

Daily Bulletin

INSIDE WEDNESDAY



- Medicare and U.S. Healthcare Policy Panelists discussed the latest health care policy developments and their impact on the field of medical imaging. 4
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EXCLUSIVE ONLINE CONTENT

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- Decreased LA Appendage Peak Velocity May Be a Risk Factor for Silent Cerebral Infarcts
- Non-Surgical Treatment Relieves Carpal Tunnel Syndrome
- Sunny With a Chance of Trauma: CT Scans Spike in Hot Weather



Looking Beyond the Image to Imagine a Better World for Everyone

By Nick Klenske

From making appointments to understanding the bill, for patients, families and providers, the entire health care system has become frustrating.

"It's now almost expected that a simple visit to your primary care physician or an imaging appointment will require taking a half day off from work," said Reed Omary, MD, MS, the Carol D. and Henry P. Professor and Chair of the Department of Radiology at Vanderbilt University Medical Center in Nashville, TN.

> The good news is that it doesn't have to be like this—and radiology can lead the way to creating a better health care system for everyone.

"With radiology becoming indispensable to all clinical practices, the opportunity for our field to influence not only medicine, but our communities and even the planet, has grown exponentially," said Dr. Omary, who gave Tuesday's plenary on designing radiology for patients, communities and the planet. To leverage this opportunity, Dr. Omary said radiologists must first get outside the radiology bubble.

"We can learn from other sectors, including service, retail, transportation, entertainment and hospitality," he explained. "Every interaction on the outside is an opportunity to learn and improve what we provide on the inside."

Designing a Better Patient Experience

One example of how radiologists can benefit from applying 'outside' concepts inside their practices is human-centered design. Long used by a range of industries, human-centered design uses the

CONTINUED ON PAGE 10

Omary

Mauro is RSNA President

Matthew A. Mauro, MD, is the 2023 RSNA president.

Dr. Mauro is president of University of North Carolina (UNC) Faculty Physicians and senior physician executive of UNC Health Care System Revenue Cycle. He is the James H. Scatliff Distinguished Professor of Radiology, as well as a professor of surgery at the UNC School of Medicine in Chapel Hill. He has been a faculty member at UNC since 1982.

As president, Dr. Mauro will support RSNA's mission by shepherding the Society through the evolving health care landscape and advancing the field of radiology through dissemination of high-quality research and education.

Dr. Mauro received his medical degree from Cornell University Medical College in New York. He completed his residency training at the UNC School of Medicine and was chief resident during his last year. Dr. Mauro completed fellowships in diagnostic and vascular radiology at UNC and abdominal and interventional radiology at the Mallinckrodt Institute of Radiology at the Washington University School of Medicine in St. Louis.

A prolific researcher, Dr. Mauro has published over 150 journal articles and numerous book chapters. He has coauthored five books. His textbook, *Image-Guided Interventions*, serves as a standard reference in the field. Dr. Mauro has given dozens of scientific research presentations nationally and internationally and has been an invited lecturer or visiting professor at over 200 institutions and meetings worldwide. He has served as principal or co-investigator on numerous funded grants, including several grants focused on diagnostic atherosclerosis imaging and treatment of complex pathology of the descending thoracic aorta.

A dedicated RSNA volunteer, Dr. Mauro served on the Scientific Program Committee beginning in 2005, and as chair from 2009 to 2013. He served on the Public Information Advisors Network from 2002 to 2011. Dr. Mauro is a regular faculty member for annual meeting educational courses and was the associate editor of Radiology from 2002 to 2007. He has served on the RSNA Research & Education (R&E) Foundation Public Relations Committee and the Corporate Giving Subcommittee, and as an R&E Foundation grant reviewer. He currently serves on the R&E Foundation's Board of Directors. Dr. Mauro joined the RSNA Board of Directors in 2015, serving as liaison for education.

Dr. Mauro has worked extensively with the Society of Interventional Radiology (SIR), where he was on the Board of Directors and served as president in 2000. With SIR, he served on the Executive Council, the Scientific Program Committee, and the Steering Committee for the World Conference on Interventional Oncology in 2005.

Dr. Mauro has served on a number of editorial boards, including *Clinical Imaging*, *Applied Radiology*, *American Journal of Roentgenology* and *Seminars in Interventional Radiology*. He has been a manuscript reviewer for several journals, including *RadioGraphics*, *Journal of*



Mauro

Interventional Radiology, Cardiovascular and Interventional Radiology, Journal of Vascular Surgery and Pediatrics. Dr. Mauro has been a book reviewer for Gastrointestinal Radiology, Journal of Vascular and Interventional Radiology, Investigative Radiology and Academic Radiology.

