RSNA 2021 PRESS KIT

VISIT THE RSNA NEWSROOM AT
RSNA.org/Press21

107th Scientific Assembly and Annual Meeting
November 28 to December 2

RSNA® 2021
REDEFINING RADIOLOGY

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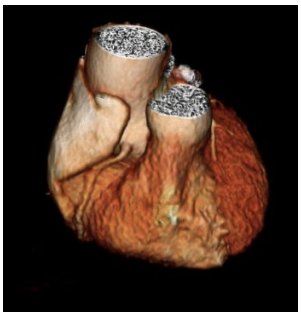
Contact the RSNA media team for help with your medical science and healthcare stories.



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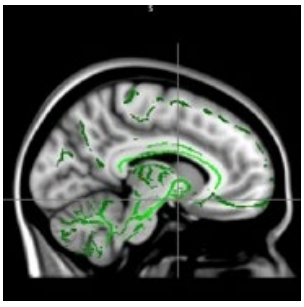


WHY:
Our team can provide you with the experts, the context and the background you need for medical stories related to radiology.

WHO:
Our network of renowned medical experts is ready to provide journalists with authoritative background, commentary and quotes.

WHAT:
Standards, such as mammography, CT, MRI, PET, ultrasound and imaging-guided therapies. Other technologies and treatments, artificial intelligence, 3D printing and advanced visualization in medicine.

HOW:
Annual Meeting — The RSNA Scientific Assembly and Annual Meeting typically hosts more than 50,000 attendees and offers approximately 4,000 research papers, posters and education exhibits. Our onsite newsroom provides press kits, images, access to radiology experts and media workspace. Visit the RSNA online newsroom: *RSNA.org/press21*.

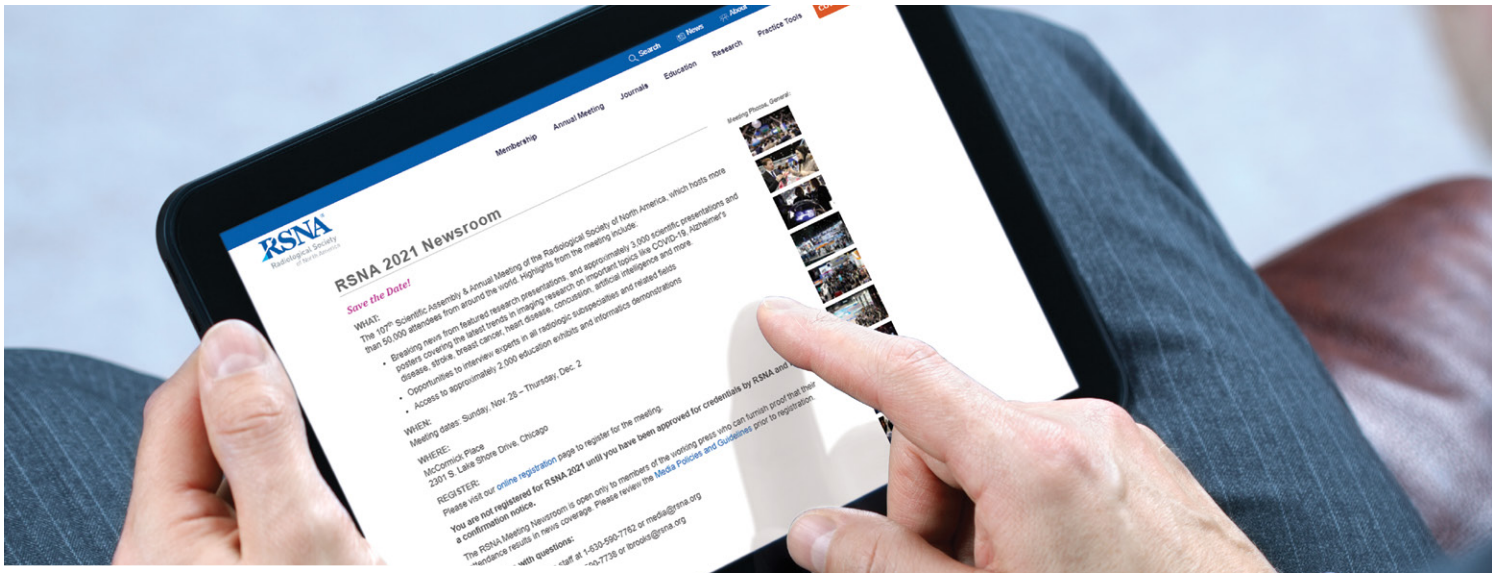
Publications — News releases and highlights from RSNA's peer-reviewed scientific journals *Radiology*, *Radiology: Artificial Intelligence*, *Radiology: Cardiothoracic Imaging* and *Radiology: Imaging Cancer* are distributed regularly to RSNA media subscribers. Visit *RSNA.org* for access to news releases, abstracts from *Radiology* and articles from *RSNA News*.

RadiologyInfo.org — Our patient information website offers detailed information about procedures and treatments, diseases and conditions, and screening and wellness written for the general public in English and Spanish.

Images & B-Roll — RSNA has radiologic images for a variety of conditions. RSNA's video library features radiologic procedures and treatments to help television and web producers create timely, realistic medical segments.

Public Service Announcements (PSAs) — RSNA offers scripted and pre-recorded radio PSAs on important issues, such as breast cancer and lung cancer awareness.

RSNA is an association of radiologists, radiation oncologists, medical physicists and related scientists, promoting excellence in patient care and health care delivery through education, research and technologic innovation.



LOOKING FOR ADDITIONAL INFORMATION?

The RSNA 2021 Online Newsroom Provides:

- High-resolution images
- Videos
- Presenter interviews
- Scientific abstracts
- Additional meeting announcements
- Exhibitor news center

All in one convenient location: ***RSNA.org/Press21***

Media@RSNA.org

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RSNA®
Radiological Society
of North America

November 28, 2021

To: RSNA 2021 Media Attendees

From: Susan D. John, M.D.
Chair, RSNA Public Information Committee

Welcome to the 107th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA), the world's premier annual radiologic meeting. More than 3,600 scientific research presentations and education exhibits will cover the latest developments in radiology and related imaging technologies dealing with diagnosis, intervention and therapy.

RSNA 2021 offers you access to an abundance of compelling medical stories and the latest in artificial intelligence (AI) research and technology.

THE KIT:

The RSNA Board and Public Information Committee are pleased to present the media with 12 news releases on some of the hottest topics from the scientific program. The meeting also provides facilitated access to many of the world's leading radiologic researchers and hundreds of story ideas for now and later.

Here are the topics you'll find in this kit.

- Popular Blood Thinners May Lead to Brain Bleeding after Head Injury
- Large International Study Reveals Spectrum of COVID-19 Brain Complications
- Cooled RFA Relieves Pain after Knee Replacement
- CT Uncovers Bone Disease in Tyrannosaurus Rex Jaw
- COVID-19 Linked to Heart Inflammation in College Athletes
- Breast MRI Shows IUDs Have Systemic Effects
- Multiple Concussions Can Disrupt Brain Connectivity in Teens
- Cancer Patients Overlooked in COVID-19 Vaccine Rollout
- COVID-19 During Pregnancy Doesn't Harm Baby's Brain
- MRI Reveals Altered Brain Structure in Fetuses Exposed to Alcohol
- Autism Changes Brain's White Matter over Time
- COVID-19 Fallout May Lead to More Cancer Deaths

You will also find a list of additional story ideas from other scientific papers and posters being presented at RSNA 2021 that are of interest to both general and specialized audiences.

I encourage you to attend plenary sessions to hear some of the most influential leaders, physicians and researchers speak on topics important to physicians and their patients. On Sunday, RSNA President Mary C. Mahoney, M.D., will deliver her President's Address: "Redefining Radiology: The Road Ahead."

Dr. Mahoney will be followed by popular lecturer, patient experience expert and author, James Merlino, M.D. Additional thought-provoking talks by leaders and visionaries in radiology will be given throughout the week by James Brink, M.D., Michele Johnson, M.D., Christine Porath, Ph.D., Iris Gibbs, M.D., and others.

