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COVER PHOTO: Angela Myers, MD, MPH, helps children today as director of the Pediatric Infectious Diseases Fellowship Program at Children’s Mercy Kansas City. Like the child pictured with her, she was once a patient at the hospital when she underwent cancer treatment during high school and college. (Photo courtesy Children’s Mercy Kansas City)

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KANSAS CITY MEDICINE

— SUMMER 2017 —
Our Children Are Our Future

KANSAS CITY CHILDREN RECEIVE OUTSTANDING CARE AT CHILDREN’S MERCY

By Michael L. O’Dell, MD, MSHA, FAAFP, Editor, Kansas City Medicine

A baby is God’s opinion that the world should go on

~ Carl Sandburg, American Poet

The fact that our children are our future is without a doubt true. Quoting Nelson Mandela, *There can be no keener revelation of a society’s soul than the way it treats its children.* In this issue, Kansas City’s soul is demonstrably positive.

If we apply Nelson Mandela’s criteria to the health care of children in Kansas City, our metropolitan area is indeed an invested and caring society. We are blessed with numerous high-quality physicians caring for children in their offices, hospitals, and many community settings. We have a fine hospital caring for children, indeed one of the country’s best, at Children’s Mercy. This issue features care of children and is the first pediatrics issue of *Kansas City Medicine* in our long years of publication. Recognition of Kansas City’s remarkable investment in the care of children is overdue in these pages. See this section starting on page 14. Thanks very much to Mary Anne Jackson, MD, of Children’s Mercy, for months of work in assembling and editing the articles in this section.

Kansas City’s support for children includes parents seeking to adopt. The following pages contain information about the adoption process and how physicians can assist adopting families. Another article outlines how significant abnormalities prior to birth are addressed by the outstanding work of a team of perinatologists and neonatologists. The cure for childhood cancer is a remarkable achievement of the last few decades: at the beginning of my training just four decades ago, cure was not often the case! An important article describes the late effects of cancer treatment in children.

The celebration of cures for childhood cancer is tempered by the return of the old nemesis of infectious disease. Each prescriber of antibiotics has responsibilities in preserving effectiveness through antibiotic stewardship, and these approaches are addressed in this issue. Newer diagnostic tests are not always better, and this fact is discussed in writing about selected infectious diseases of children.

Our society is gaining knowledge and understanding of the role of gender in perception, identity and the expression of self. In the following pages, guidance is provided about how to discuss gender identity while caring for children. And lastly, children become adults, but how can we introduce those with significant ongoing health needs to care in systems designed for adults? In this issue, this surprisingly difficult transition is explored with recommendations.

The Select Panel for Promotion of Child Health said in 1981 that *Children are one-third of our population and all of our future.* This issue highlights significant work that is yet only part of the effort in achieving healthy children for our area. Physicians and greater Kansas City should be justly proud, but also challenged as we strive to provide the best possible future for and through our care of children.

Your Editor,

Dr. Michael O’Dell
At the recent MSMA meeting, I had the great privilege of participating in a session on physician burnout for the Missouri Psychiatric Association. The main speaker was C. Robert Cloninger, MD, professor of psychiatry and director of the Center for Well-Being at Washington University. His presentation was much more complex and sophisticated than mine, resting on his extensive work on the psychobiological theory of personality. But we agreed on the central point of the problem.

Since Dr. Cloninger made the point much better than I did, let me paraphrase his argument. Physicians are people who have made it through rigorous selection and training processes, and are resilient and adaptable, as well as compulsive and highly conscientious. If this group of people is frustrated with their working environment, a reasonable conclusion is that the working environment itself is flawed. We are, as a group, being subjected to a toxic work environment.

A recent commentary on the website of WBUR, Boston’s public radio station, focused the debate more clearly on electronic health records. Three eminent Boston physicians engage in harsh criticism of the use of the EHR, saying it forces physicians to relate as much to the computer as to the patient, and rob patient encounters of the time needed for the physician to listen to the patient. They point out that the current EHR systems force large amounts of unneeded work on physicians, offload most of the work involved in hospital billing onto physicians (and nurses), and come between physicians and patients. EHRs, in short, have failed in their promise to make health care simpler and more cost-effective. They have, in fact, made it more complicated, more expensive and more frustrating to both doctors and patients.

And the economics of the whole system are just nuts. Consider: Physicians and nurses are the most highly paid people in hospitals. So, we require them to spend up to half their working time shoveling data into computers. Besides drastically lowering their actual productivity, this forces them to eliminate parts of their former activities. Like, for example, sitting down and actually talking with patients. As a result, we need nurses and physicians in much greater numbers, and they are working far less efficiently, with less patient contact. Data entry can certainly be productive work, but not for physicians and nurses.

So … why are EHRs so difficult to use? Given that we all need to document our findings and our procedures, why have we made it so difficult? Probably the best answer comes from the observation that those using the systems are not those purchasing them. Hospital administrators are properly concerned with such things as billing, operations and inventory. But while hospitals often solicit opinions from doctors and nurses, they don’t really take their needs into account. The EHR companies are focused on managing data, and the interaction with the “users” is of relatively small importance. Many physicians and computer scientists have worked out better ways of interacting with EHRs, but they don’t run the computer companies, nor do they have much influence within health care organizations.

The Boston physicians noted that they are organizing town meetings and other such activities to try to improve the EHR. Whether this sort of “grassroots” pressure will be effective...
is anybody’s guess. Personally, I’m not hopeful. There is a great deal of inertia to overcome. EHR systems are very expensive, and there is a very large installed base. It is difficult to make even small changes in existing systems. Government regulations have the effect of freezing existing systems. Significant changes may require Congressional action and/or regulatory reform. Any objective observer would realize that the whole regulatory framework for EHRs is ineffective and should be scrapped. The AMA, after a great deal of work and much lobbying, succeeded only in softening the terms of MACRA, which is now called MIPS. (Don’t bother to remember those. They’ll be different next year.) So, improving EHRs is going to take a lot of work, much political capital and a long time.

PAY FOR PERFORMANCE

But our toxic work environment isn’t limited to EHRs, frustrating as they may be. Let us consider piece work. Now, piece work is the practice of paying the worker for each item produced. It was the common method of paying industrial workers at the end of the 19th century. But in industry after industry, it was abandoned during the first half of the 20th century because of union pressure, technological change and the increasing need of companies to obtain a stable work force. For a case history, see the reference below. Of course, it still exists for physician practices. More than that, modern management fads such as “pay for productivity” and “incentive payments” have tried to move piece work from private practice into organizations for knowledge workers such as physicians.

Piece work is superficially attractive to managers, insurers and government. It has the entirely coincidental side effect of increasing overall physician reimbursement.

As most of us realize, painfully, our work environment has other toxicities. With the ever-increasing role of regulation in medicine, we are all subjected to multiple bureaucratic harassments. Some of these are unnecessary, perhaps even most of them. Do we need quality measures? Sure. But why aren’t they any better? Does an internist control his or her patients so closely that the average hemoglobin A1c level has any meaning? What about the average blood pressure? These aren’t quality measures, except in the negative sense that they indicate physicians who are willing to care for difficult patients.

MAINTENANCE OF CERTIFICATION

Some are self-inflicted. For example, we awarded power to specialty boards, who then approved re-certification examinations and maintenance of certification. We are not doing nearly enough to take back that power. Why should a cardiac subspecialist, for example, have to take three exams every 10 years and engage in multiple MOC activities? And yet, these particular ills are inflicted on the profession by itself.

A great deal more can be said about the working environment for physicians today. Unfortunately, most of it is negative. Perhaps some of it is not avoidable. But the EHR isn’t going to get better without a lot of agitation by physicians. Re-certification and MOC aren’t going to improve, unless we reform the specialty boards. That won’t be pleasant. The boards have entrenched power and money and strongly resist any changes.

More than that, modern management fads such as “pay for productivity” and “incentive payments” have tried to move piece work from private practice into organizations for knowledge workers such as physicians.
Government regulation will continue to be intrusive, and will get worse if we don't start pushing back. If we do not find ways to make our work environment more functional and less frustrating, and if we cannot push our health care organizations into promoting change, we will be in a toxic work environment for a long time to come.

Charles W. Van Way, III, MD, is editor emeritus of Kansas City Medicine and is emeritus professor of surgery at the University of Missouri-Kansas City, and director of the UMKC Shock Trauma Research Center. He can be reached at cvanway@kc.rr.com.

REFERENCES
3. Senior hospital administrators, are paid more, of course, but they don’t see patients. Making poor decisions has always been very highly paid.
4. The computer industry and the illicit drug industry are the only major industries which refer to their customers as “users.” They appear to share other attitudes towards their customers, as well.

Missouri’s David Barbe, MD, MHA, Inaugurated as AMA President

David O. Barbe, MD, MHA, became the first Missourian to lead the American Medical Association in 90 years when he was inaugurated as AMA president in June. Dr. Barbe is a board-certified family physician from Mountain Grove, population 5,000, in southern Missouri about 60 miles east of Springfield.

In his inaugural address to the AMA Annual Meeting, Dr. Barbe said physicians’ role as leaders is especially critical “in advocating for health reform in today’s political environment, in describing and shaping the future of health care, and in mentoring those who will one day follow us in this profession.” He urged physicians to rise above the partisan fray in the health reform debate. “Good leadership is constructive, consensus-building and principled.”

Every day, Dr. Barbe noted, he sees patients who need tests or treatments, who are still uninsured or haven’t met their deductibles, and often delay necessary care. “I see firsthand, every day, why the AMA’s unwavering goal of affordable health insurance coverage for all is worth fighting for,” he said.

Besides his primary care practice which he has operated for 34 years, now Mercy Clinic Family Medicine-Mountain Grove, Dr. Barbe is vice president of regional operations for Mercy Springfield Communities, with oversight of five hospitals, dozens of clinics and nearly 200 physicians and advanced practitioners.

HIGHLIGHTS OF AMA ACTIONS
Among a wide range of actions, the AMA House of Delegates:
• Voted to support multifaceted, multiagency approaches to combat the wave of new psychoactive substances in the drug trade, and make it easier for physicians to prescribe buprenorphine.
• Supported efforts to use lifelong learning as the pathway to Maintenance of Certification.
• Reviewed strategies to reduce consumption of sweetened beverages, and promote healthier food in hospitals, food banks and other venues.
• Addressed how medical licensing boards handle physicians who have sought behavioral health treatment. For more details, see a summary report in the upcoming Missouri Medicine by Charles W. Van Way, III, MD, or visit the AMA Wire section of the AMA website, www.ama-assn.org.
Prescription Drug Monitoring Now Online in Jackson County

PHYSICIANS ENCOURAGED TO CHECK DATABASE WHEN PRESCRIBING OPIOIDS

With Missouri's legislature continuing to balk at adopting a prescription drug monitoring program, many counties and cities across the state are taking the matter into their own hands.

Jackson County is one of 22 Missouri counties—along with the cities of Kansas City, Mo., and Independence—participating in a prescription drug monitoring program that began operation on April 25. The PDMP is administered by the St. Louis County Department of Public Health; other participating cities and counties have passed ordinances to contract with St. Louis County on the program.

Area physicians licensed in Kansas already can use the K-TRACS PDMP operated by the Kansas Board of Pharmacy. Work is in process to enable the two systems to share information, an important consideration in the Kansas City metropolitan area which is bisected by the state boundary. Both systems use the same Appriss platform which is used in 25 states.

Physicians are encouraged to register for the Missouri/St. Louis County PDMP and then check it as clinically appropriate when prescribing opioids. The registration website is: https://missouri.PMPaware.net. (Note, “PMPaware,” not “PDMPaware.”)

Physicians may also designate staff members to have login credentials for the PDMP.

Teesha Miller has been appointed director of the PDMP for the Jackson County Health Department. She said, “I encourage physicians to register and use the PDMP in an effort to arrest this growing epidemic. Used consistently, PDMPs have been successful disrupting cycles of diversion and abuse.”

She noted three specific benefits of the PDMP:

• The PDMP can help improve controlled substance prescribing by providing critical information regarding a patient's controlled substance prescription history.
• PDMPs aid in informing clinical practice by identifying patients at high-risk who would benefit from early interventions.
• PDMPs reduce the number of people who misuse, abuse, or overdose while making sure patients have access to safe, effective treatment. States such as New York and Tennessee have seen drops of 75% and 35% respectively in patients seeing multiple prescribers for the same drugs (CDC: State Successes, 2016).

As this issue of Kansas City Medicine was going to press, Missouri Gov. Eric Greitens announced the creation of a state prescription drug monitoring program. Initial reaction from MSMA and county program sponsor Sam Page, MD, is that the state program does not allow doctors or pharmacies to access the database, an essential element of the program that is in place in other states. They encourage physicians to continue to use the county program. Watch for further updates from KCMS and MSMA.
Dr. Page added that liability may exist in certain setting when opioids have been prescribed, a PDMP is available, and the clinical scenario warranted further investigation prior to prescribing.

“This in no way discourages prescribing opioid analgesics in the appropriate clinical scenario, or limits safe and effective treatments,” he noted. Dr. Page is a graduate of the University of Missouri-Kansas City School of Medicine.