Since 2020, Dr. Mauro has been the RSNA Representative to the Academy for Radiology & Biomedical Imaging Research Executive Committee. He was past president of the Southeastern Angiographic Society, where he served on the Board of Directors from 2012 to 2018. Dr. Mauro has served on the American Heart Association's Scientific Sessions Program Committee, as well as the Executive Committee, and he served on the Board of Chancellors of the American College of Radiology. At the American Board of Radiology (ABR), Dr. Mauro served as a trustee, on the Board of Governors, and on the Executive Committee.

Dr. Mauro was awarded the gold medal by SIR in 2014. The ABR has presented him with both the Distinguished Service Award and the Lifetime Service Award.

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Wednesday At a Glance

Plenary Session

11 a.m. – Noon | Arie Crown Theater Exciting Radiology Game Show: What's Your Emergency? Life in the STAT Lane This hit session is back with new cases to challenge the teams and audience. Join this lively session to have fun and compete for bragging rights.



Hanna, MD

Plenary Session



Quynh-Thu Le, MD



Jennifer W.

Uyeda, MD

radiation therapy workflows.

Radiology

8 a.m. – 9 a.m. 12:15 – 1:15 p.m. **Poster Discussio Science and Education Sessions** Learning Center 9 a.m. - 9:30 a.m. **Poster Discussions** 1 p.m. – 5 p.m. Learning Center **Building Connec** Americas 9 a.m. – 3 p.m. S102AB **Cutting-Edge Research Presentations** 1:30 p.m. - 2:30 p.m Learning Center Theater Science and Edu 9 a.m. – 3:15 p.m. 2 p.m. – 3:30 p.m. **Technical Exhibits** 2022 Quantitati **Industry Presentations** Symposium 9:30 a.m. - 10:30 a.m. E253AB **Science and Education Sessions** 2 p.m. – 4 p.m. 10 a.m. - 5 p.m. Last Call at the **Professional Portrait Studio** Technical Exhibi South Hall. Booth 1031 3 p.m. – 5:30 p.m. 10:30 a.m. - 1:15 p.m. **RSNA AI Theater Presentations**

South Hall, Both 5149 11 a.m. – 11: 30 a.m. Meet the RSNA Journal Editors: David A. Bluemke, MD and Linda Moy, MD

MEMBERSHIP SERVICES

Science and Edu 9 p.m. – Midnight **RSNA After Dai** Tao Chicago

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our calendar at *N*

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Meeting Grants and Awards

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DailyBulletin

The RSNA 2022 *Daily Bulletin* is the official publication of the 108th Scientific Assembly and Annual Meeting of the Radiological Society of North America Published Sunday, November 27–Thursday, December 1.

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Awards Posted in Learning Center

Visit the Learning Center to see the RSNA 2022 award-winning posters, education exhibits and quality improvement reports. Recognized items are noted with a ribbon. While you're in the Learning Center, check out the more than 2,500 posters, education exhibits and quality improvement reports featuring the latest in radiology innovation and research.

Share your favorite poster, education exhibit or quality improvement report over social media using #RSNA22.



MIDRC Publishes Over 100K Imaging Studies

The Medical Imaging and Data Research Center (MIDRC) has released over 100,000 imaging studies to advance the development of ML/AI for COVID-19.

MIDRC is an open-access platform which publishes data to be used for research. The studies include chest X-ray and CT studies for COVID-19 patients solicited from sites around the world.

MIDRC is funded by the National Institute of Biomedical Imaging and Bioengineering, hosted by the University of Chicago, and jointly developed by RSNA, the American College of Radiology and the American Association of Physicists in Medicine.

Each month, MIDRC hosts online seminars on the third Tuesday where speakers share research presentations and answer questions about the platform.

Learn more about MIDRC and how you can participate at midrc.org.

Physics Tip

American Association of Physicists in Medicine

It is filtration that primarily controls the energy of the beam and thus the subject contrast in mammography. Image processing can accentuate that contrast in the final image.

 $Clari\pi$ Pioneers A

for Imaging Safety **Population Health Opportunistic Screening**

South Hall, Booth 1007

ClariCT.Al Superb AI-Powered CT Denoising Solution Future is Now, Innovation is Yours Ready for Photon-Counting CT

Low-Dose CT Today





Al Theater: Sun, Nov. 27, 2:30-2:45pm

Booth:

"How AI-based CT Denoising Impacts Imaging Workflow Efficiency: An Experience at Tübingen University Hospital"

Booth 4932 South Hall Level 3, AI Showcase



Changes Ahead for Medicare: Is Radiology Ready?

By Richard Dargan

Major expansions in Medicare such as those proposed by Medicare for All advocates are unlikely in the future, but more modest proposals such as Medicare buy-in at an earlier age are a real possibility, according to physicians and health care policy experts who spoke Tuesday.

Medicare for All, an umbrella term for a collection of ideas involving a more farreaching public health insurance, has been proposed as a solution to the disparities that plague the U.S. health care system.