RSNA 2021 will offer more than 50 scientific presentations, lectures, courses and exhibits on diversity, equity and inclusion throughout the week. Courses include “Moving Beyond the Gender Binary: Exploring the Gender Spectrum and Diversity in Patient Care, Education, and Research,” “Inclusion as a Key to Success of Diversity Efforts” and “Trailblazers in Health Equity: Lessons Learned & Leadership Opportunities to Advance Health Equity in Radiology and Beyond.”

The popular Fast 5 Session on Monday afternoon features five speakers taking five minutes each to present creative ideas and emerging possibilities. The innovative, non-clinical topics were selected by popular vote. Wednesday offers an exciting radiology game show: “What’s Your Emergency? Life in the STAT Lane.”

The Technical Exhibition, featuring the expansive AI Showcase and Theater, provides attendees the opportunity to see all the innovative products and services being offered by nearly 500 exhibitors.

The Imaging AI in Practice demo is an interactive exhibit spotlighting new AI technologies and integration standards needed to embed AI into the radiology workflow.

Stop by the Innovation Theater, where you can be the first to hear about leading edge technology and product launches or recharge in the Virtual Exhibitor Lounge, an area highlighting Virtual Only exhibitors.

Be sure to take some time to enjoy the entertainment at the Discovery Theater in Lakeside Center.

For more information about any of these events and sessions, including locations and times, please consult the meeting program, call 1-312-791-6610 or visit the Newsroom staff.

I appreciate your interest in the field of radiology and hope you have a wonderful experience at RSNA 2021!

Policies and Guidelines for News Media Covering the RSNA 2021 Meeting

The Radiological Society of North America is pleased to welcome the world press to its 107th Scientific Assembly and Annual Meeting.

GENERAL INFORMATION The 107th Scientific Assembly and Annual Meeting, Sunday, Nov. 28, to Thursday, Dec. 2, 2021, at McCormick Place in Chicago, is an international forum of peer-reviewed research, state-of-the-art technology and education for radiologists, radiation oncologists, medical physicists and allied scientists. It is a meeting place for medical imaging leaders worldwide. As such, it provides a host of news opportunities.

NEWSROOM LOCATION The RSNA Newsroom is located in the South Building, Level 1, S105. Newsroom facilities include a work area, interview cubicles and food service.

NEWSROOM HOURS Saturday, Nov. 27, 3 - 5 p.m.; Sunday – Wednesday, Nov. 28 – Dec. 1, 8 a.m. - 6 p.m.; Thursday, Dec. 2, 8 a.m. – 2 p.m.

MEDIA ELIGIBILITY Press badges are available only to *working press* who can show evidence that their attendance results in original coverage of the RSNA Scientific Assembly and Annual Meeting in print, broadcast or recognized Internet news media. RSNA does not issue press badges to: publishers or a publication's advertising, marketing, public relations or sales representatives; publishers, editors or reporters from manufacturers' house organs or promotional publications; public relations staff of exhibitors or educational institutions; or other individuals who are not actually reporting on the meeting.

To obtain a press badge, identification certifying that you are a working member of the print, online or broadcast news media and/or a letter from an editor stating that you are on assignment to cover the RSNA Scientific Assembly and Annual Meeting is required. Business cards or membership cards from communications or writers' organizations are not sufficient to establish eligibility. If RSNA issues you a press badge, you must not participate in sales or development of ads, products for sale or CME products. Working press may NOT also register as exhibitors. RSNA reserves the right to make final determination of media eligibility.

PROOF OF COVERAGE If you attended a past RSNA meeting as media, you will be asked to furnish a copy of an article or report resulting from that assignment to be credentialed as press at a subsequent RSNA meeting. If a news outlet sends a staff member or freelancer, the outlet must furnish proof of resulting original coverage in order to send a representative in subsequent years. RSNA does not bear the responsibility for locating coverage.

ADVANCE REGISTRATION Advance registration is *strongly encouraged*. Members of the media interested in attending should visit our online registration page to access registration materials.

ONSITE MEDIA REGISTRATION COVID-19 vaccine validation is required before obtaining media credentials at the Registration desk. Vaccine verification and meeting registration for media are located in the Grand Ballroom (S100) of the South Building. A business card or other proof of identity may be required to obtain credentials. For media registering onsite, proof of eligibility will be required. After receiving their credentials at the Registration desk, media should proceed directly to the Newsroom. Television, video crews and photographers covering the meeting are required to check in immediately at the Newsroom each day and must be accompanied by a Newsroom representative when shooting inside McCormick Place. Shooting schedules should be provided by Nov. 1 to ensure Newsroom staff availability.

EXHIBITOR MEDIA INFORMATION RSNA rules prohibit news conferences at hotels or other locations away from the meeting site during meeting hours. Journalists invited to such events are asked to notify RSNA Newsroom staff. As a convenience for journalists, news releases and other information from exhibitors will be displayed in a special area of the Newsroom. Exhibitor representatives are not allowed to distribute press materials outside the news conference facility or Newsroom. It is inappropriate to provide any exhibitor with the news material of other exhibitors. Exhibitor representatives are not allowed in the Newsroom unless accompanied by a journalist who intends to conduct an interview. RSNA advises journalists that it neither reviews for accuracy nor endorses exhibitor news materials. A list of exhibitor press conferences will be posted in the Newsroom.

SCIENTIFIC PAPERS & VISUALS In order to help maintain their eligibility for peer-reviewed journal publication, scientific papers and posters may not be available to media. Reprinting of scientific abstracts or posters is strictly prohibited. Journalists who want to use slides, graphs and other visuals to illustrate coverage must have the presenter's permission. Each presenter has been notified that publication or broadcast of illustrations, tables or other portions of his or her work may adversely affect eligibility for publication in peer-reviewed journals.

CME CREDIT The Radiological Society of North America is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. The Society sponsors this annual scientific assembly, and as an accredited sponsor, designates this educational activity for CME credit. Because RSNA is the sole sponsor of its assembly, and because the ability to offer CME credit for an educational activity rests on integral participation in the planning, implementation and evaluation of that activity, only the Society can designate this meeting or any portion of it for CME credit. To retain its status as an accredited provider, RSNA cannot and does not designate news or promotional stories issued from its meeting for CME credit, nor does it allow press to do so.

MEDIA ACCESS Media may access scientific presentations, plenary sessions, scientific and educational exhibits and technical exhibits during posted hours. Private areas and events, including but not limited to Board and staff offices, physician lounges, Board and committee meetings, and other scheduled private events, are reserved for RSNA representatives and designated professional attendees. RSNA retains final authority in all issues of access. Questions regarding media access should be directed to Newsroom staff.

INTERVIEWS Cubicles will be available in the Newsroom for media to conduct private interviews. Interviews may also be conducted in open, public areas, provided that traffic flow is not impeded. Interview opportunities with RSNA Board members and other Society leaders are extremely limited and must be arranged through RSNA media relations staff at 1-630-590-7762 or *media@rsna.org* prior to October 1. No interviews with RSNA Board members will be available during the annual meeting.

VIDEO/PHOTO REGULATIONS Special audio/video requests, including arrangements for taped interviews, must be submitted in writing to RSNA prior to October 1. Please email audio/video requests to Linda Brooks at *media@rsna.org*.

Scientific Presentations/Plenary Sessions. Television and video crews and photographers must be accompanied by a Newsroom representative when shooting in scientific sessions. Availability of photo escorts is limited. Requests for photo escorts should be emailed along with a planned shooting schedule to Linda Brooks at *media@rsna.org* by November 15, to ensure Newsroom staff availability. As a courtesy to presenters, television and video crews and photographers must obtain the permission of the speaker and moderator before shooting presentations. Television and video crews may not use artificial lights during presentations. Lights may be used only before the session begins or after it concludes. Flash photography is not allowed during scientific presentations and plenary sessions.

Lakeside Learning Center. Crews and photographers are asked not to interrupt physicians and others who are studying education exhibits and scientific posters. Physicians can be interviewed in open, public areas, provided that traffic flow is not impeded, or as they leave the Lakeside Learning Center. Flash photography is not allowed during author presentations.

