC), Arkansas Hospital Association, and Arkansas birthing hospitals began a coordinated effort to reduce newborn screening delays. Leveraging the innovative and successful Arkansas Medicaid Inpatient Quality Incentive (IQI) program, AFMC and DMS developed two newborn screening quality measures. These measures both challenge and incentivize Arkansas hospitals to reduce the time between taking newborns' blood-screening samples and sending them to the ADH lab.

Newborn screening specimen collection and submission requirements from the Arkansas Board of Health were the basis for development of the IQI newborn screening quality measures. The two quality measures are:

- Newborn Screen 1 (NBS-1): Timely Collection of Newborn Screening Specimen
- Newborn Screen 2 (NBS-2): Timely Submission of Newborn Screening Specimen

These quality measures complement ongoing efforts in birthing facilities to examine their current process for collection and submission of newborns' blood samples and enhance their ongoing quality improvement efforts. Each facility must determine the best approach to meet its needs and assist the facility in reaching established targets.

Since Nov. 2013, the ADH reports that Arkansas' hospitals have attained an almost 400 percent improvement in the timely submission of blood samples for testing by the ADH lab. From July through September 2014, about half of newborn blood samples collected at Arkansas hospitals arrived at the state lab within 48 hours. Arkansas hospitals are working hard to achieve the more stringent target of one working day. Many hospitals in Arkansas have addressed and eliminated issues with collection and delivery of newborn blood samples.

Time is critical, and the newborn screening process is a team effort. Hospital physicians, nurses, and related staff take care of newborns. Newborns' blood samples are typically drawn from the baby before it is released from the hospital. After blood samples are sent to the state lab and the results obtained, the ADH sends test results to the physician for follow-up. The physician can then advise and assist families in finding the right resources and team of specialists to get appropriate treatment. Getting the right treatment, which starts with timely collection and testing of blood samples, makes a great difference in affected infants' chances for a healthy outcome. \blacktriangle

Mr. Chasteen is manager of quality programs for the Arkansas Foundation for Medical Care; Dr. Golden is professor of medicine and public health at the University of Arkansas for Medical Sciences and medical director of Arkansas Medicaid and Dr. Smith is director and state health officer of the Arkansas Department of Health.

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Diagnosis and Successful Surgical Management of Posterior Nutcracker Syndrome in a Patient with Loin Pain Hematuria

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Abstract

The syndrome of loin pain hematuria in the absence of stones is poorly understood but must be considered in the differential diagnosis for patients with clinical manifestations resembling nephrolithiasis. A 22-year-old white female with a 4-year history of left flank pain and hematuria underwent an extensive workup with normal renal ultrasound and cystourethroscopies. CT scan and MRI revealed a retro-aortic left renal vein. Posterior nutcracker syndrome was considered the most likely diagnosis. The patient underwent a left laparoscopic nephrectomy with auto-transplantation in the right iliac fossa. She developed azotemia shortly after, which resolved and since then has become asymptomatic.

Introduction

Nutcracker syndrome (NCS) is a rare cause of loin pain hematuria syndrome. In certain cases it can lead to relentless pain, gonadal swelling, and pelvic congestion to the point that surgical intervention becomes necessary. Anterior and posterior nutcracker syndromes have been described in the literature; ¹ in the former, the left renal vein is compressed between the abdominal aorta and superior mesenteric artery. In the latter, the left renal vein has a retro aortic course and is compressed between the abdominal aorta and vertebral body. We report a case of symptomatic posterior nutcracker syndrome treated with nephrectomy and renal autotransplantation.