"I don't see that as being realistic," said Kavita Patel, MD, senior policy advisor at Stanford University and former official in the Obama administration. "Not only because we're dealing with a more divided Congress but also a more divided public too."

A more likely scenario involves continued growth in Medicare, Medicaid and Medicare Advantage, also known as Medicare Part C, said Mark McClellan, MD, PhD, professor at Duke University and former administrator of the Centers for Medicare and Medicaid Services.

'Not Medicare for all, but if we don't do anything else we're going to see Medicare for more," said Dr. McClellan. "That's just demographics, with more people aging and more income inequality that means fewer people being able to afford their insurance.'

Declining Reimbursements, Implications for Radiology

Drs. McClellan and Patel appeared as part of a conversation on Medicare and U.S. health care policy moderated by Amanda Starc, PhD, associate professor at Northwestern University's Kellogg School of Management in Chicago. In a wide-ranging discussion, the two physicians talked about everything from AI to radiologist shortages. Declining reimbursement, though, was at the forefront of the discussion.

"We're coming up on a time when we'll probably see a bigger change in physician reimbursement, maybe over the next several years," Dr. McClellan said. "Now is a time when Congress is starting to think about what it could do differently.³

"Medicare is so big, so it's not always influenced by the commercial sector, but it does look for what is working," Dr. Patel said. "It's incredibly important to have radiology as part of these population based models.

Dr. McClellan suggested that people concerned about government-run health care may be unaware that managed care plans make up almost 90% of Medicaid. Policymakers in Washington, he said, are currently focused on how to pay for Medicare, Medicare Advantage and Medicthem more accountable, not only for keeping

total costs down but for improving quality, access and equity.

"That's where the future is headed," said Dr. McClellan. "More government oversight in Medicare and Medicaid, which are the fastest growing parts of our health care system. The question is, can we do it right?"

No matter what shape the policies take, radiologists must work to ensure



aid in a way that makes (Left to right) Patel, Starc, McClellan

their voices are heard, Dr. Patel said. "I haven't seen enough of radiology at

the table," Dr. Patel said. "I think RSNA doing this discussion is a great step in that direction, but these conversations should become more commonplace within the profession."

Access the presentation, "Medicare and U.S. Healthcare Policy: A National Conversation," (T6-RCP04) on demand at Meeting.RSNA.org.

Creating Cross-Cultural Competencies By Comparing CT in the U.S. and Kenya

Historically, much of radiology global health service in low- and middle-income countries (LMICs) has emphasized on-site support, education and imaging with radiographs and point-of-care ultrasound.

By Nick Klenske

This is now starting to change, thanks in large part to these countries having increased access to CT imaging.

"With the increased availability and utilization of CT imaging for routine patient care in LMICs comes new opportunities for radiologists across the globe to perform research, remote consultations, interpretations and training via cloud-based image

"By comparing the most

common diagnoses, we

hope to elucidate differ-

expand cross-cultural

ences in the different patient

populations and settings and

competence in radiology."

sharing platforms," said Michael Hartung, MD, assistant professor in abdominal imaging and intervention at the University of Wisconsin (UW), Madison.

To illustrate just how big an opportunity this is, during a Tuesday session Dr. Hartung shared the

results of his recent study that compared the diagnostic yield and variety of abdominopelvic CT diagnoses for abdominal pain in a U.S. academic medical center (UW) and a rural Kenyan teaching hospital (Tenwek Hospital).

"By highlighting the similarities, differences and challenges faced in diagnosing and treating patients in such different health care and country settings, we hoped to foster cross-border discussions and, ultimately, stimulate interest and research in global health radiology programs," Dr. Hartung explained.

Study Identified Several Major Differences

The retrospective study utilized sequential samples of 750 adults from both hospitals who underwent CT for abdominal

pain between February 2019 and July 2020. The most common type of exam was a routine CT with IV and often oral contrast and imaging in the exam's portal venous phase.

Using the shared imaging data, researchers identified several major differences between the two hospitals, starting with a much higher percentage of compari-

> son imaging available for UW patients (72% versus 6% at Tenwek). Regarding the CT diagnoses, 40% of UW patients had a negative exam compared to 23% of Tenwek patients, and 58% had an acute abdomen diagnosis compared to Tenwek's 38%.

Furthermore, 40% of Tenwek patients received **Michael Hartung, MD** a new cancer diagnosis, which was at an even greater overall per-

centage than the acute abdomen diagnoses. Despite their substantially different

health care settings, both institutions shared 10 of their top 15 most common diagnoses, such as small bowel obstruction appendicitis and pancreatitis. Each institution also had unique diagnoses, including tuberculosis, hydatid disease and peritonitis at Tenwek, and colitis, diverticulitis and constipation at UW.

Expanding Cross-Cultural Competence In Radiology

According to Dr. Hartung, having access to such imaging data can provide key information and insights for academic programs or organizations looking to develop successful global health partnerships.