The registration process is brief and requires uploading of credentials such as medical licenses. In addition, Dr. Page said, other staff may be authorized to access the PDMP. “In recognition of the reality of patient workflow in the emergency room or outpatient setting, the PDMP allows the concept of a delegated user. Physicians may select individuals to delegate access, allowing someone in their office to query the PDMP and print PDMP reports which are readily (continued on page 13)
KANSAS

By Rachelle Colombo, Kansas Medical Society

For the entirety of this year’s near record-length legislative session, the political discourse was dominated by budget, tax and school funding considerations. The state constitution stipulates that if nothing else, legislators must address the state budget and balance the books yearly, but a Supreme Court-mandated adjustment to K-12 funding complicated the fiscal crisis and contributed to the necessity of a revenue package to fund these and other priorities. Any of these issues alone would be daunting, but when layered together and compounded by a commitment to consider Medicaid expansion and other public health issues not vetted in recent years, the result was political quagmire making the advancement of any one issue difficult.

Despite the circumstances, a number of health issues did advance during the regular session and legislators did close the session with a balanced budget, school funding and revenue plan.

(HB 2079) supported by the Kansas Medical Society, the Kansas Hospital Association and other provider groups—reversed the 4% payment cut to Medicaid providers, passed both the House and Senate and was signed into law by the governor, restoring previous reimbursement rates.

(HB 2278) repealed the requirement on state health care facilities and mental health facilities to either allow licensed individuals to carry firearms or significantly increase security measures. The governor allowed the bill to become law without his signature.

Though (HB 2044), Medicaid expansion, passed with strong majorities in both the House and Senate, the effort to override the governor’s veto fell three votes short in the House and was not attempted again during the wrap-up session.

(HB 2026), introduced at the request of provider groups (including KMS) increases standardization, encourages uniform processes and aims to improve the appeals process for claims adjudication within the KanCare program. The bill saw major revisions agreed to in the conference committee between the House and Senate. The revisions were requested by the Kansas Department of Health and Environment to make the bill more workable upon implementation while still resolving provider concerns with the program. The bill passed both chambers and was signed into law by the governor.

(HB 2217) established a statewide protocol for the procurement, administration and reporting of opioid antagonists by first responders, school nurses, bystanders and law enforcement. Kansas was just one of four states that had not passed legislation relating to opioid antagonists. The bill was signed into law this spring. In all, nearly 30 different proposals impacting the practice of medicine were considered by House and Senate Health committees. Whether pertaining to the medical student loan program, administration of vaccinations, opioids, telemedicine, step therapy, provider reimbursement, the state’s Medicaid program, malpractice liability, scope of practice issues, the consideration of new drug therapies or more—the Kansas Medical Society is at the statehouse every day to educate and inform lawmakers about the impact of legislation on Kansas patients and physicians.

Regardless of the political dynamics shaping the landscape, KMS is always advocating to protect the practice of medicine and ensure it remains in the hands of a physician. If you have an interest in learning more about legislative issues, please contact me.

Rachelle Colombo is director of government affairs for the Kansas Medical Society. She can be reached at rcolombo@kmsonline.org, 785-235-2383.

MISSOURI

By Jeff Howell and Kenny Jackson, Missouri State Medical Association

Editor’s Note: The following is excerpted from the Missouri State Medical Association (MSMA) end-of-session legislative report.

PRESCRIPTION DRUG MONITORING PROGRAM

Missouri will remain the last state without a statewide prescription drug monitoring program (PDMP). Luck-
Advocacy

...ily, we have a number of intertwined county programs that will soon cover more than three million Missourians.

The presence of these programs complicated the PDMP debate this session. Those who had previously opposed any effort at a statewide PDMP found themselves in support of a plan that was overburdensome to prescribers and not robust enough to properly treat patients. On the other hand, past advocates of a strong statewide PDMP (including MSMA) had to position themselves late in session to protect the more desirable county programs from a horrible statewide effort.

Moving forward, MSMA will support a PDMP that is at least as beneficial to patients as the county effort.

BILLS THAT PASSED

EXPERT WITNESS REFORM (HB 153). Signed by the governor, it requires the state courts to shed the antiquated Frye standard for the admission of expert testimony in favor of the more widely accepted Daubert standard.

PROFESSIONAL LICENSE RENEWAL (SB 501). Requires the boards under the Division of Professional Registration to extend to licensees the ability to apply or renew their licenses online, as well as submit payment for them.

COLLATERAL SOURCE (SB 31). Changes the way damages are calculated in medical malpractice cases.

MEDICAL STUDENT BURNOUT (SB 52). Creates a committee that will work with medical schools to research the prevalence and concerns surrounding medical student burnout and depression, and develop protocols to minimize the risk of suicide.

ANTIPSYCHOTIC MEDICATIONS (SB 139). Requires the MO HealthNet Division to establish a polypharmacy program for high-risk patients who are on multiple medications.

ASSISTANT PHYSICIAN FIX (SB 50). Grandfathers in the applications of medical schools graduates who would have otherwise been able to apply for an assistant physician in 2014.

STATEWIDE NARCAN PROTOCOL (SB 501). Allows the director of the Department of Health, if they are a physician, to establish a statewide protocol for Narcan, making it easier to access the overdose antagonist.

EPIPEN PROTOCOL (SB 139). Allows certain entities, such as restaurants and amusement parks, to stock a supply of Epipens under a physician’s protocol.

OVERDOSE GOOD SAMARITAN (SB 501). This bill allows limited immunity from prosecution for any person, who in good faith, seeks medical assistance for themselves or another person experiencing an overdose.

BILLS THAT DIED

APRN LICENSURE. Would have established a separate license for advanced practice registered nurses, as well as outlined their scope of practice in statute.

APRN SCHEDULE II. Would have allowed advanced practice registered nurses to prescribe Schedule II controlled substances.

APRN PROXIMITY. Would have lightened or eliminated the requirement for geographic proximity to a supervising physician.

FUND SWEEP. A late amendment would have swept the fund balances of the professional licensing boards, including the Board of Healing Arts, in order to fund prior budgetary cuts to in-home and nursing care for the elderly.

HELMET REPEAL. Would have repealed the state’s motorcycle helmet requirement.

PREDETERMINATION OF BENEFITS. Would have required insurance companies to respond in real time to patient requests for cost sharing information prior to the service being provided.

ANY WILLING PROVIDER. Would have allowed any provider into insurance networks as long as they were willing to abide by the insurer’s contractual terms.

MOC/MOL. Would have restricted insurance companies and hospitals from considering maintenance of certification and maintenance of licensure in creating networks or staff privileges.

PHYSICAL THERAPY DIRECT ACCESS. Would have granted patients direct access to physical therapy services without a prescription from a physician.

Jeff Howell is director of governmental affairs and Kenny Jackson is director of legislative affairs for the Missouri State Medical Association.

For more information, they may be reached at 800-869-6762, jhowell@msma.org or kjackson@msma.org.
Not only does Christine Nedeau, MD, have access to the most current electronic health records software in her primary care practice, she also has the opportunity to influence the systems’ design.

Those are unique benefits Dr. Nedeau enjoys as a physician employed by the Kansas City-based health care technology company Cerner. Her practice is caring for Cerner employees as part of the company’s Healthe Clinics program.

“I often hear, ‘Doctor, that solution you are using is mine,’” Dr. Nedeau said. “Because each patient contributes in some way to the technology or solution that we use, in our clinic they can experience the result of their work firsthand.”

Cerner employs 11 physicians to provide primary care to Cerner’s Kansas City workforce; about 56 percent of the company’s local employees take advantage of the benefit. Urgent care, chiropractic care, behavioral health, lab, pharmacy and more also are available. Clinics are located onsite at four of Cerner’s seven area campuses. Dr. Nedeau works out of the new Innovations campus at I-435 and Bannister Road.

Dr. Nedeau sees an average of 18 patients a day face-to-face, and manages another 10-15 virtual visits daily through Cerner’s robust patient portal.

Of the portal, she said, “We have found that there are many minor problems that can be managed without bringing the patient in to be seen by the provider. This style of practice is growing more popular, demanded by the modern world where services are expected at the touch of a keystroke.”

The Healthe Clinic utilizes a full pa-
tient-centered medical home (PCMH) model. The PCMH team includes a nurse navigator, nurse care coordinator, nurse practitioner, health coach, registered dietitian, pharmacist, therapist/counselor, chiropractor, fitness specialist/athletic trainer and member service specialist.

“This shift in the care model has made a dramatic change in both patient and clinician satisfaction, as well as improved quality of care and outcomes for those with chronic conditions,” Dr. Nedeau noted.

Dr. Nedeau says the team approach reminds her of her father’s rural family medicine practice in Elkhart, Kan. (pop. 2,205), where he worked closely with the local pharmacist, his nurses and other local providers to coordinate the care of each patient.

“Everyone on his team understood the needs of the patient, the social circle surrounding the patient and the resources available to the patient. They saw the whole picture, not just the medical problem. So, what’s old is now what’s new again, but, as my dad says, ‘Cerner does it so much more efficiently than I did in my time!’”

The small-town feel carries over into her practice at Cerner. “I’ve also found that, because I am a Cerner associate and work in the same environment as my patients, there is already a shared connection that allows for an easier trust to develop in the provider-patient relationship.”

That level of trust extends into Dr. Nedeau’s support of systems design. She works with a team of IT engineers, technical architects and designers who specifically support the Cerner HealthClinics.

She describes her role: “Our clinic incorporates many of the ambulatory software systems that Cerner offers, of course, but we also test many features, upgrades and new designs to the software before they go live. I can utilize the best Cerner programs that suit my practice needs and have opportunity to play with future program design. I know I’m in a rare position as a physician to influence the design of the EMR being used, so I try to provide as much input to the IT team as I can so that improvements can be made when needed.”

As the nation seeks to reduce obesity and other chronic conditions, data will play a part. “The ability to chart well and manage population health data is still important, but the question we are now asking is, how do we use all the data collected in a more meaningful way to improve health or prevent disease?” she said.

PUBLIC HEALTH AND COMMUNITY SERVICE

Dr. Nedeau this year joined the Kansas City and Wy Jo medical societies’ Vaccination Task Force and brings her linkage with Cerner to the effort. It is just one of many volunteer health causes in which she is involved. Her interest is rooted in her background as a native of the Philippines.

She emigrated with her parents to the United States when she was a toddler. Both her parents are physicians. Her concern for public health was sparked by a visit to the Philippines as a teenager when she was struck by the stark contrast between her hometown in Kansas and the third-world poverty in her home country.

She returned to the Philippines for (continued on page 23)

~ KCMS extends its condolences to the Cerner family on the July 9 sudden loss of their chairman and CEO, Neal Patterson, due to complications from cancer treatment.
Men and women who have died and been successfully resuscitated sometimes undergo what is called “near-death experiences” (NDEs). They recall being detached from their dying body, often seeing their body from outside. They pass to a bright light, sometimes through a dark tunnel, and feel the light is welcoming them. The whole experience is usually characterized by a feeling of detachment and peace. Such experiences have been recorded in about 15% of patients undergoing cardiac arrest with successful resuscitation, as well as in other circumstances. Patients have had NDEs even when under general anesthesia.

Between 2013 and 2015, Missouri Medicine published a series of articles on near-death experiences. John Hagan, MD, the long-time editor-in-chief of Missouri Medicine and a KCMS past president, has compiled these into a slim but highly informative volume. I should point out that any proceeds from the book will go to the Missouri State Medical Association. The 13 chapters range from a scholarly review of the published evidence to discussions of the theory of consciousness to personal accounts by physicians of their own near-death experiences. All of the authors in the book, save one co-author, are physicians and scientists. This brings the objectivity of scientifically-trained observers even to the personal accounts. I found that reading the account of a NDE by someone I know and respect was a very convincing experience.

Modern interest in NDEs dates back only about 50 years, to the 1970s. But descriptions can be found as long ago as the ancient Greeks. Heraclitus, Democritus and Plato all wrote on “revenants,” people who apparently died, and then recovered. There have been published studies in the recent literature. Pim Van Lommel, MD, describes a prospective multi-hospital study from the Netherlands of cardiac arrest patients. Of 344 patients who were entered into the study because they had cardiac arrest, 62 (18%) had some sort of NDE. His chapter cites other, smaller studies with similar results.

But while the existence of NDEs is generally recognized, they are not understood. Kevin Nelson, MD, a neurologist, presents a strong argument for placing NDEs into modern neuroscience. Other authors deny this. Eben Alexander, III, MD, a neurosurgeon, makes an equally compelling argument for NDEs being outside the current framework. Most of the other chapters touch on this issue in one way or another. Basically, the argument revolves around the theory of consciousness. Is consciousness produced by the brain, as some sort of epiphenomenon? Or is consciousness separate, existing alongside but separate from the physical nervous system? This question is far beyond the scope of the present review.

Several of the contributors urge strongly that physicians should recognize NDEs as being part of the life experience of at least some of our patients. Many people who have had such experiences feel a need to talk about them. Most are affected by their NDE. Such an experience may be life-altering. Further, while “classic” NDEs are generally positive.
experiences, some may be negative or threatening. Post-traumatic stress disorder has been reported following NDEs. As physicians, we need to be sensitive to the existence of NDEs. We must be able and willing to talk about the subject, especially if and when a patient wants us to help them understand their experience.