Case Report

A 22-year-old Caucasian female presented

to us with left-sided flank pain and hematuria that had been occurring for at least four years. The patient was involved in a motor vehicle accident in 2008. As part of her trauma work-up, she had a CT scan performed at an outside facility which suggested the possibility of left-sided renal vein compression or "nutcracker syndrome." No intervention was done at that time. Her pain and frank hematuria got significantly worse during her last pregnancy in 2012. The patient had microscopic as well as frank hematuria. On examination, she had no evidence of abdominal or vulvar varicosities, and she had a soft abdomen with no significant flank tenderness. The patient was first referred to the urology clinic. She described having intermittent gross hematuria accompanied by pain that sometimes would be severe enough to require oxycodone for relief. A renal ultrasound was normal; however, an abdominal duplex revealed a dilated left renal vein that appeared compressed beneath the aorta. A cystourethroscopy revealed normal bladder mucosa, no diverticula or stones, and a clear efflux from both ureteric orifices. Given her history of nutcracker anomaly, an MRI was done. It revealed a compressed retro-aortic left renal vein (Figure 1). The patient was subsequently referred to the vascular surgery service for fur-



Figure 1. CT scan of this patient showing entrapment and compression of the left renal vein between the aorta and the vertebral body with proximal dilatation of the renal vein.

ther work-up and treatment. Although retrograde phlebography and angiography with reno-caval pressure gradient determination is accepted as the gold standard in establishing a final diagnosis of NCS, in this patient, the left renal vein was compressed to such a degree that the vascular surgeon was unable to get a wire across the lesion. A gradient between the left renal vein and inferior vena cava of > 3 mmHg clinches the diagnosis of NCS (normal 0-1 mmHg).

Given the diagnosis of posterior nutcracker syndrome and continued symptoms of severe left flank pain and hematuria, one treatment strategy considered was transposition of the left renal vein anterior to the aorta and lower on the inferior vena cava. However, this would require a major abdominal operation with its concomitant morbidities. After discussions with the transplant surgery service a less invasive approach was conceived: a left laparoscopic nephrectomy with autotransplantation in the right iliac fossa. Her preoperative CT angiogram demonstrated the presence of a single artery, retro-aortic renal vein, and only one ureter (Figure 2A). The patient's surgery was uneventful. However, she was admitted once postoperatively with acute kidney injury due to pyelonephritis of her autotransplanted kidney. This was treated with antibiotics and she improved. Overall, her hematuria resolved and her loin pain subsided. The left nephrectomy and autotransplantation resulted in resolution of her symptoms and a functioning transplanted kidney (Figure 2B, 2C). Fifteen months later, her last creatinine was 0.6 mg/dL. Her postoperative urine analyses have consistently demonstrated less than 2 red blood cells per field.

Discussion

Nutcracker syndrome is a well-known but under-recognized cause of hematuria. The more common variant is anterior nutcracker syndrome, in which the left renal vein is compressed between the superior mesenteric artery and the aorta. Our patient had posterior NCS in which a retroaortic left renal vein (LRV) is compressed between the abdominal aorta and the vertebral body. In both types of nutcracker syndrome, it is postulated that congestion from the obstructed flow in the left renal vein causes loin or pelvic pain and hematuria, likely resulting from the rupture of thin-walled intrarenal venous sinuses into calyceal fornices. This renal vein hypertension also results in a pelvic congestion syndrome with reflux of blood down the left gonadal vein, often resulting in symptoms such as dyspareunia, dysmenorrhea, atypical pelvic pain, or vulvar and lower abdominal varicosities.² Our patient's symptoms worsened during her last pregnancy, suggesting that the gravid state or fluid shifts caused her symptoms to worsen.

The natural history of NCS is characterized by a delayed diagnosis and repeated diagnostic procedures that may be avoided by early diagnosis. Imaging such as ultrasound, computed tomography, and magnetic resonance imaging are required to diagnose NCS.³The most accurate method of diagnosis is left renal venography with measurement of the pressure gradient between the left renal vein and the inferior vena cava.

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Figure 2. (A) Preoperative CT angiogram showing patient's retro-aortic vein. The small arrow is the aorta and the long thin arrow is the left renal vein; (B) CT scan showing autotransplanted kidney in the right lower quadrant; (C) Renogram showing both kidneys working on the right side.