Scientific Slides or Posters. Photographic or video reproduction of scientific presentation slides or scientific posters for publication without permission of the presenter is strictly prohibited. Presenters have been notified that publication or broadcast of illustrations, tables or other portions of their work may adversely affect eligibility for publication in peer-reviewed journals. Media are permitted to capture images of slides and posters without the presenter's permission as background for reporting accuracy only.

Technical Exhibits. Technical exhibits cannot be videotaped or photographed without the expressed advance consent of the exhibitor. Crews must not enter or walk through the exhibit area with cameras rolling. Arrangements for taping establishing shots of wider areas of the show floor should be made through the Newsroom. Videotaping and photographing of technical exhibits by media must occur during posted exhibit hours. Interviews conducted with exhibitors must be used strictly for news reporting purposes without promotional consideration. Photo escorts are not required on the exhibit floor. However, media wishing to capture images or video on the exhibit floor must provide RSNA Newsroom staff with a planned shooting schedule in advance and a list of interviews conducted before the Newsroom closes each day. Advance shooting schedules should be sent to Linda Brooks via email at *media@rsna.org*.

USE OF AUDIO RECORDING EQUIPMENT Media may not affix taping devices to the speaker, lectern, speaker's table, microphone or McCormick Place power source during scientific or plenary presentations. Audio recordings are to be used for reportorial notes only.

ELECTRONIC EQUIPMENT/POWER SOURCE Media using video cameras, lights, audio recording equipment, computers or any other electronic equipment must provide their own battery-operated power source. Outside of the Newsroom, media may not plug into the McCormick Place power system.

PHOTOCOPYING A photocopier will be available in the Newsroom for the convenience of reporters. Arrangements should be made with the Newsroom receptionist.

EMAIL DISTRIBUTION LIST Press wishing to receive email notifications about upcoming news from future RSNA meetings can opt-in to the distribution list. The form will be available at the Newsroom front desk.

HEALTH & SAFETY RSNA is working closely with McCormick Place, the City of Chicago and Choose Chicago to provide the safest possible meeting environment. McCormick Place and the City of Chicago are working with the CDC and state/local health authorities. McCormick Place adheres to the recommendations set forth in the U.S. EPA's Emerging Pathogen Policy regarding cleaning disinfectants effective against the coronavirus. The convention center is one of the first in the U.S. to agree to independent, third-party verification of its cleaning protocols from Global Biorisk Advisory Council (GBAC). To ensure the highest possible air quality, building engineers regularly verify compliance with ASHRAE, standards including increased frequency of filter replacement.

RSNA will require proof of U.S. Food & Drug Administration (FDA) or World Health Organization (WHO) approved COVID-19 vaccination from all RSNA 2021 meeting attendees, staff and exhibitor personnel prior to admittance into McCormick Place. RSNA will require RSNA 2021 meeting attendees to wear masks when inside McCormick Place and encourages RSNA 2021 attendees to wear masks in *all* public indoor spaces, except when eating or drinking. All RSNA meeting attendees will be subject to whatever health and safety protocols are in place at the time of the meeting, based on the recommendations of the CDC and state/local health authorities. Learn more about RSNA 2021 Health and Safety policies.

Failure to follow any of the policies outlined above will result in forfeiture of media credentials for RSNA 2021 and denial of credentials for subsequent RSNA meetings.

QUESTIONS CAN BE DIRECTED TO RSNA Media Relations: 1-630-590-7762 or media@rsna.org.

RSNA 2021 Press Kit
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Early Releases

Meeting Week

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Embargoed for release on Monday, Nov. 22, 2021, at 5:00 a.m. ET

Breast MRI Shows IUDs Have Systemic Effects

AT A GLANCE

- **Intrauterine contraceptive devices (IUDs) used by millions of women appear to have systemic effects on the body like those of hormone replacement therapy.**
- **Researchers found that women with an IUD in place often show significantly higher background enhancement on breast MRI.**
- **While IUDs appear to be safe, women with unexplained side effects should talk to their doctors and consider other types of contraception.**

CHICAGO – Intrauterine contraceptive devices (IUDs) appear to have systemic effects on the body like those of hormone replacement therapy, according to a breast MRI study being presented next week at the annual meeting of the Radiological Society of North America (RSNA).

"It has been claimed that IUDs have a purely local effect on the uterus," said Luisa Huck, M.D., radiology resident in the Department of Diagnostic and Interventional Radiology at RWTH Aachen University in Aachen, Germany. "Our study results suggest that this is not true."

Levonorgestrel-releasing IUDs (LNG-IUDs) are used by tens of millions of women worldwide. They work by releasing a small amount of hormone into the uterus. Because the hormone is released directly into the uterus, the amount in the bloodstream is lower than with other hormonal methods. In theory, this limited area of release means that any side effects would be confined to the region around the IUD. However, emerging evidence suggests that LNG-IUDs can be associated with systemic side effects similar to those of systemic hormonal medication.

Christiane Kuhl, M.D., a leading breast cancer researcher and chief of the Department of Radiology at RWTH Aachen University noticed that women with a hormonal IUD in place often show higher background parenchymal enhancement on contrast-enhanced breast MRI. Background parenchymal enhancement —the initial enhancement of normal breast tissue—is a sensitive marker of hormone levels.

The observation prompted Dr. Huck to investigate the association between LNG-IUD use and background parenchymal enhancement in breast MRI and explore possible systemic effects of LNG-IUDs.

Using the hospital database, Dr. Huck and colleagues identified premenopausal women without a personal history of breast cancer or hormone or antihormone intake, who had undergone standardized dynamic contrast-enhanced breast MRI for screening at least twice.

"By comparing the level of contrast enhancement in the same women with and without the IUD in place, a change in systemic hormone levels due to the IUD could be traced," Dr. Huck said.

Half of the women in the study underwent the first breast MRI exam before IUD placement and the second with the IUD in place. The other half had their first MRI with IUD placement and the second MRI after IUD removal. This enabled the researchers to avoid age-related effects on background parenchymal enhancement that might affect interpretation of the results.

Analysis showed that IUD use led to significant increase of enhancement in 23 of 48 patients, indicating that there are hormonal effects caused by IUD use that occur well beyond the uterus.

"The results suggest that IUDs do not have a purely local effect on the uterus – but affect the entire body," Dr. Huck said.

She added that is plausible that IUDs can have side effects similar to that of other hormonal treatments.

"Use of an IUD leads to hormonal stimulation of the breast that is detectable by MRI," Dr. Huck said. "The increased enhancement also has implications for the diagnostic accuracy of breast MRI in women using hormonal IUDs."

While the results point to a systemic hormonal effect for women with IUDs in place, it does not mean that the contraceptives are unsafe to use, Dr. Huck emphasized.

"IUDs appear to be a very safe means of contraception and are generally well tolerated," she said. "However, if women with an IUD in place experience unexplainable side effects, they should talk to their doctor and consider using other types of contraception."

Co-authors are Daniel Truhn, M.D., Caroline Wilpert, M.D., Eloisa Zanderigo, M.D., Vanessa Raaff, M.D., Ebba Dethlefsen, M.D., and Maike Bode, M.D.

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Note: Copies of RSNA 2021 news releases and electronic images will be available online at *RSNA.org/press21*.

RSNA is an association of radiologists, radiation oncologists, medical physicists and related scientists promoting excellence in patient care and health care delivery through education, research and technologic innovation. The Society is based in Oak Brook, Illinois. (*RSNA.org*)

Editor's note: The data in these releases may differ from those in the published abstract and those actually presented at the meeting, as researchers continue to update their data right up until the meeting. To ensure you are using the most up-to-date information, please call the RSNA Newsroom at 1-312-791-6610.

For patient-friendly information on breast MRI, visit *RadiologyInfo.org*.