Lastly, this book should induce a certain feeling of humility in all of us. For all our knowledge, and skill, there are things which we do not yet understand. Let Shakespeare have the last word:

There are more things in heaven and earth, Horatio, Than are dreamt of in your philosophy.

~ Hamlet (1.5.167-8), Hamlet to Horatio

Charles W. Van Way, III, MD, is editor emeritus of Kansas City Medicine and is emeritus professor of surgery at the University of Missouri-Kansas City, and director of the UMKC Shock Trauma Research Center. He can be reached at cvanway@kc.rr.com.

REFERENCE

PDMP (continued from page 7) available in the medical record when the patient is seen,” he said.

PDMP NOW COVERS ALMOST HALF OF STATE POPULATION

Missouri counties and cities currently participating in the program represent almost half of the state population. In the St. Louis metropolitan area, participants include the City of St. Louis, St. Louis County, St. Charles County and Lincoln County. In mid-Missouri, the cities of Columbia and Jefferson City have joined the program along with nine counties. An additional nine southeast Missouri counties are in the program, along with one in southwest Missouri.

More counties are expected to join the program now that the legislative session has closed without a statewide program.

Dr. Page concluded, “Physicians have a critical role in identifying opioid misuse, overdose and addiction and referring these patients to the proper care and treatment. The PDMP is an important first step. Please join the house of medicine in incorporating this new tool into your clinical practice.”
EXCELLENCE IN PEDIATRICS:

Children’s Mercy
KANSAS CITY
GUEST EDITOR’S MESSAGE

In late September 2016, Drs. Mike O’Dell and Sara Gardner invited me to a meeting to discuss the potential of guest editing a pediatric-themed issue of Kansas City Medicine for summer 2017. What follows is what became a labor of love—a compilation of articles written by our own Kansas City leaders in the field, that spotlight some of the most important developments, best practices and hot topics in pediatrics. I am delighted to present the issue and send a big thanks to all of the authors who contributed, to Dr. Angela Myers for sharing her personal story and to Jim Braibish, managing editor of Kansas City Medicine, for keeping the project on time. I hope that readers will find the issue offers insight into day-to-day practice challenges, and that the discussion educates and inspires all providers who are on the front lines of practice. Maybe there is potential for an annual issue to focus on pediatric-themed topics!

MARY ANNE JACKSON, MD, FAAP
Professor of Pediatrics, University of Missouri-Kansas City; Director, Division of Infectious Diseases, Children’s Mercy Kansas City

INTRODUCTION

Welcome to this special pediatrics issue of Kansas City Medicine. This focus section is devoted to the future. As pediatricians, we know that fostering health and well-being in children ensures the future of families, communities, and our society. In the following pages, you will see this.

We both started our careers in the Kansas City area. Whether it was Pam at the University of Kansas School of Medicine or Karen at the University of Missouri-Kansas City, we both began with amazing mentors who encouraged us to grow in our medical skills, training, research and education. They were committed to improving the health and well-being of all children and instilled in us the skills necessary for long careers in pediatrics. The commitment of Kansas City’s medical community to children’s health and health care is evident in the world-class research and clinical innovation shared in this issue.

Children are always changing and growing, and so is the field of pediatrics. Regardless of your field of medicine, you will want to read this issue and participate in the dynamic science and medicine of pediatric care. Every adult was once a child, and children’s care impacts their future as well as adult medicine. Just as the antecedents of adult disease are found in childhood, so are keys to adult health and wellness.

Thank you for reading this issue.

PAM SHAW, MD, FAAP
Professor of Pediatrics, University of Kansas Medical Center; Assistant Dean for Clinical Sciences; Medical Director, Neis Clinical Skills Lab; Board Member, American Academy of Pediatrics; M.D., University of Kansas, 1986

KAREN REMLEY, MD, MBA, MPH, FAAP
Professor of Pediatrics, Eastern Virginia School of Medicine; CEO, American Academy of Pediatrics; M.D., University of Missouri-Kansas City, 1980

(left) Mural at Children’s Mercy by resident artist Scribe.
Children’s Mercy has been a part of the life of Angela Myers, MD, MPH, for the last 24 years, both as a patient and as a physician.

Growing up in Overland Park, Kan., Dr. Myers in 1993 at the age of 16 was diagnosed with osteosarcoma at Children’s Mercy. She traded in her cheerleading uniform for chemotherapy, prosthetic knee replacement surgery and months of rehabilitation.

The following year, she completed high school with her graduating class. She applied and was accepted into the University of Missouri-Kansas City six-year medical degree program.

“I had known I was going to be a doctor since the age of 12,” Dr. Myers said. “UMKC was close to home, and the six-year program offered the quickest route to medicine.”

During her medical school tenure, she experienced recurrence of osteosarcoma in the left lung and chest and underwent three thoracotomies to remove tumors. She graduated in 2001, and was honored with the Laura L. Backus, MD, Memorial Award for Excellence in Pediatrics.

After medical school, she completed pediatric residency at Children’s Mercy Hospital Kansas City in 2004, followed by fellowship in pediatric infectious diseases in 2008. She received a master’s degree in public health from the University of Kansas in 2008, and was inducted into Alpha Omega Alpha.

Dr. Myers joined the faculty at Children’s Mercy Kansas City in March 2008, where she serves as director of the Pediatric Infectious Diseases Fellowship Program. She is a core faculty member for the fellow common core curriculum and regularly provides national presentations focusing on cognitive skill development to prepare fellows for independent practice. Additionally, she is the immediate past chair of the Fellowship Program Directors Executive Committee of the Association of Pediatric Program Directors and serves as the co-chair of the Training Program Committee of the Pediatric Infectious Diseases Society.

“I have always felt a deep connection to Children’s Mercy and the people who work here.”

Mary Anne Jackson, MD, director of infectious disease for Children’s Mercy Kansas City and professor of pediatrics at the UMKC School of Medicine, said of Dr. Myers: “Angie represents the heart of Kansas City, and loves that she can give back to the city and hospital that took care of her when she needed it most.”

Today, Dr. Myers and her husband, pediatrician David Yu, MD, also care for their own children, Jackson and Emma.

FOCUS ON RESEARCH AND QUALITY IMPROVEMENT

Dr. Myers’ career has focused on research endeavors in education and in quality health care outcomes. She is involved in a national collaborative of subspecialty program directors who have developed a research platform to evaluate various aspects of fellowship training, including assessment tools, protected time for program directors, and fellowship funding.

She is passionate about judicious antibiotic use, which has led to quality improvement initiatives to decrease unnecessary streptococcal testing in emergency departments and community (continued on page 31)
The impact of vaccine hesitancy and refusal is clear-cut for infections like measles. Measles infection is highly contagious, spreads through vulnerable communities, has a high risk of complications and is completely preventable by utilization of MMR vaccine.

Endemic measles was eliminated in the U.S. in 2001, however maintaining high measles vaccines coverage is imperative to ensure herd immunity and prevent spread once disease is introduced within a community.¹ Using the example of a large public school outbreak of measles in Germany, investigators reported that measles vaccination coverage in excess of 95% was optimal to achieve herd immunity.² In 2014, measles vaccine coverage in U.S. kindergartners for two doses of measles, mumps, and rubella (MMR) vaccine was 94.7%; however, there are clearly geographical pockets where rates are much lower.³ Therefore, risk for measles spread within the U.S. remains high, and outbreaks are costly in terms of human suffering and costs to society. Between 2010 and 2016, there were 1,450 cases of measles reported in the U.S.; the index case was often traced to an unimmunized visitor to the U.S.; the index case was often traced to an unimmunized visitor to the U.S. Costs related to local and public health department investigations of 16 outbreaks in 2011 alone averaged over one quarter million dollars per outbreak (Table 1).⁴ In 2017, the impact of under-immunization within a geographic pocket in the U.S., has clearly been seen in Minneapolis, Minn., where >50 cases of measles have been confirmed as of May 2017, with disease centered in the Somali community. MMR vaccine coverage dropped precipitously from 92% in 2004 to below 70% in 2008 to 42% in 2014 in children of Somali descent born in Minnesota, fueled by vaccine fear propagated by anti-vaccine groups. The decline dates back to the introduction of anti-vaccine messaging targeting the Somali community, suggesting that higher rates of autism in Somali children were related to MMR vaccine, despite evidence that had long disproven the association.

Working with the Somali community, the Minneapolis Somali Autism Spectrum Disorder Prevalence project—which was initiated in 2011 and completed in 2013—showed that children of Somali descent were no more likely to have autism than Caucasian children (http://rtc.umn.edu/autism/). Still, vaccine coverage rates for children of Somali descent remain among the lowest in the country.

**RECOGNIZING MEASLES DISEASE AND RISK WITHIN POPULATIONS**

Assessment of measles risk starts with confirming the immunization status for every patient who presents with febrile rash illness; measles infection is

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### Table 1. U.S. Measles Outbreaks 2010-2017.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th># U.S. outbreaks, and important locales*</th>
<th>Importation risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>220</td>
<td>16 outbreaks</td>
<td>France</td>
</tr>
<tr>
<td>2012</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>187</td>
<td>11 outbreaks</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>667</td>
<td>27 states; Amish community, OH; Greater KC community</td>
<td>Philippines</td>
</tr>
<tr>
<td>2015</td>
<td>188</td>
<td>24 states; amusement park, CA</td>
<td>Serotype identical to Philippines strain</td>
</tr>
<tr>
<td>2016</td>
<td>70</td>
<td>16 states</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>61**</td>
<td>10 states; Somali community, MN</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1511</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
unlikely in any patient who has received two doses of MMR vaccine. Providers should maintain a high index of suspicion for measles in those who are under-immunized, reside in an under-immunized community or who were born or recently traveled to a country with high measles risk. Within the U.S., a history of visiting an amusement park or other venue that features contact with an international population should also be considered. Though overall rates of measles immunization are high in the U.S., a recent study using age-specific measles vaccination data from the National Immunization Survey-Teen (2008-2013) suggests approximately 12.5% of U.S. children and adolescents are measles susceptible with highest levels in children aged 3 years or younger (24.7%).

1. Recognizing Measles. An outbreak of measles in Miami, likely introduced by an international visitor was reported in 2014. Two of five patients infected (all unimmunized) were misdiagnosed on initial visits to health care providers, perhaps because providers did not recognize the classic presentation of measles infection.

a. The Prodrome. Fever occurs first and is high grade, often lasting 5-7 days, and is generally associated with cough, coryza and/or conjunctivitis. Koplik spots are found during the prodromal phase and are generally gone by the time the patient presents with rash.

b. The Rash. A maculopapular rash develops 3-5 days following the fever onset and is first seen on the head and neck before spreading to the trunk and extremities. It may be pruritic and the appearance can mimic other infections (e.g., roseola, erythema infectiosum). Most children with measles are described as ill-appearing.

2. Complications of measles. Pneumonia, hepatitis, bone marrow dysfunction or secondary bacterial super-infection may be seen in hospitalized individuals, and acute encephalitis occurs in 1 in 1,000 infected. Supportive care plus evaluation and treatment for bacterial superinfection should be initiated and treatment with vitamin A is indicated.

3. Late-stage risk. The most important late-stage complication of measles is subacute sclerosing panencephalitis (SSPE), which is universally fatal. This complication is only seen following wild type measles virus infection, underscoring the importance of measles prevention. SSPE is most common in boys who experience measles infection early in life. Subtle behavior and cognitive dysfunction is typically reported first. Speech and motor dysfunction (myoclonic jerks, hyperreflexia, hypertonia) follows, and deterioration from coma to death progresses over one to three years after initial symptoms.

Jim Cherry, MD, and his colleagues recently reported the California experience identifying 17 cases of SSPE from a review of death certificates, reports from the Centers for Disease Control and Prevention, or through investigations for undiagnosed neurologic disease for the years 1998 to 2016. Among the patients reported with SSPE, a male-female ratio of 2:4:1 was noted; in addition, measles occurred before 15 months of age in 71% with confirmed rash illness, and none had received MMR immunization before onset of clinical infection. Patients presented a median of 12 years after measles diagnosis (range: 3-35 years) and the overall incidence was 1:1367 for children who had measles infection <5 years and 1:609 for those <12 months of age at time of infection, a much higher rate than that reported in the past (4-7:100,000).

MEASLES PREVENTION

The risk of measles spread within a community depends on the vaccination coverage. In communities where vaccine coverage is below 90%, outbreaks are more likely—and more likely to be sustained. This underscores the importance of two doses of MMR vaccine, the first dose at 12-15 months of age and the second dose at school entry.

For a child who is traveling internationally, comprehensive travel counseling should be provided and with respect to measles include the following recommendations:

1. Advise against travel to countries where measles is endemic, for those younger than six months (too young to be immunized).

2. For older infants, a first dose of MMR vaccine should be given as early as six months of age before travel (and this dose does not count as part of the two-dose series).