The differential diagnosis of patients presenting with loin pain and hematuria includes nephrolithiasis, renal cell cancer and other malignancies, polycystic kidney disease, IgA nephropathy, recurrent renal papillary necrosis with obstruction, recurrent renal thromboembolism, recurrent renal artery dissection, endometriosis and nutcracker syndrome.⁴⁻⁵ Other rare cases of giant kidney worm and polyarteritis nodosa limited to the kidney have also been reported in the literature.⁴ To arrive at the diagnosis of renal nutcracker syndrome, K. Ahmed et al. proposed an algorithm that starts off with urinalysis, urine microscopy, and culture followed by an ultrasound scan. If these tests are negative and hematuria is present, the next step is to perform a cystoscopy +/- ureteroscopy. If this procedure is negative as well, patients should undergo a color Doppler evaluation of renal vessels to examine the flow, followed by a CT angiogram or MR angiogram. The gold standard for the diagnosis of renal nutcracker syndrome is renal vein phlebography and manometry to look at pressures within the renal vein.³

Reported treatments for posterior nutcracker syndrome include transposition of the left renal vein, venolysis, widening of the window behind the aorta, and omental packing.^{1, 5-6} Renal autotransplantation has been also successfully used to treat idiopathic loin pain hematuria syndrome and anterior nutcracker syndrome.⁷⁻⁸ In our case the autotransplant was preferred over the transposition of the vein because the nephrectomy offers the advantage of denervating the kidney, as well as a less morbid surgical approach by negating the need for a laparotomy incision. We conclude that renal autotransplantation is a viable option in patients with refractory symptoms from nutcracker syndrome.

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The Culture of Complexion: The Impacts of Society's **Role in Shaping The Definition of Beauty**

Abstract

he definition of beauty has evolved as the trends valued by the top of society change.

For centuries, fair skin was a requirement of the Western definition of beauty; however, a shift in the 1920s made tanned skin the new standard. In this article, smoking and tanning are presented as risky behaviors that are perpetuated through industry advertising and exploitation of the authority of health professionals. The article further explores the culture of complexion in Western society before and after the 1920s as well as the consequences of tanning and efforts to rewrite society's definition of beauty.

Throughout history, people of Western society have engaged in various socially promoted behaviors that proved to be detrimental to their ultimate survival. For example, through the first half of the twentieth century, cigarette smoking was an essential element of socialization and physicians were even known to offer cigarettes to patients to help calm their nerves. However, by the mid-twentieth century, cigarette smoking began to be associated with several new and uncommon diseases including intermittent claudication, peripheral vascular disease, and lung cancer.1

As the newfound dangers of smoking became more evident, tobacco companies relied on advertising campaigns to reassure the public that cigarettes were safe. A common advertising strateqy was employed by the 1940-1949 "More Doctors Smoke Camels" campaign in which Camel advertisements were placed in conjunction with images of physicians and a storyline of health advancements. However, consumers did not know that the advertisements were based on unsupported claims and surveys that were specifically designed to ensure that physicians would support Camel cigarettes.²

Tanning Culture

Around the same time that health concerns

Sarah Carlock, BS and Brian Russell, MD

associated with smoking began to surface, another dangerous culture began to emerge, shifting the definition of beauty and ideal complexion for decades to come. Tanned skin has not always been considered beautiful. In Western Cultures, white skin was the standard of beauty for centuries, and it was not until the 1920s that tanned skin became socially acceptable.

During the Elizabethan Era, Queen Elizabeth was the picture of ideal beauty. In order to maintain this youthful appearance of the Virgin Queen, she used multiple cosmetics with a white powder base. Her appearance inspired most European women to cover their own skin with whitening powders, paints, and creams.³ A particular favorite, called "ceruse," was a combination of white lead and vinegar.4

Fair skin remained the standard of beauty until 1923, when the prominent French fashion designer, Coco Chanel, accidentally received too much sun while sailing on a yacht in the French Riviera. When she returned with a golden complexion, her accident was guickly revolutionized into an industry.5 Tanned skin became a trademark of the new affluent upper class lifestyle, and as proclaimed by Coco Chanel herself, "The 1929 girl must be tanned. A golden tan is the index of chic!"6