RSNA Radiological Society of North America

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Embargoed for release on Monday, Nov.22, 2021, at 5:00 a.m. ET

Multiple Concussions Can Disrupt Brain Connectivity in Teens

AT A GLANCE

- **In a new functional MRI study, adolescents and young adults with post-concussive symptoms who suffered three to five concussions showed disruption in the brain's default mode network.**
- **Changes or disruptions in the default mode network have been linked to a wide number of diseases and mental disorders.**
- **No difference was found in the connectivity of the network in patients who had experienced only one or two concussions.**

CHICAGO – Adolescents and young adults with post-concussive symptoms who suffered three to five concussions showed disruption in the default mode network, an interconnected network of brain regions involved in wakeful rest and internal thoughts. Results of study using a special MRI technique called resting-state functional MRI (fMRI) are being presented next week at the annual meeting of the Radiological Society of North America (RSNA).

"In the last 20 years, the public awareness of concussion and its long-term effects on the brain has increased and so has research into the topic," said Thomas Johnson, M.D., Ph.D., a resident physician in neurology at the University of Rochester Medical Center in Rochester, New York. "But there has been scant research using resting state fMRI at the intersection of the adolescent/young adult population and athletes with multiple concussions."

The default mode network is a functional network of brain regions that becomes active when an individual is not involved in a specific mental task but is instead daydreaming, thinking about the future or recalling memories. Brain structures included in the network are the medial prefrontal cortex, posterior cingulate cortex, inferior parietal lobule, temporal cortex and hippocampal formation. Changes or disruptions in the network have been linked to a wide number of diseases and mental disorders.

"I think of the default mode network as the idle state of the brain, similar to an idling engine," Dr. Johnson said.

The study group included 142 concussion patients (67 female, mean age 18.2 years) and age- and sex-matched controls (12 female, mean age 20.7). The patients were enrolled in a concussion clinic at the University of Rochester Medical Center for post-concussion syndrome, which includes persistent symptoms such as headaches, dizziness, fatigue and irritability.

All patients and control group participants were scanned using resting-state fMRI while doing nothing but keeping their eyes open during the imaging process. The fMRI allowed researchers to evaluate the default mode network by identifying which areas of the brain activated during imaging.

"When certain areas of the brain get active, blood flow increases in those areas," Dr. Johnson said. "Using a data analysis technique, we're able to create a map for each individual in the study that shows how activity was distributed in space and over time."

Compared to controls, the researchers found no difference in the connectivity in the default mode network in patients who had experienced one or two concussions. In patients who had three to five concussions, the maps detected a disruption in the default mode network.

"We're seeing evidence of a two-tier disease," he said. "Experiencing several concussions is a very different pathology."

Dr. Johnson said the study results give clues as to the threshold at which concussions cause effects, which in turn may help inform protocols for playing contact sports following a concussion.

"Suffering three to five concussions has the potential for long-term disruption of cognitive processes," he said. "We need to determine our tolerance for concussions. When do we say no more contact sports? We need more evidence to set some limits for people."

In the future, Dr. Johnson said he would like to conduct follow-up research on his study group by scanning the patients with resting-state fMRI in five years to determine whether disruptions in the default mode network remain.

"Trying to determine the cognitive impacts of concussion over the long-term is tricky to tease out," Dr. Johnson said. "Typically, we use standard paper tests. Using fMRI is an advanced mathematical way of looking at the networks in the brain."

In the meantime, he said resting-state fMRI may be helpful as a marker of progress and means of monitoring recovery in patients with prolonged post-concussion syndrome.

"The current standard for evaluating concussive patients is based on symptoms," Dr. Johnson said. "I envision this technique being used to help inform and guide the clinical course of patients."

Co-authors are Arun Venkataraman, Ph.D., Jianhui Zhong, Ph.D., and Edward P. Lin, M.D.

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For patient-friendly information on fMRI, visit *RadiologyInfo.org*.

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Embargoed for release on Tuesday, Nov. 23, 2021, at 5:00 a.m. ET

Cooled RFA Relieves Pain after Knee Replacement

AT A GLANCE

- **Roughly 15-30% of people who get knee replacement surgery continue to experience pain and stiffness in the knee.**
- **A minimally invasive procedure called cooled radiofrequency ablation offers long-term relief for patients who experience chronic and debilitating pain after knee replacement surgery.**
- **The results showed that the patients experienced significant reduction of pain and stiffness and dramatic improvement in quality of life.**

CHICAGO – A minimally invasive ablation procedure offers long-term relief for patients who experience chronic and debilitating pain after knee replacement surgery, according to a study being presented next week at the annual meeting of the Radiological Society of North America (RSNA).

Arthritic knee pain is a major cause of disability around the world. More than 14 million Americans suffer from knee arthritis. Many go on to have a severe form of the disease, creating intense pain and lack of mobility.

A growing number of these patients are opting for total knee arthroplasty, or replacement, in the hopes of regaining mobility and having a better quality of life. Unfortunately, 15 to 30% of people who get a knee replacement continue to experience pain and stiffness in the knee. They can go through surgery again, but there is no guarantee that the pain will not return.

"A lot of patients don't achieve any resolution of pain," said study lead author Felix Gonzalez, M.D., assistant professor in the Division of Musculoskeletal Imaging of the Department of Radiology and Imaging Sciences at Emory University School of Medicine in Atlanta, Georgia. "It's a big problem, and up till now, there weren't any other options."

A procedure called cooled radiofrequency ablation (C-RFA) offers hope for these patients. The procedure involves insertion of an introducer needle around the knee under local anesthesia targeting specific nerve locations. A probe is then guided through the introducers. The tip of the probe imparts a low voltage current (radiofrequency) to the deep sensory nerves around the knee. Water circulating through the system allows for a greater dissipation of heat from the tip of the probe.

"With a larger propagating heat wave, you can account for the differences in nerve anatomy from patient to patient because of a larger treatment zone," Dr. Gonzalez said. "Treating a larger zone increases the effectiveness of the procedure."

In previous studies, Dr. Gonzalez's group showed that C-RFA provides lasting pain relief for people with knee, shoulder and hip arthritis. The new study focused on 21 patients who were experiencing persistent chronic pain after total knee replacement, without underlying hardware complications. The patients had all failed conservative care. They filled out clinically validated questionnaires to assess pain severity, stiffness, functional activities of daily living and use of pain medication before and after the procedure. Follow-up outcome scores were collected up to one year after the C-RFA procedure.

Questionnaire results showed that the patients experienced, on average, a statistically significant improvement in quality of life. Both pain and stiffness scores improved dramatically. No major complications were encountered, and no patients required repeat treatment, surgical revision or other intervention.

"This procedure can have a huge impact in patients who have gone through major surgery and are still suffering pain that is very debilitating," Dr. Gonzalez said.

The procedure's long-term relief gives it a major advantage over cortisone injections, which offer on average only about three months of pain relief in the treatment of knee arthritis.

"It's very encouraging that up to a year out these patients have such significant pain relief and a better quality of life," Dr. Gonzalez said. "The hope is that in that period of time, the patient can become more mobile and increase their activity. Even if pain comes back, we predict that it won't come back with the same intensity as before."

Since it is minimally invasive, the procedure can easily be repeated, according to Dr. Gonzalez. It can also reduce or eliminate the use of opioid pain relievers, which carry significant risks associated with dependency.

"We hope that this procedure will become a standard of treatment for pain in this setting," Dr. Gonzalez said.

Co-authors are Janice M. Newsome, M.D., Nima Kokabi, M.D., Zachary Bercu, M.D., Mircea Cristescu, M.D., M.B.A., Adam Singer, M.D., Philip Wong, M.D., Mohammed Loya, M.D., Fiza Khan, D.O., and Andrew Tran.

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Autism Changes Brain's White Matter over Time

AT A GLANCE

- **Researchers found significant changes in the microstructure of the brain's white matter in adolescents and young adults with autism spectrum disorder.**
- **For the study, clinical and DTI data from 583 patients of four distinct patient populations were analyzed: infants, toddlers, adolescents and young adults.**
- **Impaired connectivity between brain hemispheres was seen in adolescent and young adult ASD patients, but not in infants and toddlers.**

CHICAGO – Researchers at Yale University analyzing specialized MRI exams found significant changes in the microstructure of the brain's white matter in adolescents and young adults with autism spectrum disorder (ASD) compared to a control group, according to research being presented next week at the annual meeting of the Radiological Society of North America (RSNA). The changes were most pronounced in the region that facilitates communication between the two hemispheres of the brain.