3. In those where the first dose has already been given at the routine 12-15 months of age, the second dose may be completed at any age before travel, if 28 days has elapsed since the first dose.
Pediatrics

children's mercy

people.gov/2020/data/map/4722?-
year=2015) shows the percentage of
children by state who are meeting
the national target for completion of
recommended doses of DTaP, polio,
MMR, Hib, HepB, varicella and pneu-
mococcal conjugate vaccines by 19-35
months of age; both Missouri and
Kansas are below the national targets.

For adolescents, vaccine cover-
age rates are 86% nationally for Tdap
vaccine and 73.8% meningococcal
conjugate ACWY vaccine. In teens,
most providers recommend and give
Tdap and meningococcal vaccines
but practices vary when it comes to
HPV vaccine. HPV vaccine has been
clearly shown to be safe and effective
in preventing HPV-associated cancers.
In a recent study, those in whom HPV
vaccine was recommended were 35
times more likely to receive vaccine
than those who did not.9

National completion rates for a (continued)

VACCINATION CHALLENGES IN OUR
OWN BACKYARD—BEYOND MMR
VACCINE

Providers should be aware of the 2017
ACIP Immunization schedule and the
following are easy access sites that are
divided by age with schedules outlined
for the child:

• Birth-age 6 years—https://www.cdc.
gov/vaccines/schedules/easy-to-
read/child.html

• Preteen and teens 7-18 years—
https://www.cdc.gov/vaccines/
schedules/easy-to-read/pre-
teen-teen.html

• Adults—https://www.cdc.gov/vac-
cines/schedules/easy-to-read/adult.
html

All providers should have knowl-
edge of the contraindications and
precautions to vaccination. Recom-
mending and implementing vaccines
at every health contact opportunity
(including during hospitalization
for those not acutely moderately or
severely ill) is the optimal approach to
ensuring patients are protected from
vaccine preventable diseases.

One of the challenges for providers
is establishing the immunization status
for any patient at the point that they
access care in your office. In a survey
of hospitalized children where parents
reported the child’s vaccines to be “up
to date,” only 16% percent of patients
were in compliance with Advisory
Committee on Immunization Practices
(ACIP) guidelines when immunization
records were accessed and vaccine
receipt was confirmed; the most com-
monly missed vaccines were influenza
(67%) followed by meningococcal
(57%), hepatitis A (48%), and varicella
(38%).8

The following outlines challenges
and priorities for immunization within
our own communities.

Figure 1 (https://www.healthy-
people.gov/2020/data/map/4722?-
year=2015) shows the percentage of
children by state who are meeting
the national target for completion of
recommended doses of D Tap, polio,
MMR, Hib, HepB, varicella and pneu-
mococcal conjugate vaccines by 19-35
months of age; both Missouri and
Kansas are below the national targets.

For adolescents, vaccine cover-
age rates are 86% nationally for Tdap
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HPV vaccine. HPV vaccine has been
clearly shown to be safe and effective
in preventing HPV-associated cancers.
In a recent study, those in whom HPV
vaccine was recommended were 35
times more likely to receive vaccine
than those who did not.9

Figure 1. Percentage of children who are meeting the national target for completion of selected vaccines by age 19-35 months.
Table 2. Adult vaccines: influenza, pneumococcal, shingles and Tdap vaccine: Baseline coverage, burden of disease and Healthy People (HP) 2020 targets.10

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Burden of disease</th>
<th>Baseline</th>
<th>Targets Healthy People 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumococcal vaccine</td>
<td>~50,000 cases of bacteremia each year Higher rates in elderly and persons with comorbidities</td>
<td>64% of persons aged 65 years and over in 2008 had ever received a pneumococcal vaccination</td>
<td>90%</td>
</tr>
<tr>
<td>Shingles vaccine</td>
<td>500,000 to 1 million cases annually; lifetime risk ~32%</td>
<td>31% of adults aged 60 and over had received shingles vaccine</td>
<td>30%</td>
</tr>
<tr>
<td>Seasonal influenza vaccine, adults</td>
<td>200,000 excess hospitalizations annually ~40% in the elderly, ~24,000 excess deaths</td>
<td>41.7% of adults aged 18 years and over were vaccinated against influenza during the 2015-16 influenza season</td>
<td>70%</td>
</tr>
<tr>
<td>Influenza vaccine, pregnant women</td>
<td>Protects mother who is high risk; protects infant for several months after delivery</td>
<td>~50% of pregnant women were vaccinated against seasonal influenza during the 2015-16 influenza season</td>
<td>80%</td>
</tr>
<tr>
<td>Tdap, pregnant women (recommended for every pregnancy in late 2nd or 3rd trimester)</td>
<td>20,762 cases of pertussis in 2015 Most severe-infants</td>
<td>42.1% of pregnant women were vaccinated with Tdap vaccine, data 2015, Internet panel survey <a href="https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/tdap-report.html">https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/tdap-report.html</a></td>
<td>Not specifically included as HP target; protection against infant disease</td>
</tr>
</tbody>
</table>

three-dose series of HPV vaccine by girls ages 13-15 years are 37.1% overall nationally (data from 2015). Only 22.6% of Missouri teenage girls and 28.6% of Kansas teenage girls have completed the series. On a provider level, there is a new recommendation related to HPV vaccine—namely, the two-dose schedule. The series should be administered with dose 2 at least six months apart from the initial dose, and the series is recommended to start for 11-12 year-olds, but can be initiated as early as 9 years of age. A three-dose series is indicated for teens whose series is not started until past their 15th birthday through age 26 years, and for anyone age 9-26 years who is immunocompromised. Pain with injection and vaccine-related syncope are no more likely with HPV vaccine than with any other of the teen vaccines.

Optimizing vaccines in the adult population is critical especially as demographics show those aged 50+ and 80+ are growing faster than any other and vaccine-preventable diseases disproportionately affect this older, vulnerable population who often have underlying chronic care conditions. Providers should take a comprehensive and proactive approach to adult immunization and possess knowledge of baseline coverage rates, the burden of disease, and the national targets for coverage (Table 2). A concerted effort is necessary from providers who care for patients throughout the age spectrum, to ensure that at each visit, immunization coverage is reviewed for each and every patient, that appropriate recommendations are made, and that their practice has a process to ensure that vaccines are implemented. Check out the following website http://izsummitpartners.org which under the heading "adult standards," provides three slides sets which you can use to educate other providers, the public or public health officials.

Mary Anne Jackson, MD, FAAP, is professor of pediatrics at the University of Missouri-Kansas City School of Medicine and the Division Director of Infectious Diseases at Children’s Mercy Kansas City. She is a member of the American Academy of Pediatrics Committee on Infectious Diseases and the associate editor for the 2015 and upcoming 2018 Red Book. She can be reached at 816-234-3061.

REFERENCES
Over the last four decades, those diagnosed with cancer during childhood have experienced increasingly improved outcomes with nearly 85% now surviving their cancer diagnosis.\(^1\) As of Jan. 1, 2011, there are an estimated 388,500 childhood cancer survivors in the U.S.\(^2\) As survival rates improve, and the population of childhood cancer survivors (CCS) increases, an increased awareness of the late effects induced by their cancer therapies has emerged. Just 10% of children survived cancer in the 1950s, just over half in 1975 and between 2004-2010, more than 80% who were diagnosed before age 20 years, survived for at least five years. The impact has been especially dramatic for children with non-Hodgkin lymphoma and acute lymphoblastic leukemia, where 85% and 90% of children survive respectively.

**LATE EFFECTS OF CANCER TREATMENT**

Experience with a cohort of childhood cancer survivors who were treated for cancer between 1970 and 1986 has confirmed that late effects of treatment occur in over half and underscore the importance of long-term follow up and intensified medical surveillance for late effects. Late effects of treatment can be physical or emotional and typically appear two to five years after completion of treatment, often emerging in the second decade of life. Commonly identified late effects include learning or memory issues, emotional concerns, growth failure, hypothyroidism, infertility, heart failure and secondary cancers. The development of late effects may be influenced by the type of cancer, the treatment, age at diagnosis, and genetic predisposition. Those children with bone or brain cancers, and Hodgkin lymphoma appear at greatest risk for late effects. The impact of the late effects is significant. In a large cohort study of CCS, 27.5% of survivors reported a grade 3 or 4 chronic health condition, compared to only 5.2% of their siblings.\(^3\) Almost 24% of survivors report three or more chronic health conditions, compared to 5.4% of their siblings.\(^3\)

Comprehensive medical care as well as emotional care and education on late effects of cancer are provided at Children’s Mercy Hospital through the multidisciplinary Survive and Thrive Clinic. The clinic has seen substantial growth since its inception in 2009 (Figure 1) and follows the Children’s Oncology Group’s Long-term Guidelines for Survivors of Childhood, Adolescent and Young Adult Cancers (www.survivorshipguidelines.org/pdf/LTFUGuidelines_40.pdf).

Eligible patients are those whose cancer was diagnosed at least five years ago, who have been off therapy for at least two years, and who are currently in remission. Assistance with transition of care is provided for those over 18 years of age, even if not eligible by basic criteria. A visit to the Survive and Thrive Clinic includes a complete physical examination, and recommendations.\(^9\) (continued)
Decreasing the dose of anthracyclines and minimizing thoracic radiation is recommended and has been successful with certain tumors, such as Hodgkin Lymphoma.

are given for long-term follow-up care, nutritional and psychosocial assessments, and education on late effects of cancer treatment. As survivors reach the teenage years, preparation for transition to adult providers is incorporated into each visit. This includes the skills and education that each patient will utilize to advocate for their health care needs once they leave the pediatric setting, which is particularly important in cases where management of late effects is indicated.

CARDIOMYOPATHY—AN EMERGING RISK FOR SOME CCS

Screening for cardiomyopathy is recommended per COG Guidelines. A comprehensive care clinic is available for CMH survivors in collaboration with cardiology, and represents one of the nation’s first pediatric cardio-oncology clinics. Screening for cardiotoxicity is initiated shortly after the conclusion of cancer therapy and continues throughout the life of the patient, as CCS are at greater risk for the development of late effects as they age. The relative risk of a survivor developing a grade 3 (severe) or grade 4 (life threatening) congestive heart failure (CHF) is 15.1 with a 95% CI of 4.8-47.9. Treatments that increase a CCS chance of developing CHF are increased exposure to chest radiation and higher doses of anthracyclines (doxorubicin, daunorubicin, etc.).

Survivors are screened for development of CHF with periodic echocardiograms, the frequency of which is individualized based on the results of a history/physical and exposure history. Healthy lifestyle choices are encouraged, and nutritional evaluation/education is provided including promotion of regular cardiovascular exercise. Research has shown that hypertension places a survivor at an increased risk of developing cardiomyopathy. Thus, screening for hypertension is performed to allow for early intervention to prevent the development of cardiomyopathy.

As risk factors for the development of cardiotoxicity become more elucidated and screening techniques more refined, the focus of research is shifting from identification of cardiomyopathy after treatment to prevention of this late effect. Sanket Shah, MD, of Children’s Mercy has demonstrated the feasibility of performing three-dimensional echocardiogram and its correlation with cardiac MRIs (the gold standard for evaluating for cardiomyopathy) in CCS populations. Patients whose echocardiograms demonstrate changes consistent with the early development of cardiomyopathy, valvular dysfunction or other signs of cardiotoxicity during therapy may reduce their risk of cardiac effects by modification of treatment. Decreasing the dose of anthracyclines and minimizing thoracic radiation is recommended and has been successful with certain tumors, such as Hodgkin lymphoma. In other cancers, these treatments remain an essential part of
curative therapy, and reduction in risk may require different strategies. 6

REDUCING THE RISK OF CARDIOTOXICITY IN CSS

Work is ongoing to identify how best to reduce the risk of cardiotoxicity by altering the method through which anthracyclines are delivered, through the development of newer anthracyclines that may be less cardiotoxic, and by administrating drugs, such as dexrazoxane prior to anthracycline.7 The means to prevent the development of cardiomyopathy post-therapy are being further researched. An open trial through the Children’s Oncology Group is available to patients at Children’s Mercy to evaluate medical therapy that may help prevent the development of cardiomyopathy (Carvedilol in Preventing Heart Failure in Childhood Cancer Survivors). This multi-institutional study is chaired by Saro Armenian, MD, in collaboration with Wendy Hein, APRN, and Dr. Joy Fulbright at CMH.

THE FUTURE OUTLOOK

While the outlook has improved for many of the 1 in 285 children in the U.S. who are diagnosed with childhood cancer, survival rates remain dismal for some cancers (e.g., brain tumors); and childhood cancer remains the number one cause of death for U.S. children, with approximately 2,000 deaths each year. Ninety percent of the nearly 16,000 children diagnosed annually with childhood cancer are cared for at children’s cancer centers affiliated with the National Cancer Institute-supported COG, and improvement in care and outcomes will continue to be their central focus.

Joy Fulbright, MD, FAAP, is an associate professor of pediatrics at the University of Missouri-Kansas City School of Medicine and the director of the Survive and Thrive Clinic, and medical director of the Adolescent and Young Adult Program at Children's Mercy Hospital in the Division of Hematology-Oncology. She can be reached at 816-302-6836.

Christine Nedeau (continued from page 11) medical school at the Cebu Institute of Medicine after obtaining her undergraduate degree from Baylor University. “In the Philippines, it became more obvious how the power of basic preventive measures such as access to clean water, good hygiene, appropriate nutrition, breastfeeding and routine immunization can drastically impact the health of a community.”