The 1920s were only the beginning of a new international obsession with the sun. During the following decades, sunbathing became socially acceptable, beaches became common vacation destinations⁷ and the advertising and entertainment industries developed

Bardot, a French film star, began to flaunt her tan on the beach. Her youthful and sexy appearance inspired celebrities to embrace tanning and magazines quickly filled with images of bronzed celebrities.9

Another wave of tanning frenzy overcame Americans when the German scientist, Friedrich Wolff introduced tanning beds to North America in 1978. Within a few years, tanning beds became a popular method of quickly obtaining a tan throughout the United States. In a 2006 study, Hoerster et al. examined the prevalence of tanning salons in the 116 most populated cities in the United States. The researchers found that there were more tanning salons than McDonald's restaurants or Starbucks coffee houses.10

Consequences of Tanning

Not coincidentally, skin cancer rates have continuously increased since the 1970s. As



American culture has demanded tan skin, people have deliberately sought ultraviolet radiation (UVR) exposure through direct sunlight and tanning beds. Tanning bed use has become a well-known risk factor for both melanoma and non-melanoma skin cancers. In a retrospective case study, Christenson et al. examined rising rates of non-melanoma skin cancers, which were propelled by increasing rates in young women. For women between the ages of 26-30, the incidence of basal cell carcinoma increased approximately 300 percent between the late 1970s and 2003.11 In addition to the increases in non-melanoma skin cancers, cutaneous melanoma has also increased drastically among young Americans. Reed et al. observed a 6-fold increase in the incidence of melanoma in young adults over the past 40 years.12

In the early 2000s, several articles were published correlating tanning device use with an increased risk for developing skin cancer. In a 2002 population-based case control study, Karagas *et al.* found that those who used tanning devices were 1.5 times more likely to develop squamous cell carcinoma and 2.5 times more likely to develop basal cell carcinoma, compared to those who did not use tanning devices.¹³ In 2005, Gallagher *et al.* reported that there is a significantly increased risk of cutaneous melanoma subsequent to sunbed use. Melanoma is associated with intermittent sun exposure, and tanning beds, by their very nature, expose individuals to intermittent UVR.¹⁴

As mounting evidence exposing the dangerous consequences of tanning threatened to compromise the multi-billion dollar enterprise, the tanning industry relied heavily on advertising and promotion to save face. Many advertising methods mimic those utilized by the tobacco industry beginning in the early twentieth century.

Though not capable of enacting large-scale changes on their own, the combination of legislative changes, promotion of skin cancer prevention by foundations, and celebrity endorsement of fair skin might prove to be effective in changing the perception about complexion that has been engrained in the minds of American women for nearly a century. Greenman and Jones found that both smoking and tanning advertisements fall into four major categories.¹⁵ One category, mitigating health concerns, closely reflects the "More Doctors Smoke Camels" campaign of the 1940s. As illustrated by an advertisement that portrays a resident physician claiming, "After working 16-hour shifts for my residency, I tan because it recharges me for work tomorrow," the tanning industry has relied on the cultural authority of the medical profession to reassure consumers that tanning is safe. The advertisements fail to mention that in a 2006 study, "100% of dermatologists and 84% of non-dermatologist physicians would discourage UV tanning for non-medical purposes even in healthy patients."¹⁵

Striving for Solutions

During the 1990s, the medical community made extensive efforts to educate the public on the dangerous effects of sun exposure as well as the benefits of sun protection through print, radio, and television. Despite the efforts, adolescents continued to report frequent sunburns. Robinson *et al.* acknowledge, "Skin cancers are potentially preventable with adequate sun protection of the population during occupational and recreational exposure to ultraviolet light."¹⁶

By conducting phone interviews with 658 lllinois teenagers, Robinson *et al.* found that teens were aware that too much sun could cause sunburns and skin cancer. Despite awareness, teens with fair skin reported an average of 3.3 sunburns within the past year.¹⁶