To stress the importance of such partnerships and program development, Dr. Hartung noted a recent report by Dr. Frank Minja, et al. that found that only 18 of the 54 African sovereign countries (excluding disputed territories), have well-established diagnostic radiology residency programs. "By comparing the

we hope to elucidate differences in the different patient populations and settings and expand cross-cultural competence in radiology," he said.

Dr. Hartung also said that the data can be used to develop location-specific radiology curricula for trainees in either

Physics Quiz

differential diagnosis into a location- and culture-specific context that may allow for the differences in prevalence and presentations of disease at a given institution. "This data increases awareness about the challenges to providing medical care in LMICs and may inspire others to invest in developing the health care infrastructure that will bring lasting change to these regions," Dr. Hartung concluded.

location. It can also provide a

basis for 'reordering' a typical

Access the presentation, "CT without borders: comparison of CT diagnoses for abdominal pain in a US academic medical center and a teaching hospital in rural Kenya," (T1-SSER01-3) on demand at Meeting.RSNA.org.







- a. Internal scatter not blocked by apron
- b. Characteristic X-rays increase dose
- c. Apron will confuse AEC
- d. Bremsstrahlung dose increase
- [Answer on page 9.]

most common diagnoses, Hartung



Using AI To Secure Imaging Follow-Up

During a Wednesday session, Krishna Nallamshetty, MD, presented the results of a year-long study evaluating the impact of implementing an AI-enabled care coordination program to guide providers and patients during the imaging follow-up process.

By Mary Henderson

"For every 1 million diagnostic imaging exams performed, an estimated 135,000 are lost to follow-up," said Dr. Nallamshetty, professor and chair of radiology at the University of South Florida Morsani College of Medicine and chief medical officer of Radiology Partners. "The purpose of our project was to develop a care coordination program to make sure patients get the right study at the right time."

Dr. Nallamshetty said approximately 15 percent of imaging reports include followup recommendations. Of those, 66% omit details such as the imaging modality and timeframe required for accurate follow-up. Surprisingly, even when those details are included, the necessary imaging is completed only 30% of the time.

AI Patient Registry Was Integrated Into EMR

In the study, the researchers reviewed imaging studies performed within a 14-month period at a Radiology Partners site using an AI-based natural language processing algorithm to identify patients with incomplete follow-up imaging. Within the study period, the practice also began using another AI program that automatically presents the interpreting radiologist with evidencebased follow-up recommendations based on imaging findings.

Using an AI-driven patient registry to track the status of follow-up recommendations, the care coordination program sent automatic notifications to referring physicians to prompt action on follow-up imaging. If physicians didn't respond, the system sent a notification to the patient to contact their doctor to discuss the recommended follow-up. A team of navigators managed the care coordination program and reached out to physicians and patients directly when needed.

"We aren't telling referring providers how to manage their patients," he said.

We aren't telling referring providers how to manage their patients. Our goal is to be an umbrella that catches any recommendation that falls through the cracks and to empower patients to take care of themselves.

Krishna Nallamshetty, MD

"Our goal is to be an umbrella that catches any recommendation that falls through the cracks and to empower patients to take care of themselves."

A total of 2,971 studies were identified with significant incidental findings, of which 2,951 required follow-up. The most frequent follow-up recommendations were related to findings in an ovary, kidney or thyroid gland.

At the study's beginning, imaging follow-up recommendations were successfully completed at a rate of 43%. One year later, follow-up exams were successfully completed 91% of the time.

"Using AI programs and care navigators, we increased the number of patients receiving recommended follow-up imaging by nearly 50% or a 110% improvement from baseline," Dr. Nallamshetty said.

Implementation At Other Locations Shows Consistent Results

Following the pilot, the care coordination program has been implemented at additional Radiology Partners sites with consistent results.

"Radiology can provide significant value through a care coordination program by leveraging AI to provide the right study at



Nallamshetty

the right time," he said.

Access the session, "The Right Study at the Right Time - Expanding Radiology's Role in Care Coordination," (T3-SSNPM02-2) on demand at *Meeting.RSNA.org*.



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Rest easy and reserve your RSNA 2023 hotel room today.







R&E Foundation Board of Trustees Chair Vijay Rao, MD, (center) recognized the Foundation's valuable industry partners during the Corporate Donor Reception on Sunday



Grant recipients at the Corporate Donor Reception.



R&E Foundation donors enjoyed a festive reception Monday evening.



The Learning Center features thousands of posters, exhibits and quality improvement reports.



Bonnie Joe, MD, (center) celebrated with Foundation grant recipients.



On a brisk Tuesday morning, 441 runners completed the RSNA 5k Fun Run benefiting the R&E Foundation. Top finishers in the women's division were (left to right) Graciela Garrido (silver), Guggenberger Konstanze (gold) and Emily Ambinder (bronze). In the men's division, the medals went to (left to right) Erik Fredenberg (bronze), Francesco Mungai (gold) and Romain Labas (silver). Congratulations to all the runners!