She has served as coordinator and medical director of several missions to the Philippines through the Philippine Medical Society of Greater Kansas City, coordinating groups as large as 60 volunteers. “We saw 1,500 to over 2,000 at each mission, providing medical and surgical care as well as education and community outreach. Following Super Typhoon Haiyan in 2013, we entered several storm-damaged areas to deliver provisions and medical care, and assist in re-building the community,” she said.

In other activities, she serves on the Clinical Decision Committee of the First Hand Foundation, Cerner’s non-profit organization that funds health-related needs of children when insurance and other financial support are lacking. She also is a preceptor for the family medicine clinical rotation for fourth-year medical students at the University of Missouri-Kansas City School of Medicine, and for high school student interns for Northland Center for Advanced Professional Studies program. She is active with the Liberty Youth Ballet and Anna’s Angels.

About her busy and fulfilling life of service, Dr. Nedeau references the Bible verse, “For God loves a person who gives cheerfully. And God will generously provide all you need.”

REFERENCES


The Elizabeth J. Ferrell Fetal Health Center (FHC) at Children’s Mercy Kansas City (CMKC) formally began in 2010, but the concept had been in evolution for more than a decade before that. Development of an obstetrical service within a freestanding children’s hospital, focused on complex fetal care, was a novel undertaking at the time and created multiple challenges. In this review, we will provide a brief description of the implementation of this program. We will underscore the importance of careful planning and the educational opportunities that were recognized in initiating a safe and effective program for women and newborns in a pediatric facility. We will provide some lessons learned in outcomes and successes over the first years of this program.

BACKGROUND

There are few areas of medicine that have had such dramatic change in mortality and morbidity outcomes as can be found with neonatology. During the 20th century, neonatal mortality rate declined 89%, paralleled by a 96% decline in infant mortality. The decline in infant mortality was primarily driven by improved birth weight-specific survival. Only 1 in 10 extremely low birth weight infants (less than 1000 g) survived in 1980 and now 7 of 10 will survive. However, over the past 20 years with the improved survival of preterm infants, the relative contribution of birth anomalies to infant mortality has increased and now exceeds that of prematurity, with rates of 119 and 104 per 100,000 live births, respectively. During this same time, there have been marked advances in fetal medicine especially in diagnostic sonography which have revolutionized prenatal diagnosis and management, and expanded our understanding of the developmental aspects of congenital malformations.

The identification of fetal abnormalities prior to delivery has enhanced the practice of fetal medicine which relies on identification and accurate assessment of abnormal fetal development. It has been well demonstrated that diagnosis of serious fetal conditions before birth leads to improved neonatal and long-term outcomes. A recent systematic review demonstrated that diagnosis of critical congenital heart disease significantly improved preoperative neonatal survival by providing optimal care at birth. Understanding the fetal condition before birth offers opportunity to counsel and educate prospective parents, helping them cope and prepare for what may be a difficult situation. Prenatal diagnosis is important for individualizing pregnancy care and optimizing timing, location and mode of delivery, potentially impacting neonatal outcomes and parent satisfaction. Improved imaging and other diagnostic techniques more recently have allowed for additional opportunities for fetal therapy.

Making a fetal diagnosis starts with screening, a process to identify “at risk” fetuses. Early attempts at screening occurred by review of medical history (e.g., a prior child with cystic fibrosis). Beginning in the 1960s, serum screening became available (e.g., maternal serum alpha-fetoprotein testing for open spina bifida). Currently, numerous fetal diagnoses are screened by testing of maternal serum. Nothing has advanced our ability to identify abnormal fetal development more than ultrasound imaging. Since the 1970s, ultrasound technology has rapidly advanced and allows for detection of a large spectrum of abnormalities, both structural (2-D and 3-D imaging) as well as functional (pulsed and color flow Doppler). Confirmatory assessments may include genetic testing of amniotic fluid or fetal blood. Fetal echocardiography has revolutionized prenatal diagnosis of congenital heart defects. In the last 10 years, fetal MRI has also added to our diagnostic imaging options in the fetus.

The goal in the development of the FHC was to offer a comprehensive service to facilitate involvement of maternal-fetal (MFM), pediatric medical
and surgical subspecialties, to provide a care plan in all instances when fetal problems are identified by referring MFM and obstetrical physicians. For many, the focus would be on educational and supportive counseling with the family. In other situations, consultations from our MFM specialists, in conjunction with pediatric subspecialists, would assist referring physicians with pregnancy management decisions and guidance for neonatal care.

For a minority of cases, delivery at the FHC would be the best option, depending on the anticipated newborn problems and the availability of services at the referral hospital. In the event of FHC delivery, the intent would be to provide immediate resuscitation and assessment of the neonate, offering necessary medical and/or surgical interventions. Such services for infants with complex malformations may only be available at Level IV neonatal units, which often are within a children's hospital. On-site delivery prevents delays in therapy necessitated by neonatal transport and at the same time, allows the mother-to-be in close proximity to her newborn infant.

A fully integrated program seamlessly provides families with a unified plan developed and made available to all providers, addressing anticipated pregnancy and newborn needs. Intrinsic in the development of the FHC was the support of hospital leadership and other stakeholders, who identified community needs and risks and benefits of this new service. The University of Missouri-Kansas City School of Medicine and its primary teaching hospital, Truman Medical Center-Hospital Hill (TMC-HH), were enthusiastically supportive of this initiative from the beginning. Community support was clearly in place and a generous grant from the Elizabeth J. Ferrell Foundation provided initial resources for program development.

**PRENATAL CONSULTATIONS**

From the beginning, it was deemed important for prenatal consultations to be multidisciplinary, where all specialists who could be involved in the care of the infant met to provide the family a forum to better understand issues from multiple perspectives. For instance, for a fetus with a congenital heart defect and a brain malformation, the implications for initial care and long-term outcome may be very different than if these were isolated lesions. Genetics and neonatology are present at all consultations and other clinical specialties as indicated. The pediatric radiologist is included in the prenatal consultation when a fetal MRI or other radiographic study is reviewed.

At the end of the consultation, the discussion is summarized with recommendations from all consultants in one written document, which is sent to referring physicians and made available to families. If subspecialty or surgical services will be needed in the immediate neonatal period, recommendation is made to parents and referring physicians for delivery at CMH FHC. For those situations in which the delivery will be at another facility, the letter is also sent to the primary pediatrician and/or neonatal service at the delivery hospital, providing recommendations for postpartum care and guidance for follow-up appointments in pediatric subspecialty clinics.

For prenatal consults which occur relatively early in gestation, if there is a complex fetal condition, a second prenatal consultation closer to delivery date may be planned to address priorities for the family, including, e.g., time for holding the infant as soon as possible after birth, family pictures, addressing religious traditions, visitation requests and in appropriate cases, to involve the palliative care team (PaCT) when there is anticipation of prolonged hospital care or high mortality (continued)
risk. Prenatal availability of the PaCT member helps to develop relationships with the family which are beneficial as they provide continuity throughout the child’s hospitalization.

**FHC DELIVERIES**

Providing the capacity to deliver a fetus with a birth malformation needing immediate intervention at the Level IV NICU was a high priority for development of the FHC. To accomplish this, the program was developed with availability of full obstetrical services 24/7, with in-house obstetricians, experienced labor and delivery nurses, MFM availability and unique resuscitation facilities for infants in immediate proximity to the NICU. An anesthesia maternal screening protocol allows for decisions regarding delivery locations to ensure maternal safety as well as optimizing infant outcomes.

“Flight plans” for each type of lesion (myelomeningocele, encephalocele, gastrochisis, critical congenital heart defect, etc.) were developed to outline equipment and procedures needed for stabilization of the lesion and infant resuscitation. Unique FHC simulation scenarios for both obstetrical and neonatal complications, offer ongoing multidisciplinary and interdisciplinary teamwork experience. When unusual cases are anticipated, such as conjoined twins or Ex utero Intrapartum Treatment (EXIT) procedures, extensive prenatal planning and repeated simulations are critical to assure safe and effective care.

**FETAL INTERVENTIONS**

An early example of fetal therapy was the use of maternally administered anti-arrhythmic medications for the treatment of fetal supraventricular tachycardia (SVT). Other invasive techniques have followed including ultrasound-guided intravascular fetal transfusion for Rh alloimmunization, fetoscopic guided laser ablation for twin to twin transfusion syndrome and open fetal surgical repair of meningocele. Currently, the FHC provides many of these fetal therapies and plans to offer additional advanced fetal interventional procedures in the near future.

**INITIAL EXPERIENCE AND OUTCOMES**

The FHC opened for deliveries in March 2011, with the number of deliveries increasing about 11% per year. As of April 2017, the FHC has had 743 deliveries and 1,689 integrated prenatal consults. The most common fetal diagnoses for delivery have been cardiac (34%), gastrointestinal (17%) and complex-multi organ (14%) (Figure 1). Many of these families are referred from our usual regional network in western Missouri and eastern Kansas, but we have also had prenatal consultations with families from more distant locations (e.g., Oklahoma, Iowa and Nebraska). Some parents have sought evaluation for less complex fetal conditions, which other centers may not address, such as isolated cleft lip and/or cleft palate, club foot or other limb anomalies.

**CASE EXAMPLES**

Outcomes cannot be measured simply in mortality or morbidity statistics, but also are reflected in the smiles and positive comments that we receive from parents who thank us for support they received during a difficult pregnancy, and in some memorable cases when early death had been predicted after initial fetal diagnosis.

Case 1:

A 27-year-old G1 was referred at 24 weeks gestation because of fetal diagnosis of an oropharyngeal teratoma with fetal MRI indicating concern for airway compression. Spontaneous labor occurred at 31 weeks gestation, and the infant was delivered by EXIT, an operative delivery method which allowed for emergency airway placement while the fetus remained on uteroplacental circulation. After the airway was secure, the delivery was completed and the infant was able to be ventilated (Figure 2). The mass was electively removed at about a month of age, although the infant continued to need an airway for several years (Figure 3). The child is now 5 years old and breathing without problems following decannulation.
Case 2:
A 26-year-old G3 presented at 26 weeks gestation with severe oligohydramnios. Fetal ultrasound showed a large left dysplastic and right hydrenephrotic kidney. She was counseled about poor infant prognosis because of anticipated renal failure and severe pulmonary hypoplasia. She presented in labor at 36 weeks gestation and delivered a male infant who had immediate respiratory distress. He was initially treated with high frequency oscillatory ventilation and inhaled nitric oxide, but he developed bilateral pneumothoraces and hypoxemia from pulmonary hypertension, leading to treatment with extracorporeal membrane oxygenation (ECMO) within three hours of birth. During the ECMO course, he received hemodialysis and subsequently continued on peritoneal dialysis for renal failure. At three years of age, he had a successful renal transplant. His proud parents recently celebrated his sixth birthday (Figure 4).

LOOKING AHEAD
In the past six years, we’ve accomplished our initial goal to develop a unique fetal program, which serves as a resource for regional obstetrical providers and for families who are coping with fetal developmental differences. We have offered opportunity for regionalization for these families, so that those infants at highest risk may be delivered at our center where intensive neonatal and subspecialty services are available without requiring infant transfer. We have assisted with prenatal management, family counseling and ongoing family support, offering integrated maternal-fetal and pediatric subspecialty input for fetal problems. We have selectively provided fetal therapies and anticipate adding to those procedures based on needs within our region. We look forward to addressing educational and research missions through the FHC to educate the next generation of providers and to continue to find new solutions to care for these complex fetal conditions.

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REFERENCES
Advanced Diagnostic Testing: More May Not Always Be Better

NEWER MICROBIOLOGIC TESTS ARE OFTEN MORE COMPLEX COMPARED TO OLDER TESTS AND ARE OFTEN HARDER TO INTERPRET FOR PROVIDERS

By Rangaraj Selvarangan, BVSc, PhD, D(ABMM)

In 2013, the Infectious Disease Society of America and the American Society of Microbiology issued a guide to assist providers in the utilization of the microbiology laboratory. The guideline begins by identifying that in terms of the diagnostic laboratory, newer microbiologic tests are often more complex compared to older tests and are often harder to interpret for providers. This underscores the importance of strong partnerships between clinicians and the microbiology laboratorians.1

The CDC “Get Smart” campaign raises awareness of the threat of antibiotic resistance and the importance of appropriate antibiotic prescribing. A recent study by Gong, et al., documented that the majority of ED visits for infants occurred in general emergency departments and the majority of these children received increased use of radiography, corticosteroids and antibiotic in spite of the guidelines recommending against them.2

Appropriate test selection and clinical integration of the test results has the potential to promote adherence to guidelines and preserve our inventory of antimicrobials. The diagnostic test selection and specimen collection is directed by providers and is often the key to appropriate diagnosis, directly impacting patient care and influencing health care costs, antibiotic decision making, and in some cases, length of hospital stay and infection control implementation.