Ultimately, changing the public perception of tanned skin as the most desirable appearance has proven to be difficult. Tanning has become so engrained in our culture that tan skin has become a requirement in our definition of beauty. Psychologically, the need to appear beautiful outweighs the risk of skin damage leading individuals to use tanning beds and sunbathe despite knowledge of the associated dangers. Understanding the influence of such social implications, organizations such as the *American Academy of Dermatology* and the *Richard David Kann Melanoma Foundation* encourage those who want to be tan to utilize spray-tans and other sunless tanning products (STPs) rather than UVR sources.¹⁷

While they are a great alternative to tanning beds and tanning outdoors, research indicates that STPs are not a perfect solution. A 2006 study by Brooks *et al.* shows that both users and potential users of STPs were more likely to have burned dur-

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ing the previous summer and more likely to have used tanning beds than those who did not use or had no intentions of using STPs.¹⁸

It appears that STPs are not serving as the safe alternative to UV tanning that the professionals had hoped for. Brooks *et al.* propose multiple explanations for the higher sunburn rates among sunless tanners: users might be unaware that the products do not provide protection against the damaging effects of the sun, use may be more common among those with tan-promoting attitudes, or tanners might be using the products to accentuate tans received from sunbathing or tanning beds.¹⁸

The association of STP use with tanning bed use and sunburns leaves many concerned that STP use might be encouraging, rather than discouraging, intentional exposure to UVR. Promoting a tanned appearance, even through artificial means, continues to fuel its social value.¹⁸

Combined Efforts

The truth about tanning is that people are dying from melanoma. As reported by The American Academy of Dermatology, the incidence of this cancer "has been rising for at least 30 years - particularly among young, white women in the most recent years."19 Pressing concern over the health consequences associated with tanning and the importance of preventing UVR damage from a young age has prompted the regulation of tanning bed use by minors. Currently, five states, including California, Illinois, Nevada, Texas, and Vermont, have banned tanning bed use by minors, and Wisconsin has banned use for minors under the age of 16. Over 30 other states regulate tanning bed use through means such as parental permission requirements, time limits, and public school education. Arkansas requires in-person parental consent for anyone under the age of 18.20

In addition to governmental intervention, *The Skin Cancer Foundation* urges people to "Go With Your Own Glow." This campaign was developed "to encourage women to love – and protect – their skin, whatever its natural hue."²¹ Using simplistic, yet attractive, advertisements, the campaign aims to draw attention to the consequences of tanning and to encourage women to be confident with their natural complexion. *The Foundation* states, "Once people stop associating tanned skin with beauty, we will really make headway against skin cancer."²¹

Throughout the evolving nature of ideal complexion, there has been one constant – the influential role of high-status individuals. Inevitably, changes introduced by celebrities trickle down to become the trends of the general public. While tanned skin has dominated the pages of magazines and television screens for some time now, images of celebrities, such as Anne Hathaway, embracing their natural, fair complexions are becoming more common. Hathaway was recently commended for protecting her skin while walking around New York, and her look was described as "reminiscent of Audrey Hepburn's classic glamorous style."²²

Though not capable of enacting large-scale changes on their own, the combination of legislative changes, promotion of skin cancer prevention by foundations, and celebrity endorsement of fair skin might prove to be effective in changing the perception about complexion that has been engrained in the minds of American women for nearly a century. Tanned skin is not necessary to be beautiful and it does not provide the appearance of health and youthfulness. As women grasp that the consequences of UVR exposure outweigh the satisfaction of temporary beauty as described by society, the definition of beauty will continue to evolve.

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AMA HONORS FORMER ARKANSAS SURGEON GENERAL WITH TOP GOVERNMENT SERVICE AWARD



(L) Clark Fincher, MD; Joe Thompson, MD; Jennifer Thompson; David Wroten; Scott Ferguson, MD

On February 24, 2015, the American Medical Association (AMA) presented former Arkansas Surgeon General Joseph W. Thompson, M.D., M.P.H., with the Dr. Nathan Davis Award for Outstanding Government Service. Dr. Thompson was presented the award in conjunction with the AMA's National Advocacy Conference in Washington, D.C.