"One in 68 children in the U.S. is affected by ASD, but high variety in symptom manifestation and severity make it hard to recognize the condition early and monitor treatment response," said Clara Weber, postgraduate research fellow at Yale University School of Medicine. "We aim to find neuroimaging biomarkers that can potentially facilitate diagnosis and therapy planning."

Researchers reviewed diffusion tensor imaging (DTI) brain scans from a large dataset of patients between the age of six months and 50 years. DTI is an MRI technique that measures connectivity in the brain by detecting how water moves along its white matter tracts. Water molecules diffuse differently through the brain, depending on the integrity, architecture and presence of barriers in tissue.

"If you think of gray matter as the computer, white matter is like the cables," Weber said. "DTI helps us assess how connected and intact those cables are."

For the study, clinical and DTI data from 583 patients from four existing studies of distinct patient populations were analyzed: infants—34 with ASD and 121 controls (34% female, median age 7 months); toddlers—57 with ASD and 45 controls (27% female, median age 32 months); adolescents—106 with ASD and 124 controls (49% female, median age 158 months); and young adults—67 with ASD and 29 controls (1% female, median age 230 months).

"One of the strengths of our study is that we looked at a wide range of age groups, not just school-aged children," Weber said.

To assess the influences of age and ASD diagnosis on white matter microstructure, the research team created fractional anisotropy, mean diffusivity and radial diffusivity maps using data from the four studies.

Fractional anisotropy is the extent water diffusion is restricted to just one direction. A value of zero means that diffusion is unrestricted in all directions. A value of one means that diffusion occurs only in one direction. Mean diffusivity is the overall mobility of water molecules, which reflects how densely cells are packed together. Radial diffusivity is the extent water diffuses perpendicular to a white matter tract.

"When white matter integrity is disrupted, we see more water diffusing perpendicularly, which translates to a higher radial diffusivity," Weber said.

The key finding of the analysis was reduced fractional anisotropy within the anterior/middle tracts of the corpus callosum in adolescent and young adult ASD patients compared to individuals in the control group. The corpus callosum is a thick bundle of nerve fibers that connects and allows the two sides of the brain to communicate. Corresponding increases in ASD-related mean diffusivity and radial diffusivity were found in young adults.

"In adolescents, we saw a significant influence of autism," Weber said. "In adults, the effect was even more pronounced. Our results support the idea of impaired brain connectivity in autism, especially in tracts that connect both hemispheres."

No reduction in fractional anisotropy was observed in the same tracts in toddlers and infants with ASD compared to controls.

The researchers hope the findings can help improve early diagnosis of ASD and provide potential objective biomarkers to monitor treatment response.

"We need to find more objective biomarkers for the disorder that can be applied in clinical practice," Weber said.

Co-authors are Robert T. Constable, Ph.D., Sam Payabvash, M.D., Nigel S. Bamford, M.D., Dustin Scheinost, Ph.D., Stefan P. Haider, and Evelyn M.R. Lake, Ph.D.

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COVID-19 Fallout May Lead to More Cancer Deaths

AT A GLANCE

- **Significant decreases in CT imaging for cancer during the COVID-19 pandemic raise the possibility of more advanced cancers and poorer outcomes for patients in the future.**
- **During the peak of the pandemic, CT for cancer screening fell 82%, while CT for initial workup, active cancer and cancer surveillance also saw significant declines.**
- **The study findings underscore the vulnerable position of cancer patients in the pandemic.**

CHICAGO – Significant decreases in CT imaging for cancer persisted even after the peak of the COVID-19 pandemic in 2020, delaying diagnosis and treatment and raising the possibility of more advanced cancers and poorer outcomes for patients in the future, according to a study being presented next week at the annual meeting of the Radiological Society of North America (RSNA).

Numerous studies have shown COVID-19's severe impact on U.S. health care, as the pandemic filled hospitals and reduced imaging capacity during its peak of March to early May 2020. Few studies, however, have explored the pandemic's lingering effects on cancer imaging.

For the new study, researchers from Massachusetts General Hospital (MGH) and Harvard Medical School in Boston compared cancer-related CT exams during three periods of 2020: the pre-COVID phase (January to mid-March), peak COVID (mid-March to May) and post-COVID peak (May to mid-November). They looked at CT volume and the type of care being delivered through imaging.

As expected, CT volumes dropped significantly during the COVID peak. CT for cancer screening fell a whopping 82%, while CT for initial workup, active cancer and cancer surveillance also saw significant declines. Volumes for cancer screening and initial workup failed to recover in the post-COVID peak period, remaining down 11.7% and 20%, respectively, from their pre-COVID numbers.

"The decline during the COVID peak was expected because of stay-at-home orders and the number of imaging departments that shut down as a precaution," said study senior author Marc Succi, M.D., an emergency radiologist at MGH and executive director of the MESH Incubator, an in-house innovation and entrepreneurship center. "Once normal operations resumed, you'd expect that these patients were being imaged in an equitable way, but, in fact, it turns out that they weren't."

The persistence of the decline in CTs for cancer screening and initial workup likely means higher numbers of patients with advanced cancers in the future.

"We expect that we're going to see increased morbidity and mortality due to the fact that these patients weren't able to get their routine imaging," Dr. Succi said. "You can also surmise that they probably didn't have their routine elective follow-up appointments as well."

CT imaging declines particularly affected the outpatient setting, as utilization shifted away from large academic centers toward community hospitals and the Emergency Department (ED). Cancer-related CTs at the ED actually increased in the post-COVID peak period.

"The ED remains a place in the American healthcare system where people can get help, no matter the situation," said study author Ottavia Zattra, a fourth-year medical student at Harvard Medical School. "From a systems perspective, however, the best care in terms of prevention is administered in the outpatient setting."

The possibility of being exposed to COVID-19 likely made many cancer patients reluctant to go to large hospitals and primary care centers, the researchers said. As a result, they may have put off a visit until symptoms grew too significant to ignore.

"When initial diagnostic imaging is done in the emergency room, that suggests that people were having symptoms due to cancer for months and months, and they weren't checking in with their primary care providers," Zattra said. "Ultimately, the symptoms got so bad they couldn't handle it at home."

The study findings underscore the vulnerable position of cancer patients in the pandemic.

"We need better awareness and outreach toward the oncologic patient population," Dr. Succi said. "For example, if a patient is due for a yearly lung cancer screening with a CT scan, we need to make sure they're aware that they can and should get that screening regardless of COVID. Delays in screening are inevitably going to lead to delayed diagnoses and increased morbidity."

The imaging utilization trends support the diversion of more resources to community centers to take care of patients who might be avoiding large academic hospitals. The trends also highlight the importance of a robust ED imaging service with overnight coverage in both academic medical centers and private practices.

"Even the smaller centers should think about having 24/7 ED imaging coverage to meet the needs of these patients who are being diverted," Dr. Succi said.

The researchers hope to do a follow-up study to track CT imaging volumes through 2021. They also want to look at the role that factors like race, language and income have played in access to cancer imaging during the pandemic.

Co-authors are James Brink, M.D., Sanjay Saini, M.D., Michael Lev, M.D., Michael S. Gee, M.D., Ph.D., and Min Lang, M.D.

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COVID-19 Linked to Heart Inflammation in College Athletes

AT A GLANCE

- **A significant proportion of Big Ten college athletes with COVID-19 develop myocarditis, a potentially dangerous inflammation of the heart muscle.**
- **An alarmingly high proportion of the myocarditis cases (54%) were found in athletes with no clinical symptoms Only cardiac MRI identified the problem.**
- **Myocarditis, which can affect the heart's rhythm and lead to scarring of the heart muscle, has been linked as many as 20% of sudden deaths in young athletes.**

CHICAGO – A small but significant percentage of college athletes with COVID-19 develop myocarditis, a potentially dangerous inflammation of the heart muscle, that can only be seen on cardiac MRI, according to a study being presented today at the annual meeting of the Radiological Society of North America (RSNA).