PATIENT CHARACTERISTICS AND TEST SELECTION

Microscopy and the Gram stain continue to permit diagnosis of many infectious diseases, with results available in minutes. Traditional laboratory methods that are culture-based usually take a few days for isolation of the pathogen followed by identification and antibiotic susceptibility testing, requiring more days. Newer molecular-based diagnostic testing has vastly improved the sensitivity and turnaround time of result availability. The molecular assays range from manual to fully automated systems and are capable of detecting a single organism commonly associated with a specific disease condition (Group A streptococcus pharyngitis, Chlamydia trachomatis and Neisseria gonorrhoea in sexually transmitted infections) or many organisms associated with syndromes such as respiratory infection, gastrointestinal infections and central nervous system infections.

The growth in molecular diagnostic testing options provides us an opportunity to select the right test for the right patient population for rapid diagnosis and appropriate clinical decision making. Appropriate test selection is even more important in the current environment of ever-increasing health care costs and decreasing medical reimbursement. The molecular tests are expensive and add significant costs to the laboratory budget; however, careful selection and implementation of these tests in both outpatient and inpatient settings can result in huge cost savings for the overall health care system and improve efficiencies in overall health care management. Although laboratorians play a key role in test selection, many studies have documented that successful implementation of tests requires collaboration with clinical care teams and antimicrobial stewardship teams.

Diagnostics should be differentially applied depending on the patient’s illness and the patient care setting, and ideally should allow for collection and testing by trained personnel. Ideally, one would want rapid, sensitive and specific tests at low cost. Some of the current antigen tests such as influenza and Group A streptococcus (GAS) assays meet such criteria for testing in the pediatric setting.

Seasonal testing for influenza during winter months in the outpatient setting has been demonstrated by many studies to improve appropriate antiviral use, reduce antibiotic prescriptions, reduce additional investigations, and reduce overall costs related to hospital visits.

On the other hand, the year-round prevalence of GAS-associated pharyn-
Gitis necessitates judicious testing for GAS pharyngitis as the most important way to avoid over-treating of carriers of GAS. A recent study by Shapiro, et al., documents that over two-thirds of patients tested for GAS pharyngitis have overt clinical features of viral illness. GAS testing should not be ordered for those younger than 3 years or in those who have any respiratory viral symptoms. Such indiscriminate testing guarantees one will identify those who are colonized and not infected, which is estimated to be ~25% of the child population, resulting in inappropriate use of antibiotics. Recently the FDA has approved several new rapid molecular tests for detection of GAS from throat swabs of patients with pharyngitis. Providers should carefully consider the possibility that by use of the highly sensitive molecular test method, a positive test may more often represent GAS colonization if patients are poorly selected for testing.

The judicious utilization of antibiotics is a priority for all providers and in the pediatric population. Antibiotic stewardship is now focusing on outpatient use, targeting best practices for evaluation and management of acute respiratory tract infections (viral upper respiratory infection, otitis media, sinusitis and pharyngitis including that due to Group A streptococcus). The advances in sample-to-answer automated instruments. The question is whether these panels are appropriate for all respiratory test requests as a “one size fits all” approach or if testing should be “tailored” to specific patient populations and disease conditions.

In a patient with a respiratory viral infection who is only mildly ill and immunocompetent, diagnostic testing is not indicated. For those patients who are moderately ill and/or require emergency room evaluation or hospitalization, mPCR testing that features a rapid turnaround time (TAT) can influence provider decision making, limiting unnecessary antibiotic exposures and increasing the utilization of oseltamivir in the setting of influenza. Several recent studies have documented the importance of definitive etiological diagnosis of respiratory illness and its impact on antiviral and antibiotic use. A study by Rogers, et al., demonstrated that implementation of a mPCR for respiratory virus and reporting of results within a few hours significantly reduced duration of antibiotic use, inpatient length of stay, and the time in isolation when compared to a group with mPCR results available after one day.

Disadvantages of multiplex detection of respiratory pathogen detection include false negative test results due to preferential amplification of some targets or failure of some targets to amplify due to mutation in the target genes, lack of complete understanding of significance of co-infections at high rates, and possible detection of certain viruses (rhinovirus, coronavirus) that are present due to prolonged asymptomatic shedding.

**Gastrointestinal (GI) Panels**

GI panels, more recently FDA approved, test for a wide variety of viral, bacterial and parasitic agents. Utility thus far is compromised by limitations related to the syndromic approach that guarantees one will test for more agents than needed and find more positive tests that may or may not account for the patient’s clinical presentation. As such, these panels may not be suitable for routine testing nor for screening in the absence of specific signs and
symptoms, especially in an immuno-compromised host. The presentation for cryptosporidiosis and giardiasis is distinct (watery diarrhea) from that of bacterial enteritis (bloody stools and fever). Typically testing for bacteria and parasites would not be performed together and would more effectively be focused on suspected pathogen.

Another important limitation of mPCR testing for GI illness is that panels are not able to distinguish between viable, replicating organisms (i.e., that are responsible for infection) versus nonviable pathogens or remnant nucleic acid. This is especially important as certain pathogens—including norovirus, rotavirus, adenovirus, astrovirus, Shigella and Salmonella—may be detected in the stool of asymptomatic individuals or be shed for long periods following the resolution of disease. Providers should be aware that when Salmonella or Shigella is detected, culture must be also be utilized to confirm susceptibility testing and/or to facilitate epidemiologic investigation.

The increased detection of *Clostridium difficile* in stool specimens tested with the mPCR panel is an additional example of the potential of the mPCR GI panel to add confusion and complexity in interpretation. In the case of *Clostridium difficile*, a positive test may represent colonization in patients, which is especially a possibility when testing those with no known risk factors. Suspicion for *Clostridium difficile* disease should be heightened based on presence of compatible clinical symptoms (the presence of liquid stools, fever and abdominal cramping) and *Clostridium difficile* risk factors (antecedent antibiotic exposure, hospitalization) and in such cases, more cost-effective testing would be directed to that agent alone. AAP recommends against *Clostridium difficile* testing in infants less than 1 year of age and encourages testing for viral etiologies in children up to 3 years before *Clostridium difficile* testing is considered as a cause of diarrheal illness.

Lastly, testing for *Entamoeba histolytica*, *Plesiomonas shigelloides*, *Cyclospora cayetanensis*, *Vibrio spp*, *Vibrio cholerae*, enteropathogenic or enterotoxigenic *E. coli* is not indicated for the vast majority in the absence of risk factors, and the significance of finding sapovirus or enteroaggregative *E. coli* is unclear.

### Meningitis/Encephalitis (ME) Panel

In 2015, the FDA approved the FilmArray ME panel (BioFire Diagnostics, LLC) which can detect 14 different pathogens, including six bacteria (*S. pneumoniae, N. meningitidis, H. influenzae*, GBS, *Escherichia coli* [K1 strains only], and *L. monocytogenes*), seven viruses (enterovirus, HSV-1/2, VZV, HIV, CMV, enterovirus), and one fungal pathogen (Cryptococcus neoformans).

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>WBC, cells/microliter</th>
<th>Differential, CSF</th>
<th>Glucose as mg/dL or % of serum glucose</th>
<th>Protein, mg/dL</th>
<th>Confirmatory Test and Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>0-15 in first week of life; 0-5 thereafter</td>
<td>Mononuclear cells</td>
<td>60-70% of serum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteria (GBS, S pneumoniae, N meningitidis)</td>
<td>≥ 1000</td>
<td>Neutrophil predominance</td>
<td>≤ 20 mg/dL</td>
<td>&gt;100</td>
<td>Gram-stained smear may be positive; culture confirms</td>
</tr>
<tr>
<td>Enterovirus</td>
<td>50-500; in young infants, absence of pleocytosis may be seen</td>
<td>Lymphocytes; neutrophil predominance in first 24 hours</td>
<td>40-70% of serum</td>
<td>40-100</td>
<td>PCR</td>
</tr>
<tr>
<td>Herpes simplex virus</td>
<td>50-500</td>
<td>Lymphocytes</td>
<td>40-70% of serum</td>
<td>40-100</td>
<td>PCR</td>
</tr>
<tr>
<td>Parechovirus</td>
<td>0-5; absence of pleocytosis is consistently reported</td>
<td>Mononuclear cells</td>
<td>60-70% of serum</td>
<td>Normal</td>
<td>PCR</td>
</tr>
<tr>
<td>Mycobacterium tuberculosis</td>
<td>50-500</td>
<td>Lymphocytes</td>
<td>≤ 20 mg/dL</td>
<td>&gt;100</td>
<td>Requires special stain, PCR, AFB culture, assess for risk factors</td>
</tr>
<tr>
<td>Arboviruses</td>
<td>5-500</td>
<td>Lymphocytes</td>
<td>60-70% of serum</td>
<td>50-100</td>
<td>Mosquito (or tick exposure)</td>
</tr>
</tbody>
</table>

**Table 1: Cerebrospinal Fluid Findings in Central Nervous System Infection.**
CMV, HHV-6, and human parechovirus), as well as C. neoformans/C. gattii. The amount of cerebrospinal fluid needed is small (≤200 μl of CSF) and the test can be completed in <2 hours.

Experience with the panel is limited overall and especially in children. The panel includes testing for agents that are unlikely in the healthy host (C. neoformans/C. gattii) and additionally for some where the clinical significance is unclear (HHV-6) or uncommon (CMV). False positive for bacterial and viral targets were documented in a recent multicenter evaluation of FilmArray ME Panel testing of 1,560 remnant CSF specimens. Five CSF specimens had coinfections and all five specimens were confirmed to have at least one false-positive detection by reference testing. For bacterial detection, only 32% were concordant with culture and 68% were considered false positive; S. pneumoniae was the leading target (80%) with false positive results and only 40% of these results were later confirmed by additional testing or clinical evaluation. About 10% of viral targets were also confirmed as false positive. The results from this study highlight the importance of close scrutiny of test results with careful correlation to medical history and clinical presentation of the patient. Both false positive and false negative test results from CSF mPCR testing can have devastating consequences for the patient’s clinical course.

In our institution, central nervous system infection is most commonly confirmed in febrile infants in the first three months of life. Evaluation in febrile infants less than 28 days should continue to include complete blood count, measurement of electrolytes, renal function and liver function and cerebrospinal fluid (CSF) examination, with blood, urine and CSF culture. Dedicated PCRs for HSV, enterovirus and parechovirus are utilized. For any patient with suspected meningitis or encephalitis, evaluation of cerebrospinal fluid parameters are generally helpful to guide treatment, and may influence further testing (Table 1).

In summary, clinicians and laboratory should work collaboratively to be the best stewards of appropriate laboratory test selection, utilization and interpretation. Informed antibiotic management and patient care decisions based on quality laboratory test results will ensure safety, optimal care and best clinical outcomes for our patients.

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REFERENCES
In May 2016, the Centers for Disease Control and Prevention (CDC) identified the MCR-1 gene in a urine sample from a 49-year-old Pennsylvania woman with no known international travel who was seen in a medical clinic. This particular gene, first identified in China in 2015, facilitates the resistance to colistin, an antibiotic reserved to treat multidrug-resistant infections. Later in June, a healthy 2-year-old patient was identified to have the gene isolated from a stool sample following travel to the Caribbean. In January 2017, the CDC reported the first death of an elderly U.S. woman who developed a hip infection that was resistant to all available antimicrobial drugs after traveling to India. Despite structured efforts to combat antimicrobial misuse, resistance persists as a national health crisis.

**ANTIMICROBIAL RESISTANCE AS A SIGNIFICANT HEALTH PROBLEM**

In the U.S., the CDC estimates that antimicrobial resistance directly results in two million illnesses and 23,000 deaths annually. Major gaps exist in surveillance and data sharing to estimate the true global prevalence; however, in 2014 the United Kingdom commissioned a scholarly review that identified antimicrobial resistance could cause 10 million deaths by 2050. As illustrated in the preceding clinical examples, antibiotic resistance occurs as agents lose effectiveness due to the bacteria’s ability to adapt to antibiotic exposure with mechanisms that make antibiotics ineffective. This misuse of antibiotics has resulted in higher rates of resistances, placing patients at risk of acquiring infections that cannot be adequately treated with existing antibiotics.

**STEWARDSHIP DEFINED**

The overarching goals of antimicrobial stewardship are safe patient care through infection prevention and the optimization of antimicrobial therapies. The need to improve the use of antimicrobials is not a new concept in the U.S., and guidelines to address antimicrobial resistance in the hospital setting date back to the late 1980s. However in response to national concerns on resistance, antimicrobial stewardship programs (ASPs) are being required by regulatory and accrediting agencies to enhance the quality and safety of clinical care through judicious antimicrobial management. Traditional strategies to mitigate resistance have relied on the implementation of hospital-based ASPs. Led by infectious disease physicians and pharmacists, the central tenets of ASPs are formulary restriction and prospective audit. While literature has demonstrated outcome data that confirms these strategies are effective, health leaders are promoting a broader reach for stewardship.

**NATIONAL ATTENTION LEADING TO ACCREDITING AND REGULATORY SCRUTINY**

The CDC estimates 30-50% of antimicrobial prescriptions are unnecessary, mismatched or duplicative. In response, accrediting and regulatory agencies have developed standards requiring the implementation of ASPs. Overlapping with federal requirements, legislative work is also occurring at the state level in California and Missouri. In September 2014, President Obama released an Executive Order—“Combating Antibiotic-Resistant Bacteria”—declaring that the federal government will work globally to detect, prevent and control illness and death related to antibiotic-resistant infections.