KSNA 2022

Empowering **Patients** and Partners in Care



Fast 5 Speakers Define New Ways to Empower Patients

Topics at this year's Fast 5 sessions, moderated by Sherry S. Wang, MBBS, ranged from palliative care to AI, but all echoed the annual meeting's theme of empowering patients and partners in care.



Palliative Care in Radiology: More Than Meets the Eye

While not traditionally thought of as palliative care providers, radiologists are central to the process, according to Samuel Galgano, MD, section chief at the University of Alabama in Birmingham.

He pointed out that patients in palliative care often require repeated visits for imaging and/or procedures, giving radiologists ample opportunity to get to know them.

"There are three important concepts to keep in mind," Dr. Galgano said. "One, be present in the moment; two, be human with the patient; and three, be willing to be emotionally vulnerable. By doing these things you're really able to develop a personal relationship with these patients, which will reap great rewards."

As proof of this, Dr. Galgano shared an appreciative letter he received from a dying woman who had been his patient—a powerful statement on the importance of radiologists in palliative care.



Improve Patient Access to Radiologists - Empowering Patients and Increasing Patient-Radiologist Communication

With the football season entering its stretch run, Beth Vettiyil, MD, assistant professor at West Virginia University, began her talk with an anecdote from an NFL game.

She described how a player who had taken a hit to the abdomen was preparing to reenter the game. The team radiologist, a mentor of Dr. Vettiyil's, stopped the player to perform an ultrasound and discovered that he had suffered a splenic laceration that was bleeding into his abdomen, likely saving his life.

The story illustrates just one way that patients benefit from increased access to radiologists. Patients can gain access to radiologists virtually through portals where they can view their images, ask questions and discuss imaging with the interpreting radiologist.

"It would be a good public relations move for us to literally step from darkness into light," Dr. Vettiyil said. "We can bust the myth of radiologists hiding in hospital basements behind computer screens and show that we are irreplaceable."



Compensate Radiologists for Tumor Board Preparation Time

Tumor board conferences are a critical component of multidisciplinary patient care, but radiologists receive no compensation for the time they spend on them. That needs to change, according to Sanna Herwald, MD, PhD, radiology resident at Stanford Healthcare.

She outlined several reasons to establish compensation for radiologist participation in tumor boards. The work requires significant effort and expertise, she said, and contributes much to patient care. Additionally, the imaging interpretation represents an independent contribution and not just a summary of the original read.

"Participating in tumor boards is the right thing to do, regardless of compensation. But compensation will support radiologists doing the right thing so that tumor board participation becomes more widespread and sustainable," Dr. Herwald said.



Achieving Health Equity and Healthcare Systems Transformation through Meaningful Community Engagement and Upstream Partnerships

Radiologists should dedicate greater resources and time to engagement with the community they serve in order to address disparities in health care, said Peter Abraham, MD, resident physician in the Department of Radiology at the University of California in San Diego.

He cited several examples, such as providing transportation for patients and opening on more nights and weekends for people who cannot take time off from work.

"We must as radiologists leave the reading room to undergo a root cause analysis for these disparities," said Dr. Abraham. "Instead of solely thinking of radiology as a diagnostic process, we can increase our attention and resources toward thinking about the patient's journey, which improves patient engagement."



Bringing Patients to the AI Table

AI has been a hot topic in radiology for years now, but often left out of the discussion is an important stakeholder: the patient. Radiologists should take the lead in changing that tendency by assuming the role of a trusted ambassador engaging patients for ethical and effective use of AI tools, according to Ali S. Tejani, MD, from the University of Texas Southwestern Medical Center.

Patients often get information on AI in medicine from the media, he noted, which can lead to misapprehensions and distrust.

"We as radiologists are poised to take control of this conversation and to serve as stewards of this technology," Dr. Tejani said. "We have a responsibility, a mandate, to serve as trusted resources for the use of this technology."

HBV, Clinic Attendance Among Factors Affecting US LI-RADS Adherence at Safety Net Hospital

By Lynn Antonopoulos

A recent study of a patient population at an urban safety net hospital, showed that patients who had hepatitis B, and those who attend hepatology clinics, were more likely to adhere to follow-up recommendations for hepatocellular carcinoma (HCC) surveillance defined in the US Liver Imaging Reporting and Data System (US LI-RADS).

US LI-RADS offers a reporting framework for US screening and surveillance in patients at risk for developing HCC, such as those who suffer from chronic hepatitis B virus (HBV) infection and those with cirrhosis of the liver from any cause.

Because ongoing HCC surveillance guidelines can help clinicians monitor disease progression, and to ensure patients receive timely interventions, it is important to evaluate and understand factors that affect follow-up adherence.