Myocarditis, which typically occurs as a result of a bacterial or viral infection, can affect the heart's rhythm and ability to pump and often leaves behind lasting damage in the form of scarring to the heart muscle. It has been linked to as many as 20% of sudden deaths in young athletes. The COVID-19 pandemic raised concerns over an increased incidence of the condition in student-athletes.

For the new study, clinicians at schools in the highly competitive Big Ten athletic conference collaborated to collect data on the frequency of myocarditis in student-athletes recovering from COVID-19 infection. Conference officials had required all athletes who had COVID-19 to get a series of cardiac tests before returning to play, providing a unique opportunity for researchers to collect data on the athletes' cardiac status.

Jean Jeudy, M.D., professor and radiologist at the University of Maryland School of Medicine in Baltimore, serves as the cardiac MRI core leader for the Big Ten Cardiac Registry. This registry oversaw the collection of all the data from the individual schools of the Big Ten conference.

Dr. Jeudy reviewed the results of 1,597 cardiac MRI exams collected at the 13 participating schools. There was no selection bias for cardiac MRI, as all COVID-positive athletes underwent a complete cardiac battery of tests including cardiac MRI, echocardiogram, ECG and blood tests, as well as a complete medical history.

Thirty-seven of the athletes, or 2.3%, were diagnosed with COVID-19 myocarditis, a percentage on par with the incidence of myocarditis in the general population. However, an alarmingly high proportion of the myocarditis cases were found in athletes with no clinical symptoms. Twenty of the patients with COVID-19 myocarditis (54%) had neither cardiac symptoms nor cardiac testing abnormalities. Only cardiac MRI identified the problem.

"Testing patients for clinical symptoms of myocarditis only captured a small percentage of all patients who had myocardial inflammation," Dr. Jeudy said. "Cardiac MRI for all athletes yielded a 7.4-fold increase in detection."

The implications of post-COVID-19 myocardial injury detected by cardiac MRI are still unknown.

"The main issue is the presence of persistent inflammation and/or myocardial scar," Dr. Jeudy said. "Each of these can be an underlying foundation for additional damage and increased risk of arrhythmia."

As part of the study, Dr. Jeudy and colleagues continue to add to the Big Ten Cardiac Registry to gain more understanding.

"We still don't know the long-term effects," Dr. Jeudy said. "Some athletes had issues that resolved within a month, but we also have athletes with continued abnormalities on their MRI as a result of their initial injury and scarring. There are a lot of chronic issues with COVID-19 that we need to know more about, and hopefully this registry can be one of the major parts of getting that information."

The registry will allow researchers to look beyond the presence of abnormalities and study things like changes in exercise function over time.

"These are young patients, and the effects of myocardial inflammation can potentially impact their lives more significantly than in older patients," Dr. Jeudy said. "That's why we really want to push forward and continue to collect this data."

Obstacles to widespread use of cardiac MRI in college athletes are significant and include cost and lack of access to advanced MRI capability at many centers. But, as the new study shows, cardiac MRI adds considerable value to cardiac testing.

"The role of cardiac MRI as a screening tool in this population needs to be explored," Dr. Jeudy said. "The reality is that there are a small percentage of cases where we know the athletes have an increased risk for sudden death, and using cardiac MRI will increase the number of players who are identified."

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Large International Study Reveals Spectrum of COVID-19 Brain Complications

AT A GLANCE

- **Central nervous system disorders are important complications in COVID-19, affecting more than one in 100 hospitalized patients.**
- **Researchers looked at almost 40,000 cases of hospitalized COVID-19 positive patients from seven U.S. and four western European university hospitals.**
- **There were 442 acute neuroimaging findings that were most likely associated with the viral infection, the most common being ischemic stroke.**

CHICAGO – The largest multi-institutional international study to date on brain complications of COVID-19 has found that approximately one in 100 patients hospitalized with COVID-19 will likely develop complications of the central nervous system. These can include stroke, hemorrhage, and other potentially fatal complications. The study is being presented tomorrow at the annual meeting of the Radiological Society of North America (RSNA).

"Much has been written about the overall pulmonary problems related to COVID-19, but we do not often talk about the other organs that can be affected," said study lead author Scott H. Faro, M.D., FASFNR, professor of radiology and neurology and director of the Division of Neuroradiology/Head & Neck Imaging at Thomas Jefferson University in Philadelphia. "Our study shows that central nervous system complications represent a significant cause of morbidity and mortality in this devastating pandemic."

Dr. Faro initiated the study after discovering that existing literature on central nervous system complications in hospitalized COVID-19 infected patients was based on a relatively small number of cases.

To derive a more complete picture, he and his colleagues analyzed nearly 40,000 cases of hospitalized COVID-19 positive patients from seven U.S. and four western European university hospitals. The patients had been admitted between September 2019 and June 2020. Their average age was 66 years old, and there were twice as many men as women.

The most common cause of admission was confusion and altered mental status, followed by fever. Many of the patients had comorbidities like hypertension, cardiac disease and diabetes.

There were 442 acute neuroimaging findings that were most likely associated with the viral infection. The overall incidence of central nervous system complications in this large patient group was 1.2%.

"Of all the inpatients who had imaging such as MRI or a CT scan of brain, the exam was positive approximately 10% of the time," Dr. Faro said. "The incidence of 1.2% means that a little more than one in 100 patients admitted to the hospital with COVID-19 are going to have a brain problem of some sort."

The most common complication was ischemic stroke, with an incidence of 6.2%, followed by intracranial hemorrhage (3.72%) and encephalitis (0.47%), an inflammation of the brain.

The researchers also discovered a small percentage of unusual findings, such as acute disseminating encephalomyelitis, an inflammation of the brain and spinal cord, and posterior reversible encephalopathy syndrome, a syndrome that mimics many of the symptoms of a stroke.

"It is important to know an accurate incidence of all the major central nervous system complications," Dr. Faro said. "There should probably be a low threshold to order brain imaging for patients with COVID-19."

Co-authors are Arichena Manmatharayan, M.B.B.S., Benjamin Leiby, Ph.D., Neelu Jain, M.D., Feroze B. Mohamed, Ph.D., Kiran S. Talekar, M.D., Amish Doshi, M.D., M.B.B.S., Ivan Jambor, M.D., Ph.D., Chang Sanders, M.D., Mark Finkelstein, M.D., Stephane Kremer, M.D., Ph.D., Francois Lercy, M.D., Brenden Lindgren, D.O., Nathalia M. Figueidero, M.D., Varun Sethi, M.D., Simonetta Gerevini, M.D., Angela Napolitano, M.D., Rajan Jain, M.D., Siddhanth Dogra, B.S., Jay Pillai, M.D., Dan Ryan, M.D., Rolf Jager, FRCR, Francesco Carletti, M.D., Ph.D., Asim Mian, M.D., Artem Kaliev, Priya Anand, M.D., Courtney Takahashi, M.D., AK Murat, M.D., Rivka Colen, M.D., and Francesca Pizzini, M.D., Ph.D.

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Popular Blood Thinners May Lead to Brain Bleeding after Head Injury

AT A GLANCE

- **Patients taking older types of blood thinners or taking aspirin while on blood thinners may be at a higher risk of delayed brain bleeding and death following head trauma.**
- **Researchers analyzed records of 1,046 patients taking blood thinners who suffered head trauma, including 470 patients who were taking an older type of medication.**
- **Twenty patients experienced delayed hemorrhage, three patients—all of whom were taking older blood thinner types—died.**

CHICAGO – A three-year study of more than 1,000 patients found that the risk of delayed intracranial hemorrhage and death following head trauma was significantly higher for adults taking older blood thinning medications including clopidogrel (Plavix) and warfarin (Coumadin), according to research being presented today at the annual meeting of the Radiological Society of North America (RSNA). Taking aspirin concurrently with *any* blood thinner may increase the risk of delayed hemorrhage.

Intracranial hemorrhage occurs when blood vessels within the brain rupture, releasing blood into the brain tissue. In a delayed traumatic intracranial hemorrhage, bleeding in the brain occurs after the initial trauma, usually within 48 hours, after an initial negative head CT.

High blood pressure, head injury and the use of blood thinners are known causes of intracranial hemorrhage. As the population ages, the prevalence of patients taking blood thinners is increasing.