Obama established the Task Force for Combating Antibiotic-Resistant Bacteria co-chaired by the Secretaries of Defense, Agriculture, and Health and Human Services. The White House released the National Action Plan for combating antibiotic-resistant bacteria in March 2015. The order was constructed to guide the U.S. government, public health, health care and veterinary partners in efforts to address urgent threats of antibacterial resistance. Specific goals to be achieved by 2020 include: reduce the incidence...
of *Clostridium difficile* infection by 50%, reduce hospital acquired multi-drug resistant bacterial infections by 60%, and reduce the rate of antibiotic-resistant invasive pneumococcal disease among <5-year-olds by at least 25%.11

In July 2016, The Joint Commission announced a new standard, for hospitals and critical access hospitals to address antimicrobial stewardship. Effective Jan. 1, 2017, this standard requires that hospitals have an active stewardship program supported by hospital leaders. The program must meet core elements including antimicrobial tracking, reporting and education to staff and families about appropriate antibiotic use.12

For facilities receiving Centers for Medicaid and Medicare (CMS) funding, a new proposed rule requires the implementation and maintenance of a hospital-wide ASP. Underpinning this work, CMS requires administrative leadership engagement. Comparable to The Joint Commission standards, the facility must designate a leader (e.g., physician or pharmacist) to operationalize and evaluate stewardship programming. And, facilities must develop a formal procedure for examining and confirming antibiotic need 48 hours from initial orders. Unique CMS requirements, providers must document in the medical record or order entry process an indication for antibiotics, as well as dose and duration.13

**STATE-LEVEL COMMITMENT TOWARD STEWARDSHIP**

Missouri Senate Bill 579 requires that, as of Aug. 28, 2017, all hospitals and ambulatory surgical centers, excluding mental health facilities, will establish an antibiotic stewardship program for evaluating the judicious use of antibiotics and meet national standards for reporting antimicrobial usage or resistance. Hospitals must meet the reporting requirements outlined in the CDC’s National Healthcare Safety Network (NHSN) Antimicrobial Use and Resistance module.14 Unlike the Senate Bill 1279 entitled “Missouri Nosocomial Infection Reporting Act of 2004,” which is available to consumers on the Missouri Department of Health & Senior Services website, resistance data will not be publicly available at this time.15 However, if a public health emergency is declared, data may be distributed to other facilities, physicians and the public.

**MEASURING STEWARDSHIP PROGRESS**

Several outcomes, including economic measures, have been used to evaluate the impact of ASP, though a consistent performance metric has not been established. Several patient safety measures are proposed to evaluate programmatic success. The association between antimicrobial use and the acquisition of *Clostridium difficile* has promoted the evaluation of infection rates. Other metrics, such as monitoring antibiotic days of therapy, are recommended by the Infectious Disease Society of America and The Society of Healthcare Epidemiology of America as a standardized measurement for antimicrobial use.8 Length of hospital stay has been identified as a surrogate measure of ASP impact, primarily as a result of switching intravenous medications to oral therapy or stopping of unnecessary antimicrobials. The primary measures required from the regulatory and accrediting are congruent; hospitals are required to measure antibiotic consumption at the hospital or unit level. Missouri Senate Bill 579 further specifies usage in accordance to the national NHSN standards.

**INDIRECT EFFECTS OF SAFE PATIENT CARE**

Aside from the overt effects of improving antibiotic misuse, it is important to note the indirect effects of stewardship. Adverse drug reactions, drug interactions, cross-sensitivity of drugs, allergy identification and medication errors associated with antibiotic use are known to significantly impact patient care experiences.16 According to the CDC Vital Signs Report, one in five emergency room visits for adverse drug events are due to antibiotic adverse drug reactions.4 Additionally, of the 140,000 annual emergency department visits for antibiotic reactions, four of five patients are seen for allergic reactions ranging in severity from mild rashes to breathing problems.4 The nexus between patient safety and improving antibiotic use is stewardship.

**SPOTLIGHT ON STEWARDSHIP**

Children’s Mercy Hospital is a 354-bed tertiary care, free-standing children’s hospital in Kansas City, Missouri, with greater than 15,000 annual inpatient admissions.17 Our hospital has a robust antibiotic stewardship program established in 2008 with dedicated pharmacist support and infectious disease leadership, making 2,317 stewardship recommendations during 2008-2013.17 We utilize a prospective audit and feedback process and since the date of program implementation, we have provided over 26,000 reviews of care. In an examination of clinician impressions, we found ASP efforts (continued)
reduced inappropriate antibiotic use and improved the care without interfering in clinical decision-making or infringing on provider autonomy.18

EXPANSION TO AMBULATORY AND OTHER CARE SETTINGS

Outpatient stewardship is steadily gaining momentum. While the majority of stewardship efforts have targeted acute care settings, 60% of antibiotics are prescribed in outpatient settings.19 Though outpatient antibiotic therapy has declined over the past two decades, further efforts are needed to meet the White House goal of a 50% reduction in inappropriate use. On Oct. 5, 2016, a joint statement was released from the CDC that included support from 12 national health organizations including the American Academy of Pediatrics, American Medical Association, and American Academy of Family Physicians. Through coordinated efforts and membership support, these organizations aim to reduce unnecessary antimicrobial use.20,21 Clinicians may access the CDC checklist for outpatient stewardship here: https://www.cdc.gov/getsmart/community/pdfs/16_268900-a_coreelementsoutpatient_check_1_508.pdf

Additionally, on Sept. 28, 2016, CMS issued a final rule requiring the implementation of ASP in nursing homes and long-term care settings.22 The CDC has also developed a Core Elements of Antibiotic Stewardship for Nursing Homes to help guide implementation or program expansion. Access to the CDC checklist for stewardship in nursing homes is provided here: https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship-checklist.pdf

BROADENING THE REACH OF STEWARDSHIP

The urgency to wisely use the antibiotics we do currently have available has gained traction. The CDC and The Joint Commission as well as various nursing organizations and constituencies, such as the American Nurses Association, American Academy of Nursing, and National Institute of Nursing Research have recognized the importance of nurse inclusion in ASP.9 The Institute of Medicine calls for nurses to practice to the fullest extent of their licensure, and recent stewardship literature has encouraged nurses to bring their expertise to the stewardship process.9,23

Traditional stewardship efforts have been effective in reducing antimicrobial pressure.8 However, multifaceted strategies are needed across the health care spectrum to slow the spread of bacterial resistance and improve safe patient care. As facilities embark on coordinated efforts to steward antimicrobial use, remember the CDC and National Quality Forum offer practical strategies for program initiation or expansion. Our ability to steward these shared resources directly impacts current therapeutic effectiveness and our subsequent ability to treat seemingly minor infections identified across health care continuum.

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REFERENCES

13. Centers for Medicare & Medicaid Services. CMS issues proposed rule that prohibits discrimination, reduces hospital-ac-


Providers who work with families wishing to adopt internationally should be aware of the changing landscape of international adoptions that relates to country-specific economic, social and political factors. Overall, intercountry adoptions have decreased in the U.S. over the last decade. Figure 1 shows the number of internationally adopted children between 1990 and 2015.

The peak in adoptions was in 2004 when 22,989 children were adopted internationally. A steady decline has been seen since, with only 5,370 children adopted from abroad in 2016. China, Ethiopia, South Korea and Ukraine have been the most common countries of origin. However, a continued decrease was noted in the last several years in those coming from Ethiopia, and in May 2017, they suspended all intercountry adoptions. A gradual increase in age has been noted since the 1990s with most children now adopted at 5-12 years of age.

Much of the decline in international adoptions is due to increased restrictions on prospective U.S. parents, a 2013 Russian ban on adoptions to the U.S., and promotion of domestic adoption and foster care in China and South Korea. China and South Korea prioritize intercountry adoption of children with special needs. In Ethiopia, the decline may reflect the re-organization and loss of staff in the government offices that oversee adoptions.

In 2016, the U.S. State Department began full implementation of an adoption strategy to maintain intercountry adoption around the world, addressing illegal or unethical practices by adoption service providers while strengthening relationships with international partners who joined the Hague Adoption Convention which works to safeguard intercountry adoptions. There are currently 95 nations that are part of the Convention. There are differences in the adoption process between Convention vs. non-Convention countries (see https://travel.state.gov/content/adoptionsabroad/en/adoptionsabroad/faq/ Hague-vs-non-hague-adoption-process.html), and prospective parents should become familiar with them.

**The Pre-Adoption Evaluation**

Whichever process is utilized, pre-adoption evaluation is often sought by parents and is sometimes required by their adoption agencies. It provides review of available photographs, records and videos of the child to gain more information regarding the overall health, presence of underlying conditions and an estimate of whether growth and development are appropriate. Depending on the conditions in the orphanage or foster home, growth and development of the child may be impacted. It is estimated for every three months in an institution, the child may lose approximately one month of growth and development. However, this depends on the
circumstances for each institution. If adopted at a young age, most of the delayed growth and development can be caught up.

If weights and heights of the child are available, consider that the growth charts from the country of origin may be less reliable, and growth charts from the World Health Organization (WHO), should be utilized. Often medical records are limited, but sometimes it is possible to obtain additional information if prospective parents request it through their adoption agency. Immunization records are important and should be reviewed with attention toward the specific vaccine product and dates/timing of vaccines.

A travel clinic visit is recommended for prospective parents to update immunizations for the traveling parent(s) and the family at home and to give specific country-specific travel counseling. Transmission of hepatitis A and measles to parents and family members within the first month after entry to the U.S. are reported and emphasize the need to ensure appropriate pre-adoption immunization. The State Department visa medical examination is performed by local physicians trained by the CDC to identify those with active tuberculosis, mental illness, or in those 15 years or older, syphilis, gonorrhea, or chancroid (excludes HIV since 2010). Immunizations are provided if the child is coming from a country participating in the Hague Convention.

**MEDICAL EVALUATION OF THE INTERNATIONALLY ADOPTED CHILD**

Prevailing literature in the 1990s suggested that over half of internationally adopted children had at least one unexpected medical diagnosis; 75% of those are infectious in nature and 81% could be established by screening studies. Examples of non-infectious health issues that may be identified include lead toxicity, rickets, growth delay, thalassemia, hypothyroidism, hearing or vision impairment, dental (continued)
decay or mental health issues. HIV is rarely a new diagnosis after adoption, and in almost all cases is known to adoptive parents beforehand. Hepatitis B chronic infection is more commonly noted in children coming from Asia, Africa and Haiti; and hepatitis C while uncommon, is seen in those from China, southeast Asia, Russia and eastern Europe.

A medical examination for the child upon arrival in the U.S. should occur promptly if the child has an obvious acute illness or unstable medical condition. For the vast majority, the evaluation should occur within one to three weeks after arrival, so that parents and child are rested and some type of household routine has been established. Providers should review the medical record carefully, and perform a complete clothes-off physical examination. Parents may request documentation of congenital dermal melanocytosis (“Mongolian spots”) because they worry about wrongful accusations of abuse. Some may need education regarding normal physiologic variants, or have questions regarding care of foreskin and/or need for circumcision in boys. Note whether a scar is present from BCG vaccine.

Dental assessment and hearing and vision testing should be performed. A flat affect, shyness and attachment difficulties are not uncommon during the initial assessment, but often resolve in several weeks as the child adjusts to their new family. If concerns remain after 6-8 weeks, then early intervention referrals to behavior and developmental specialists should be considered.

VACCINATIONS
Review of the vaccination record should be done, recognizing that common vaccines from the country of origin may include BCG vaccine, whole cell DTP vaccine, oral polio vaccine, hepatitis B vaccine and monovalent measles vaccine. In children from China, epidemic cerebrospinal meningitis vaccine (meningococcal polysaccharide vaccine) and Japanese encephalitis vaccine may be recorded. Commonly missed vaccines in the country of origin include rotavirus vaccine (though the vast majority children are no longer age eligible on arrival), Hib and pneumococcal conjugate vaccines, hepatitis A, varicella, influenza, meningococcal conjugate, HPV and mumps and rubella vaccines. Only written documentation is considered acceptable, and attention should be paid to the dates of administration, number of doses, time interval between doses and age of patient at time of immunization. Most vaccine records are translated for providers and for those that are not, the Pink Book can be used to identify disease names and vaccines by country (Figure 2).