"When we implemented US LI-RADS at our institution, we had a discussion between our radiology and hepatology departments to fine tune the guidelines to our urban, safety net health care system," said Hailey Choi, MD, assistant professor of clinical radiology in the Department of Radiology and Biomedical Imaging at the University of San Francisco (UCSF) and Zuckerberg San Francisco General Hospital. "With the clear recommendations put forth by US LI-RADS, we wondered whether they would lead to improved adherence to HCC surveillance in our patient population."

Dr. Choi and fellow researchers, including Mandana Khalili, MD, a hepatologist at UCSF, queried their institution's radiology report database and identified patients who underwent US screening between June 1, 2020, and Feb. 28, 2021. They included the initial US and first follow-up liver imaging and searched the electronic medical record for sociodemographic and clinical factors.

"We had to do some thorough chart review to collect all the socioeconomic and clinical features,"

said Dr. Choi, who also acknowledged the challeng-

es the team faced in defining adherence. "For the purposes of the study, we decided to use a strict definition that specified the modality of HCC surveillance, as well as a small window for the time interval between studies."

Choi

Optimizing Adherence Requires Multipronged Approach

The study included 924 patients, mean age of 60, with a race distribution of 57.7% Asian, 15.7% white, 13.7% Hispanic, 9.7% Black and 3.1% other. More than half were male (56.7%). The researchers defined



"Optimizing adherence to HCC surveillance requires a multipronged approach that considers all patient, provider and system factors including ease of surveillance methods, such as including blood-based methods that are currently under investigation."

Mus Eatem M.D.

adherence to recommendations as US follow-up in six months (+/- 1) for US-1, US follow-up in three to six months for US-2, and CT/ MRI in one month for US-3.

Dr. Choi reported that just 33.9% of the patients in the total population were adherent.

"Adherent patients were more likely to be female, non-English speaking, Asian, have stable housing and attend hepatology clinic," Dr. Choi said. "Adherent patients also had HBV, lower BMI, no smoking history, no substance or alcohol use and no cirrhosis."

She also noted that patients with a US LI-RADS visualization score of A, indicating optimal visibility, were more likely to be adherent. "Despite the effort we put into reporting clear next steps for each HCC surveillance ultrasound, we found that our overall screening adherence rate remained suboptimal," Dr. Choi said, adding that lower adherence may point to factors the group did not measure. "Optimizing adherence to HCC surveillance requires a multipronged approach that considers all patient, provider and system factors including ease of surveillance methods, such as including blood-based methods that are currently under investigation."

Access the presentation, "Sociodemographic, Clinical, and Imaging Factors Associated with Adherence to US LI-RADS Recommendations in An Underserved Patient Population at An Urban Safety Net Healthcare System," on demand at *Meeting*. *RSNA.org*.



New AI Model Could Detect Colorectal Cancer on APCT Scans

By Melissa Silverberg

AI could help detect colorectal cancer on a routine abdominopelvic computed tomography (APCT) scan without bowel preparation, a finding that could help detect more cancer cases at an earlier stage, according to a presentation on Tuesday.

Colorectal cancer is an easily overlooked intraabdominal malignancy on APCT when unsuspected.

"I started to think that if I could get any help from AI, the very first thing I would like to receive was the automatic detection of colorectal cancer," said Seung-Seob Kim, MD, clinical assistant professor, Department of Radiology and Research Institute of Radiological Science, Severance Hospital, Yonsei University College of Medicine in South Versee

of Medicine in South Korea. "As I searched for previous studies regarding the automatic detection of colorectal cancer, however, I was surprised that the majority of previous works on the computer-aided detection of colorectal cancer focused only on either optical colonoscopy videos or CT colonography images."

Routine APCT Could Use AI To Detect Cancer Sooner

The team developed an AI algorithm to automatically detect colorectal cancer on routine APCT scans without bowel preparation. The AI model was trained using APCTs from 2,662 patients diagnosed with colorectal cancer between 2010 and 2014. The algorithm was then validated internally (841 patients) and externally (442 patients) with datasets of consecutive patients with



or without colorectal cancer who underwent APCT and optical colonoscopy within a two-month interval at two independent tertiary hospitals between January and June 2018.

Results showed nearly zero false positive detections of cancer, showing the potential feasibility of AI-based algorithm for detecting colorectal cancer in APCT scanned without bowel preparation, Dr. Kim said. Among the 841

patients in the internal validation set, 92 patients were diagnosed with colorectal cancer by both the colonoscopy and APCT.

Radiologists Often Aren't Looking for Cancer on APCT Unless Indicated

The biggest difference between CT colonography and routine APCT lies in the purpose of the exam. CT colonography is performed primarily to detect colorectal polyp or cancer, whereas routine APCT is indicated for various clinical purposes not limited to colorectal cancer detection. That's why routine APCTs generally outnumber CT colonography exams.

The researchers hypothesized that if colorectal cancer can be automatically detected on routine unprepared APCT images, the clinical usefulness may be much greater than previously proposed.