"The incidence of delayed posttraumatic intracranial hemorrhage in patients on different types of blood thinners with and without the addition of aspirin is not well established," said Warren Chang, M.D., neuroradiologist and director of research at the Imaging Institute of the Allegheny Health Network in Pennsylvania. "This is an active area of investigation, especially as novel blood thinners become more widely adopted."

Adults taking blood thinners who suffer head trauma typically undergo CT imaging of the brain. However, the standard of care beyond initial imaging is not well defined. Some hospitals admit patients for observation and repeat CT imaging, while others may discharge a patient who does not have intracranial hemorrhage and is in stable condition.

"Different hospital networks have different strategies for repeat imaging of these patients," Dr. Chang said.

In the retrospective analysis, researchers reviewed the records of all patients taking blood thinners who suffered head trauma and underwent CT imaging in the Allegheny Health Network between January 1, 2017, and January 1, 2020. Patients were included in the study if initial CT imaging was negative for intracranial

hemorrhage and repeat imaging was subsequently performed. The final study group of 1,046 patients included 547 women and 499 men with an average age of 77.5.

Within the study group, 576 patients were taking one of the newer blood thinners, such as apixiban (Eliquis), rivaroxaban (Xarelto) and dabigatran (Pradaxa), and 470 patients were taking warfarin, clopidogrel or another older medication.

Overall, there was 1.91% incidence (20 patients) of delayed hemorrhage and 0.3% mortality rate (3 patients). All deaths in the study group were among patients in the warfarin/clopidogrel/older blood thinner group.

Among the total study group, 345 patients were taking both blood thinners and aspirin. Of the 20 patients who suffered a delayed hemorrhage, 15 were taking an older type of blood thinner, and nine of the 15 were also taking aspirin.

“The rate of delayed hemorrhage was higher in patients taking older blood thinners compared to novel drugs, and significantly higher in patients taking aspirin in addition to the older medications,” Dr. Chang said.

Among the five patients taking novel blood thinners who experienced a delayed hemorrhage, four were also taking aspirin.

“Given the high volume of our trauma patients taking aspirin and anticoagulants, this study will help to guide our care of closed head injury patients in emergency medicine and support efforts to use imaging resources appropriately,” said Thomas Campbell, M.D., M.P.H., the system chair for Emergency Medicine of the Allegheny Health Network.

Based on the findings, the study’s authors recommend follow-up CT for patients who had no initial intracranial hemorrhage from head trauma who are taking one of the older blood thinners and for patients who take any blood thinner along with aspirin. Unless there are external signs of trauma, follow-up CT is unnecessary for patients who only take one of the newer blood thinners and do not take aspirin.

“Taking any blood thinner concurrently with aspirin significantly increased the risk of delayed hemorrhage, while taking one of the novel medications without aspirin significantly reduced the risk,” Dr. Chang said.

“This study illustrates how innovative imaging can drive optimal patient care. In the end, I believe the recommendations of this work will save many lives,” said Bethany Casagranda, D.O., chair of the Imaging Institute of the Allegheny Health Network.

Additional co-authors are Michael P. Spearman, M.D., Michael F. Goldberg, M.D., Christian P. Wanamaker, M.D., Ph.D., Charles Q. Li, M.D., Laura Eisenmenger, M.D., Albert Sohn, M.D., Tyson Tragon, M.D., Matthew Kulzer, M.D., Brian Weston, M.D., and J. Danielle Yin, M.D.

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COVID-19 During Pregnancy Doesn't Harm Baby's Brain

AT A GLANCE

- **Mild to moderate COVID-19 in pregnant women appears to have no effect on the brain of the developing fetus.**
- **Researchers used fetal MRI to study patients who contracted COVID-19 during pregnancy.**
- **There were no findings indicative of infection of the fetal brain, and brain development was age-appropriate in all fetuses.**

CHICAGO – COVID-19 of mild to moderate severity in pregnant women appears to have no effect on the brain of the developing fetus, according to a study being presented today at the annual meeting of the Radiological Society of North America (RSNA).

Two years into the pandemic, there is evidence that pregnant women are more vulnerable to the SARS-CoV-2 virus that causes COVID-19. However, little is known about the possible consequences for an unborn child if the mother is infected during pregnancy. The likelihood and impact of a vertical transmission, meaning the passage of the virus from mother to the fetus, remains unclear.

"Women infected with SARS-CoV-2 during pregnancy are concerned that the virus may affect the development of their unborn child, as is the case with some other viral infections," said study senior author Sophia Stöcklein, M.D., from the Department of Radiology at Ludwig Maximilian University of Munich, in Germany. "So far, although there are a few reports of vertical transmission to the fetus, the exact risk and impact remain largely unclear. The aim of our study was to fill this gap in knowledge regarding the impact of a maternal SARS-CoV-2 infection on fetal brain development."

Dr. Stöcklein and colleagues used fetal MRI to study 33 patients with COVID-19 infection during pregnancy. The patients were roughly 28 weeks into their pregnancies, on average, with symptom onset occurring at a mean of just over 18 weeks into the pregnancy. The most common maternal symptoms were loss or a reduced sense of smell and taste, dry cough, fever and shortness of breath.

Two board-certified radiologists with several years of experience in fetal MRI evaluated the scans. They found that the brain development in the assessed areas was age-appropriate in all fetuses. There were no findings indicative of infection of the fetal brain.

"In our study, there was no evidence that a maternal SARS-CoV-2 infection has any effect on the brain development of the unborn child," Dr. Stöcklein said. "This fact should help to reassure affected parents."

Dr. Stöcklein cautioned that only mothers with mild to moderate symptoms and without hospitalization were included in the study.

"Since the impact of severe infection on brain development in the fetus has not been conclusively determined, active protection against SARS-CoV-2 infection during pregnancy remains important," she said.

As part of that protection, the Centers for Disease Control and Prevention (CDC) recommends vaccination for all people ages 12 and older, including women who are pregnant or thinking about getting pregnant. The CDC notes that the vaccine can protect against severe illness.

"So far, vaccination is the most promising protection against COVID-19," Dr. Stöcklein said. "Any potential side effects are manageable, even in pregnant women. Therefore, despite the encouraging results of our study, pregnant women should strongly consider vaccination."

The researchers will be following the patients over the next five years, including detailed neonatal assessment, as well as assessment of neurological development.

Co-authors are Olaf Dietrich, Ph.D., Andreas Flemmer, M.D., Julien Dinkel, M.D., Nicola Fink, Vanessa Koliogiannis, M.D., Christoph Hubener, M.D., Tobias Prester, Maria Delius, M.D., M.P.H., Thomas Kolben, and Sven Mahner, M.D.

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For patient-friendly information on MRI during pregnancy, visit *RadiologyInfo.org*.

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Embargoed for release on Tuesday, Nov. 30, 2021, at 12 p.m. ET

Bruce G. Haffty, M.D., Named President of the RSNA Board

CHICAGO – Bruce G. Haffty, M.D., was named president of the Radiological Society of North America (RSNA) Board of Directors today at the Society's annual meeting in Chicago.

Dr. Haffty is associate vice chancellor, Cancer Programs, at Rutgers Biomedical and Health Sciences. He also serves as professor and chairman in the Department of Radiation Oncology at Rutgers Robert Wood Johnson Medical School, Rutgers Cancer Institute of New Jersey and Rutgers New Jersey Medical School.

Dr. Haffty completed his medical school and residency training at Yale University School of Medicine in 1988 and spent the next 18 years specializing in breast, head and neck cancers in Yale's Department of Therapeutic Radiology. He served on the faculty at Yale from 1988 through 2005. Dr. Haffty was promoted to professor of therapeutic radiology in 2000, served as residency program director from 1992 through 2004, and as vice chairman and clinical director from 2002 to 2005.

As president, Dr. Haffty will focus on expanding RSNA's profile in the broader medical community, collaborating with other major medical societies and governmental agencies in promoting the value of the radiological sciences to patients and partners in health care delivery.