Most vaccines made worldwide are reliable, and written documentation of immunizations can be considered acceptable, if they follow the current U.S. or WHO schedules. However, problems with vaccine storage, use of expired product or improper administration and at times inaccurate records have been noted, and some providers choose to obtain antibody titers if the primary series is documented in order to confirm protection. In one review by Staat, et al, among 748 tested, 85%, 95% and 94-96% of 15-month-olds had titers protective for diphtheria, tetanus

<table>
<thead>
<tr>
<th>Table 1. Suggested post-adoption screening tests.</th>
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<tr>
<td>Hepatitis B surface antigen, surface antibody and core antibody*</td>
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<tr>
<td>Hepatitis C virus serology*</td>
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<tr>
<td>HIV 1 and 2 serology*</td>
</tr>
<tr>
<td>PPD tuberculin skin test or if ≥5 years old, an interferon-gamma release assay*</td>
</tr>
<tr>
<td>Syphilis serology (RPR)</td>
</tr>
<tr>
<td>Stool exam for ova and parasites, including Giardia and Cryptosporidium antigen</td>
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<tr>
<td>Malaria smear if from sub-Saharan Africa</td>
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<tr>
<td>Trypanosoma cruzi serology if from endemic country (see text)</td>
</tr>
<tr>
<td>Lymphatic filariasis serology if &gt;2 yrs. from endemic country (see text)</td>
</tr>
<tr>
<td>Complete blood cell count with differential</td>
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<tr>
<td>Blood lead level</td>
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<tr>
<td>Thyroid stimulating hormone for infants</td>
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<tr>
<td>Vision and hearing screening</td>
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<tr>
<td>Developmental screen</td>
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*Repeat test in six months if the initial screening test result is negative.
and polio respectively. If no immunization record is available, it is safe and appropriate to administer all needed vaccines for catch-up.

SCREENING TESTS

Medical screening tests that are recommended are listed in Table 2 and should be performed even if records of testing were included in the child’s record. A complete blood count with differential, RPR and lead level should be obtained. TSH should be obtained in infants. Note that a newborn screen is not recommended as there are no well-established normal values for older infants and children.

Serology for HIV, hepatitis B and C should be obtained and repeated in six months. In terms of testing for hepatitis B, include test for surface antigen (HBsAg to confirm chronic carriage), core antibody (anti-HBc consistent with natural infection and not seen with immunization) and surface antibody (anti-HBs which may be seen with resolved natural infection or following immunization).

In terms of testing for tuberculosis, a standard tuberculin skin test is preferred for those less than 5 years old. Interferon-gamma release assay (IGRA) blood testing may be used for those older than 5 years. Repeat testing is recommended in six months.

Stool testing for ova and parasites should be performed even in asymptomatic children and should include full examination plus antigen screening for Giardia and Cryptosporidium. It is estimated that 15-50% of children will be positive and most commonly, Giardia intestinalis, Hymenolepis species, Ascaris lumbricoides and Trichuris trichuria are noted.

Note that serology for Trypanosoma cruzi (Chagas Disease) should be performed in those older than 9-12 months (to avoid false positive results from maternal antibody) from endemic regions (Mexico, Central and South America), malaria smears for those from sub-Saharan Africa (includes Ethiopia), and serology for lymphatic filariasis in those older than 2 years who come from sub-Saharan Africa, Egypt, southern Asia, the western Pacific Islands, the northeastern coast of Brazil, Guyana, Haiti or the Dominican Republic.

CONCLUSIONS

Although the number of children adopted internationally in the U.S. has been declining, thousands of children continue to enter the U.S. every year. Internationally adopted children can have special health care concerns related to infectious diseases, growth and development, behavior and family adjustment. A systematic approach to their health assessment will help the practitioner identify areas most needing attention.

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SOURCES


You walk into a clinic room expecting to see a girl, but the patient in front of you looks like a boy. You wonder whether you have gone into the wrong room. After a brief, slightly awkward conversation, you realize that the patient is transgender. His parents may be supportive and well educated, but may be as confused as you feel with the situation. It is likely that you will face this scenario in the future, if you haven’t already. You hear terms like “gender dysphoria” and “transgender” and “gender identity,” and have heard discussions about bathroom use, but you feel like you aren’t clear what the terms mean.

School surveys suggest that the prevalence is around 0.5-1.3%, so it is likely you will encounter a transgender person in your practice.1,2

By Rachel Bartel, APRN, and Jill Jacobson, MD

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Dr. Jacobson consults a patient.

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Why is it important to understand, be knowledgeable and provide an affirming, safe practice? Research shows that when children are not allowed to express their true selves, they become depressed, have a harder time focusing on learning, and in some cases will think about or attempt suicide. Current estimates for the lifetime suicide attempt rate in transgender individuals in the United States is 45%. Many people question whether young children are capable of making a decision to be a different gender. The question of the age at which gender is established, is one that is asked frequently. We know that by the age of 4, most children have a good sense of gender identity, and most often it aligns with the sex assigned at birth. But what if it doesn’t? And what do all these terms mean?

**Gender Identity** is a person’s deeply held internal sense of being male or female or somewhere else on the gender spectrum.

**Gender Dysphoria** is the condition of feeling one’s emotional and psychological identity as male or female to be opposite of one’s anatomical sex.

**Cis-gender** means that one’s gender identity aligns with the sex assigned at birth.

**Transgender** means that one’s gender identity is different from the sex assigned at birth.

**FTM or transgender man** is a female assigned at birth transitioning to male

**MTF or transgender woman** is a male assigned at birth transitioning to female

**Gender independent** is a person whose gender identity is not aligned with the sex assigned at birth, but is not as clearly defined as transgender.
Gender expression is how a person chooses to communicate gender identity to others through clothing, hair, styles, mannerisms and social interactions that are perceived as masculine, feminine, or somewhere else on the spectrum.

Sexual orientation refers to attractions to the same or opposite gender. This is completely separate from gender identity.

Gender-affirming hormones replaces the previous term “contrasexual hormones.”

Gender-affirming surgery replaces the previous term “sex-change operations.”

When transgender children and teenagers feel safe, accepted and true to their identities, they learn better, thrive socially, and have lower rates of depression and anxiety. A recent study showed that when young children were allowed to transition to the desired gender, the symptoms of anxiety were decreased. A long-term study showed that young adults who underwent medical therapies for gender dysphoria had mental health outcomes similar to cis-gender individuals.

Refer to transgender specialists. As society becomes more accepting of transgender individuals, the level of dysphoria experienced by trans individuals may be decreasing. In fact, some transgender individuals do not have dysphoria at all and are not distressed about certain sexual characteristics. Some patients therefore have no desire for medical or surgical intervention. However, many of these patients will benefit from hormonal or surgical therapy and will require referral to a multidisciplinary team.

In pediatrics, a complete multidisciplinary team will have representatives from endocrinology, psychology, social work and adolescent medicine. The Endocrine Society has issued a consensus statement recommending that health care professionals offer support for transgender patients in the gender transition process. The guidelines also recommend GnRH analogues to block unwanted secondary sexual characteristics. These should be started when transgender children first exhibit physical changes of puberty (confirmed by pubertal hormonal levels), but no earlier than Tanner stages 2–3. GnRH analogues have been used in children with precocious puberty for decades, and the effects reverse after stopping the medication. These analogs allow time for further exploration of gender identity. These treatments have been shown to decrease the complexity or duration of some surgeries later in life. Many insurance companies now pay for these therapies.

Social transition, which is also reversible, can be done at any time and involves living as the authentic gender both at home and in public. The Endocrine Society guidelines state “Partially reversible treatments include gender-affirming hormones (androgens and estrogens). The effects of these treatments do not necessarily reverse after stopping treatment.

A decision about when to start hormones should be made with the family and medical provider. The 2009 guidelines recommended hormone treatment around the age of 16. The upcoming guidelines will likely lower the age for gender-affirming hormones. Irreversible treatments include surgical procedures. The current recommendation is to delay surgical treatments until the age of majority, age 18 in the United States. Many surgeons (including several local surgeons) will make exceptions to the age guidelines, particularly when a patient has not wavered in the gender identity and is experiencing extreme dysphoria.

WHAT CAN YOU DO TO HELP YOUR PATIENTS?
Ask children about their gender identity as part of a routine visit. (continued)
Identifying children and teens early can allow for social transition, as well as allowing early hormone blocking. Transgender children are often consistent, insistent and persistent in their statements of gender identity. Primary care providers are in a unique position to identify these kids at an early age, and this is important as those who experience their primary and/or secondary sex characteristics may be intensely distressed if their sex assigned at birth is inconsistent with their gender identity. The World Association for Transgender Health provides a document for health professionals outlining the Standards of Care and providing clinical guidance for transsexual, transgender and gender nonconforming people.

Provide gender neutral bathrooms for all patients.

Physicians should ensure there is a gender neutral bathroom accessible from their offices.

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REFERENCES
Survival rates of children with chronic diseases are improving, with nearly 90% of children with chronic disease surviving to adult age.\(^1\) Newacheck, et al, reported in 1994 that nearly half a million children with special health care needs were entering adulthood each year.\(^2\) In 1997, the Individuals with Disabilities Education Act required a plan for education transition for these young adults. Over the last decade, there was a growing expectation that well-coordinated health care transitions would also occur. The Healthy People Initiative, a national prevention agenda supported by the U.S. Surgeon General, lists in the 2010 and 2020 initiatives a goal of coordinated transition to adulthood, including health care.\(^3\)

In the Kansas City region alone, over 10,000 young adults over the age of 18 have accessed care within the Children’s Mercy system (Figure 1). Pediatric health care systems and providers are embracing transition and the preparation of their patients and families. In 2002, the American Academy of Pediatrics, the American College of Physicians and the American Academy of Family Physicians adopted a consensus statement on health care transition for Young Adults with Special Health Care Needs.\(^4\) In this statement, the committee describes six critical components to ensure successful transition to Adult-Oriented Health Care:

1. Ensure that all young people with special health care needs have an identified health care professional who attends to the unique challenges of transition and assumes responsibility for current health care, care coordination and future health care planning.
2. Identify the core knowledge and skills required to provide developmentally appropriate health care transition services to young people with special health care needs and train primary care residents and physicians in practice.
3. Prepare and maintain an up-to-date medical summary that is portable and accessible.
4. Create a written health care transition plan by age 14 together with the young person and their family.
5. Apply the same guidelines for primary and preventive care for all adolescents and young adults—including those with special health care needs.
6. Ensure affordable, continuous health insurance coverage for all young people with special health care needs through adolescence and adulthood.

Over the last several years, Children’s Mercy Hospital (CMH) has adopted and implemented a coordinated plan to prepare (continued)
our young adults for their transition to adult care. This plan encompasses the six critical elements described by the professional societies.

Each division at CMH has identified providers and support personnel that coordinate and plan the transition activities of their young adults. These “transition champions” ensure that families are aware of the system’s transition policies and help the patients to identify appropriate adult providers. These individuals typically have a longitudinal relationship with the patient and family and are able to acutely identify and resolve global and unique barriers to transition.

CMH has adopted the six core elements of health care transition from Got Transition, a program of the National Alliance to Advance Adolescent Health (gottransition.org). Element three is entitled “Transition Readiness and Orientation to Adult Practice.” This allows our providers and transition champions to “conduct regular transition readiness assessments, beginning at age 14, and to identify and discuss with [the] youth and parents/caregivers their needs and goals in self-care.” In addition, we “jointly develop goals and prioritize actions with [the] youth and parents/caregivers and include in the patient’s chart. Patients are instructed to learn their diagnoses and provide a summary statement of their condition. They must be able to access a medication list and refill their medicines. Occasionally, parents must obtain guardianship of their young adult child. Much like any other developmental milestone the pediatrician monitors, the acquisition of adult health skills and literacy is monitored and anticipatory guidance is provided to the patient and family to help achieve these important milestones.

CMH is adopting a standard template for a portable medical summary for all patients. The document will be concise and adaptable to the adult-oriented health environment. Most large electronic medical records vendors are partnering with pediatric-oriented health systems to develop a consistent documentation framework that could be accessed across electronic medical record platforms.

CMH has recognized the importance of primary care providers in the transition of young adults. Young adult patients have important preventive care needs that must be addressed, in addition to their specialty care needs. All patients are strongly encouraged to establish care with a primary care provider who will serve as the coordinator of their ongoing care needs.

Transition champions at CMH work closely with our social work and financial advisors to help our young adult patients navigate the complex system of health insurance, including applying for their individual coverage and understanding how their coverage might impact their access to adult-oriented care.

CMH routinely monitors the effectiveness of this developing transition system by measuring the outcomes associated with the six core elements defined by the “got transition” model.

Finally, we have a responsibility to also prepare our adult-oriented colleagues for the management and care of chronic conditions not always found in their traditional practice or training experiences. To meet this need, a number of local and national efforts are in place. CMH hosts multiple educational and collaborative events within specialty groups to develop relationships and to provide didactic education. The MedPeds Program Directors Association has developed a didactic curriculum for pediatric, internal medicine, internal medicine-pediatric and family medicine residents that reviews basic concepts in transition, including preparation of young patients and adult-oriented care for common chronic conditions of childhood.

Recently, a textbook from the Society of General Internal Medicine, entitled Care of Adults with Chronic Childhood Conditions: A Practical Guide, was published to provide a reference for adult health care providers caring for these young adults.

Despite these advances, both locally and nationally, there continue to be significant barriers to transition. There are populations of patients that continue to struggle to find appropriate niches in adult-oriented care, particularly patients with significant developmental delays or mental health disease. There are patients with rare conditions, such as metabolic disorders, for which there are no adult-oriented specialists. There are young adults who will lose insurance coverage and have difficulty accessing care. Each of the professional groups referenced in this article, will continue to advocate for and seek opportunities for collaboration and education to eradicate the barriers for successful transition.

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(Source: Children’s Mercy website  
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