"For example, let's imagine a patient coming to the emergency department due to acute symptoms such as high fever or unspecified abdominal pain. A clinician decides to perform a routine APCT, and a radiologist may want to try his or her best to find causes of fever or pain. In such a situation, colorectal cancer can be easily missed," Dr. Kim said. "If we had an AI algorithm capable of detecting unsuspected, colorectal cancer regardless of the reason the CT was originally performed, patients could be diagnosed with colorectal cancer earlier."

Dr. Kim said the AI model still needs to be prospectively validated and that the specificity of the AI model needs some improvement, but it could still be beneficial for radiologists in the future as they look to improve patient care and diagnose cancer sooner.

Access the presentation, "Development of The Artificial Intelligencebased Algorithm for Detecting Colorectal Cancer Using An Unprepared Abdominopelvic Computed Tomography" (T6-SSGI10-3) on demand at *Meeting.RSNA.org*.

Physics Quiz

[Question on page 4.]

a. Fetal dose comes from scatter inside the

mother that the apron cannot block. It enters in the mother's head and a very tiny amount scatter inside the mother will reach the fetus.



Part of CT images from a 72-year-old female patient who was histologically diagnosed with rectal adenocarcinoma are shown. Among eleven slices with labeled ground truth boxes, AI predicted seven bounding boxes contiguously with inner overlapping, which were therefore regarded as one single lesion. The sum of predicted probabilities of the seven boxes was 4.7464. The average DSC was 0.7947, which was calculated by dividing the sum of DSCs by seven, the total number of slices of the AI-predicted lesion. As average DSC was greater than 0.3, this lesion was regarded as true positivity.

Helping Radiologic Technologists Support Transgender Patients With Imaging Needs

By Mary Henderson

To help minimize the health disparities experienced by the transgender and gender diverse populations, Evelyn Carroll, *MD*, provided radiologic technologists with strategies for creating a more comfortable and inclusive environment.

In her Tuesday afternoon talk sponsored by the American Society of Radiologic

Technologists, Dr. Carroll said only 33% of radiography technologist programs include content on imaging transgender people, even though one in 200 adults in the U.S. selfidentify as transgender.

"The transgender population is currently about 1.4 million people," said Dr. Carroll, a breast imaging fellow at NYU Langone. "So you'll be seeing these patients in your practice."

Communication Important to Ensure Positive Imaging Room Interactions

According to a 2019 *American Journal of Roentgenology* survey, 71% of transgender respondents reported at least one negative encounter with an imaging facility and 32% had to instruct staff on transgender persons. Difficulties most often occurred with image-guided procedures, ultrasound and mammography.

Dr. Carroll said the first and easiest way to make transgender patients feel comfortable is by using the appropriate terminology

"Gender identity is not the same as sexual orientation or gender expression," she explained. "Sex is assigned or designated at birth, while gender identity is an individual's innate sense of gender, which may or may not align with one's sex. Gender expression includes clothing, behavior, speech and other visible

speech and other visible aspects of someone's gender. "Transgender is an adjective not a

"Transgender is an adjective, not a noun," she added. "It's an umbrella term for people whose gender identity and or gender expression differs from what is typically associated with the sex they were assigned at birth."

She explained that gender transition is

a process in which an individual modifies their physical characteristics and expression to align with their gender identity. But not all transgender individuals transition in the same way.

"It may involve social, legal and medical steps, but it varies from person to person," she said.

Dr. Carroll said radiology departments should record the patient's sex designated at birth, gender identification and preferred name and pronouns in the patient's EMR and on intake forms.

"Working together as a team, we can provide a positive imaging experience that can improve patient outcomes and the relationship between healthcare providers and the transgender community we serve."

Evelyn Carroll, MD

"If you make a mistake, apologize briefly, correct yourself and move on," she said. "Don't belabor the point."

Imaging Appearance of Common Gender-Affirming Therapy and Surgery Results

Dr. Carroll also showed examples of imaging sequela that radiology staff can expect to see in patients undergoing gender-affirming medical and surgical interventions. She advised technologists to thoroughly explain imaging procedures to transgender patients and to avoid asking invasive questions that aren't relevant to the exam.

Other ways to create a culture of acceptance for gender-diverse individuals in the radiology department include posting a policy of non-discrimination, providing singleuser restrooms and changing rooms for all genders, and offering gender chaperones for sensitive exams.

"Working together as a team," Dr. Carroll said, "radiology departments can provide a positive experience for transgender patients."



"Imaging Time-Out" Helps Reduce Repeat CTs in Transferred Trauma Patients

By Lynn Antonopoulos

A multidisciplinary timeout may benefit transferred trauma patients by preventing a substantial number of unnecessary repeat CT studies.

According to results presented in a Tuesday session, a brief, intentional delay, or "time-out," can allow time for receiving trauma service and imaging team personnel to evaluate potential technical, procedural, cultural and clinical reasons why imaging should, or should not, be repeated.