Dr. Thompson was selected for the AMA's top government service award for his contribution to vastly expanding health insurance coverage in Arkansas, and halting an escalating childhood obesity crisis in the state. He is credited as the creative force behind innovative solutions to provide tens of thousands of Arkansans with access to the health care coverage they need. He is also recognized for helping Arkansas build a leading-edge program for successfully confronting the problem of childhood obesity. Dr. Thompson is one of seven honorees chosen this year to receive the Dr. Nathan Davis Award for Outstanding Government Service. The award, named for the founding father of the AMA, recognizes elected and career officials in federal, state or municipal service whose outstanding contributions have promoted the art and science of medicine and the betterment of public health. During the past 26 years, the AMA has honored more than 200 men and women with the Nathan Davis Award.

"The AMA's Nathan Davis Awards recognize government officials who go above and beyond the call of duty to support our nation's health," said Dr. McAneny. "Award winners have come from every branch of government service and are a testament to the important role that policymakers play in improving the health of our nation."



The American Medical Association (AMA) honored former Arkansas Governor Mike Beebe with the Dr. Nathan Davis Award for Outstanding Government Service in conjunction with its National Advocacy Conference in Washington, D.C.

Gov. Beebe was selected to receive the AMA's top government service award for his leadership in expanding health care coverage to uninsured Arkansans, as well as for his leadership in creating a robust funding effort to establish a statewide trauma system through instituting an increase in the state's tobacco tax.

"It is an honor to present former Gov. Mike Beebe with the Dr. Nathan Davis Award in recognition of his unwavering commitment to the uninsured population of Arkansas," said AMA Chair Barbara McAneny, M.D. "Through his support of innovative statewide initiatives, he has positively impacted the lives of hundreds of thousands in Arkansas."

Gov. Beebe is one of seven honorees chosen this year to receive the Dr. Nathan Davis Award for Outstanding Government Service. The award, named for the founding father of the AMA, recognizes elected and career officials in federal, state or municipal service whose outstanding contributions have promoted the art and science of medicine and the betterment of public health. During the past 26 years, the AMA has honored more than 200 men and women with the Nathan Davis Award.





LITTLE ROCK - Thomas Henry Wortham, MD, died on January 20, 2015. Dr. Wortham served in the U.S. Navy from 1944-1946 as a corpsman. He received his MD in 1953 from UAMS, graduating Magna Cum Laude. He also was awarded the Faculty Key as the outstanding student for four years of medical school and received the Joseph Roberts Award as the Outstanding Scholar for the four years of medical school. Dr. Wortham helped expand medical and other community services to meet the demand after the opening of the Little Rock Air Force Base in Jacksonville. He ran a thriving family practice clinic for 43 years. He rallied community support for funding of a hospital and then helped establish Rebsamen Medical Center. He served on many UAMS boards and committees and volunteered as a clinical preceptor for the College of Medicine residents and students, as well as the UAMS Family Medical Clinic. Dr. Wortham is survived by his children, Clay Alan and Jan Ellen and two grandchildren.

MAGNOLIA – Charles Warren Kelley, MD, passed away January 13, 2015. Dr. Kelley graduated from Tulane University School of Medicine, was a Lieutenant in the United States Navy where he was a medical officer stationed in Quantico, Virginia, and returned to Magnolia and cared for numerous patients in his private practice for many years. He is survived by his two children, Jonathan Kelley and his wife Renee Kelley, Melinda Volker and her husband Britt Volker, and three grandchildren.