"It's useful to draw attention to opportunities to reduce repeat imaging in an effort



Berger

to limit patient exposure to potentially harmful radiation and intravenous iodinated contrast," said Ferco H. Berger, MD, EDER, associate professor in the Department of Medical Imaging at University of Toronto.

Dr. Berger is also an associate scientist, deputy chief of operations and head of the Emergency & Trauma Radiology Division of the Precision Diagnostics & Therapeutics Program at Sunnybrook Health Sciences Center.

"Looking at prior CTs from other centers—if available and time allows—will help maximize efficiency and will help tailor the CT protocol performed at the receiving hospital," Dr. Berger said. "This could lead to better pickup rates of injury in patients and potentially reduce time to treatment."

Local Factors Affect Implementation of Time-Out Protocol

Building on prior experience, Dr. Berger and colleagues conducted a two-phase study evaluating local factors contributing to repeat CTs in transferred trauma patients arriving at his institution's Level 1 trauma center.

In Phase 1, the researchers observed the standard CT ordering process for 318





"It's important to understand that local factors sometimes differ, but modern IT solutions like PACS and electronic communication can help radiologists working in different areas implement a similar protocol."

transferred patients and noted reasons for repeating the CTs, such as unavailable or inadequate imaging or a lack of confidence in the outside report.

For Phase 2, the intervention phase which included 98 patients, the receiving trauma team evaluated patients clinically, while in-house radiologists reviewed the outside CT images to determine if they met local standards.

"The teams subsequently discussed imaging and clinical findings during an 'imaging time-out,' which limited further CTs to only the exams that were still considered to be indicated," Dr. Berger said.

Dr. Berger and his team tracked CTs that might have been performed without the imaging time-out and documented all CTs by body region and protocol.

Between Phases 1 and 2, the team identified a 29% reduction in the number of CT

CONTINUED FROM PAGE 1

Looking Beyond the Image to Imagine a Better World for Everyone

human perspective—including emotion and especially empathy—to solve problems and create new products, services and solutions.

According to Dr. Omary, this same concept can be used by health care to design a better patient experience and exceed patient expectations.

"By understanding patient needs, we can clarify the problems we are trying to solve and transform the maze that is health care into amazing health care," he said.

From there, the team can brainstorm ideas, prototype, and test out potential solutions.

"This iterative process becomes a partnership between patients and the health care team," Dr. Omary added. "As we learn our way towards success, each interaction becomes an experience in co-design."

Bringing Radiology into the Community

Dr. Omary also stressed that reinventing patient care shouldn't be confined to one's own hospital or imaging center.

"Radiologists can promote the health and wellbeing of citizens outside our clinical practices by helping design better communities," he said.

As Dr. Omary explained, communitycentered design includes spreading knowledge, know-how, and can-do spirit at nursing homes and schools or via the local media.

"We must be active citizens, supporting the arts, serving on the boards of local non-profits, working to improve access for essential public services, and promoting public spaces—all of which not only help create healthier communities, but also Ferco H. Berger, MD, EDER

studies performed and a 24% reduction in estimated radiation exposure. In Phase 2, they prevented 45% of potential additional CTs and 43% of potential radiation exposure.

Dr. Berger acknowledged challenges in applying an imaging time-out protocol and said local factors at the receiving institution affect if and how it might be implemented. He said that a new common reporting room in his institution's ED, and a new team of overnight in-house emergency and trauma radiologists who deal with all trauma imaging, allowed for reader facilitation of the imaging time-out.

"It's important to understand that local factors sometimes differ, but modern IT solutions like PACS and electronic communication can help radiologists working in different areas implement a similar protocol," Dr. Berger said.

increases the points of contact citizens have with health care professionals," Dr. Omary said.

This civic mindset can be expanded to encompass the health of the planet.

"Unfortunately, there's not a vaccination against climate change," Dr. Omary said. "Addressing the climate crisis requires a redesign of nearly everything we do, both professionally and personally."

That includes simple actions like powering down monitors and reducing travel to establishing green teams within one's own practice.

"And let's not forget that sustainability can be a powerful tool for promoting equity and justice," Dr. Omary added.

What the Future Holds

So, what does the future hold for radiologists? According to Dr. Omary, the answer is "a vast amount of change."

"As we look to radiology in 2030 and beyond, we should prepare ourselves for career opportunities that do not yet exist in a health care system that does not yet exist," he said.

Regardless of what the future brings, by linking the practices of patient-, communityand planet-centered design, radiologists will be well-positioned to have a big impact on designing a better future for everyone.

"For radiology, it's not just an opportunity, it's our responsibility," Dr. Omary concluded.

Access the presentation, "Designing Radiology for Patients, Communities, & the Planet," (T4-PL04) on demand at *Meeting.RSNA.org*.



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