PINE BLUFF – William Joseph "Joe Bill" James, Sr., MD, passed away January 16, 2015. He graduated from the University of Arkansas for Medical Sciences in 1953, earning his MD degree. After serving a year residency at the University of Arkansas for Medical Sciences, Dr. James entered the United States Air Force in 1955. He served as a medical officer for the Strategic Air Command (SAC) 6th Bomb Wing from 1955 to 1957. Thereafter Dr. James com-

pleted a Urology Residency at Tulane University, New Orleans 1957 – 1960. In 1960, he moved his wife and family to Pine Bluff, where he established a practice in urology. He later entered a residency in psychiatry at UAMS and Arkansas State Hospital. After completing his psychiatry residency, he practiced as a staff and Medical Director of the Southeast Arkansas Behavioral Health Center until his retirement in 1997. Dr. James received the 1980 Attending Physician of the Year Award from UAMS Area Health Education Center, Pine Bluff. He also served on numerous committees at Jefferson Regional Medical Center in Pine Bluff, including the JRMC Board of Directors, also serving as JRMC Medical Chief of Staff. He served as a board member of Jefferson Comprehensive Care Association, was a member of the board of Trinity Village Retirement Center, and was a member of Jefferson County Red Cross Disaster Relief Team. He was also a member of the Arkansas Medical Society, Jefferson County Medical Society. Dr. James served as past President of Arkansas Psychiatric Society, diplomat of the American Board of Psychiatry and Neurology and a distinguished Life Fellow of American Psychiatric Association. He served in the American Psychiatric Association Assembly of District Branches as an Arkansas Delegate from 1976 until 1992. Dr. James was a National Peer Reviewer for the American Psychiatric Association from 1978 until 1992. He worked part time as a staff psychiatrist since 1997 for Delta Counseling Associates in Monticello, McGehee and Dumas. Dr. James is survived by his loving wife of over 60 years, Sunny James; his children, William Joseph James, Jr. (Vicky), Lisa Ann James Gray (Mike), Jane Carolyn James Neely (Wayne), and Maribeth James Hartsfield along with eight grandchildren and four great-grandchildren.

LITTLE ROCK – **Byron Lester Brown, MD**, passed away January 25, 2015. Dr. Brown interned at what is now Ben Taub Hospital in Houston, Texas, and entered active duty as a Navy doctor aboard the APA Thomas Jefferson. In 1949 he began general medical practice in Superior, Nebraska, where he practiced for eight years. He maintained a private orthopedic practice in Fort Smith, Arkansas, until 1987. He is survived by his wife, Yleen Brown; sons Thomas (Fran) Brown and Steven (Pamela) Brown; daughters Margaret (Wiley) Coley and Susan (Mike) Molitor as well as nine grandchildren.

PARAGOULD - Donald I. Purcell, MD, passed away January 27, 2015. Dr. Purcell graduated from Rector High School one year early. At the age of 16, while waiting to be eligible to enlist in the military, he began his college education at the University of Arkansas, where he walked on as a Razorback football player for a short time. He was also a member of the Sigma Chi Fraternity. He transferred to the University of Louisville in Kentucky, where he completed his undergraduate degree at 19. He obtained his Medical Degree from the University of Arkansas Medical School in Little Rock at the age of 22. He was drafted by both the Army and the Navy. He served as a physician at the Millington Naval Base, just north of Memphis, TN, for about a year. He then served for another year at Camp Lejeune, a Marine division that used Navy Doctors located in Jacksonville, North Carolina. Dr. Purcell went on to work for 13 years as a General Practitioner in Paragould, and later went back to Medical School in Little Rock where he specialized in Radiology. He worked as a Radiologist for Arkansas Methodist Hospital for close to 20 years. He retired from the hospital when we was about 70 years old. Dr. Purcell was always looking for opportunities to serve in and for the community. He served as a dedicated member of the Arkansas Medical Board. He was an active member of the Paragould Rotary Club, receiving the organizations Lifetime Achievement Award in 2014. Dr. Purcell is survived by his daughters and son-in-law: Lee Purcell and her Fiancé. Bob Dahlguist, and Paige and Phillip Wooldridge, five grandchildren and four great-grandchildren. AMS





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