"I am humbled and honored to serve as RSNA president for the coming year," Dr. Haffty said. "As a radiation oncologist, I appreciate the value of imaging to my daily practice and routinely witness the importance patients and their multidisciplinary care team place on imaging in their journey through the diagnosis, treatment and follow-up of their cancer care. This next year will revolve around the value and empowerment of imaging to our patients and collaborating physicians, and I look forward to a productive and exciting year."

Dr. Haffty has authored or co-authored 50 books, book chapters and theses, more than 400 peer-reviewed articles and numerous editorials, commentaries and letters. Dr. Haffty is a leader in national clinical trials and is currently co-investigator on several national clinical trials through the NRG Oncology and Alliance for Clinical Trials in Oncology cooperative groups. He has given many scientific research presentations nationally and internationally, and has been an invited lecturer or visiting professor at nearly 180 institutions and meetings worldwide.

At Rutgers' Robert Wood Johnson Medical School, New Jersey Medical School and Cancer Institute of New Jersey, Dr. Haffty spearheaded the expansion of the radiation oncology program and developed

residency programs in radiation oncology and medical physics—the only such programs in the state of New Jersey.

Through his extensive work with the American Society for Radiation Oncology, Dr. Haffty served as the founding president of the Association of Directors of Radiation Oncology Programs (ADROP) in 2000, providing tools and resources to advance the quality of residency training and education in radiation oncology. He served as ADROP president from 2000 to 2003.

Dr. Haffty's research on new methods of delivering radiation therapy for breast cancer has focused on molecular and genetic factors as they relate to radiation resistance and outcomes in patients. His *Lancet*-published research on BRCA1 and BRCA2 gene mutations in conservatively managed breast cancer documented high rates of second primary ipsilateral breast cancers (cancers affecting the same treated breast) and has impacted clinical practice. Dr. Haffty's research has created unique factors associated with outcomes, paving the way for molecular targeted therapies in combination with radiation.

In addition to editing the comprehensive *Handbook of Radiation Oncology*, Dr. Haffty has served on numerous editorial boards, such as *The Cancer Journal*, *International Journal Radiation Oncology - Biology - Physics*, *Clinical Cancer Research, Journal of Clinical Oncology*, *Cancer Therapeutics*, *Women's Oncology Review*, *Radiation Oncology Investigations*, *Oncology Reports* and *Breast Diseases: A Year Book Quarterly*. Dr. Haffty also serves as a frequent reviewer for *The Journal of the National Cancer Institute*, *Cancer*, *Lancet*, and others. He currently serves as deputy editor of the *Journal of Clinical Oncology*. Dr. Haffty served on the *RSNA News* editorial board from 2009 to 2015.

Dr. Haffty has volunteered with RSNA in a number of roles, including as third vice president from 2013 to 2014 and as co-chair of the Bolstering Oncoradiologic and Oncoradiotherapeutic Skills for Tomorrow (BOOST) Program. At RSNA 2009, he delivered the Annual Oration in Radiation Oncology, "Genetic Factors in the Diagnostic Imaging and Radiotherapeutic Management of Breast Cancer." Dr. Haffty was named RSNA Outstanding Educator in 2013. He has served on the RSNA Board of Directors since 2014.

In addition to having a busy clinical practice, Dr. Haffty has served in many other leadership positions. He has been on numerous national committees related to research and education in breast cancer and radiation oncology. He served as president of the American Board of Radiology, American Society for Radiation Oncology and the American Radium Society.

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Embargoed for release on Tuesday, Nov. 30, 2021, at 12 p.m. ET

Matthew A. Mauro, M.D., Reappointed Chair of the RSNA Board

CHICAGO – Matthew A. Mauro, M.D., was reappointed as chair of the Radiological Society of North America (RSNA) Board of Directors today at the Society's annual meeting.

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

Dr. Mauro received his medical degree from Cornell University Medical College in 1977. He completed his residency training in 1980 at the UNC School of Medicine and was chief resident during his last year. Between 1980 and 1982, 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.

As RSNA chair, Dr. Mauro will continue to lead the board in advancing patient care through educational programs, supporting scientific discovery through the Research & Education (R&E) Foundation, and providing the premier forum for scientific dissemination.

"It is my honor to be serving as chair of the RSNA Board of Directors for a second term," Dr. Mauro said. "For the coming year, my goals are to continue to implement our governance changes, increase our diversity, and support RSNA's mission by fostering advances in the radiological sciences."

A prolific researcher, Dr. Mauro has published over 150 journal articles and numerous book chapters. He has co-authored 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 R&E Foundation Public Relations Committee and the Corporate Giving Subcommittee, and as an R&E Foundation grant reviewer. 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 from 1996 to 2000, serving as president during his last year. With SIR, he served on the Executive Council from 1994 to 2000 and again from 2002 to 2006, the Scientific Program Committee from 2000 to 2002, the Steering Committee World Conference on Interventional Oncology in 2005, and many other positions and committees between 1992 and 2006.

Dr. Mauro has served on a number of editorial boards, including *Clinical Imaging*, *Applied Radiology*, *American Journal of Roentgenology*, and *Seminars in Interventional Radiology*, among others. He has been a manuscript reviewer for several journals, including *RadioGraphics*, *Journal of 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, and he has served with many societies and organizations. 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 from 2003 to 2009. At the American Board of Radiology (ABR), Dr. Mauro served on the Board of Governors from 2015 to 2018 and on the Executive Committee from 2013 to 2015. He was trustee from 2006 to 2015.

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

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Embargoed for release on Wednesday, Dec. 1, 2021, at 5:00 a.m. ET

CT Uncovers Bone Disease in Tyrannosaurus Rex Jaw

AT A GLANCE

- **Researchers identified bone disease in the fossilized jaw of a T. rex using a nondestructive imaging approach called dual-energy CT (DECT).**
- **The left dentary of the jaw showed thickening and a mass that extended to the root of one of the teeth and evidence suggesting an infection of the bone.**
- **DECT could have significant applications in paleontology, as an alternative to destructive fossil assessment methods.**

CHICAGO – Researchers in Germany identified bone disease in the fossilized jaw of a Tyrannosaurus rex using a CT-based, nondestructive imaging approach, according to a study being presented today at the annual meeting of the Radiological Society of North America (RSNA). The imaging method could have significant applications in paleontology, researchers said, as an alternative to fossil assessment methods that involve the destruction of samples.

A familiar subject of today's popular culture, the T. rex was a massive, carnivorous dinosaur that roamed what is now the western United States millions of years ago. In 2010, a commercial paleontologist working in Carter County, Montana, discovered one of the most complete T. rex skeletons ever found. The fossilized skeleton dates back approximately 68 million years to the Late Cretaceous period. It was sold to an investment banker, who dubbed it "Tristan Otto" before loaning it out to the Museum für Naturkunde Berlin in Germany. It is one of only two original T. rex skeletons in Europe.

Charlie Hamm, M.D., a radiologist at Charité University Hospital in Berlin, and his colleagues recently had an opportunity to investigate a portion of the Tristan Otto's lower left jaw. While previous fossil studies have mostly relied on invasive sampling and analysis, Dr. Hamm and colleagues used a noninvasive approach with a clinical CT scanner and a technique called dual-energy computed tomography (DECT). DECT deploys X-rays at two different energy levels to provide information about tissue composition and disease processes not possible with single-energy CT.

"We hypothesized that DECT could potentially allow for quantitative noninvasive element-based material decomposition and thereby help paleontologists in characterizing unique fossils," Dr. Hamm said.

The CT technique enabled the researchers to overcome the difficulties of scanning a large portion of Tristan Otto's lower jaw called the left dentary. The piece's high density was particularly challenging, as CT imaging quality is known to suffer from artifacts, or misrepresentations of tissue structures, when looking at very dense objects.

"We needed to adjust the CT scanner's tube current and voltage in order to minimize artifacts and improve image quality," Dr. Hamm said.

On visual inspection and CT imaging, the left dentary showed thickening and a mass on its surface that extended to the root of one of the teeth. DECT detected a significant accumulation of the element fluorine in the mass, a finding associated with areas of decreased bone density. The mass and fluorine accumulation supported the diagnosis of tumefactive osteomyelitis, an infection of the bone.

"While this is a proof-of-concept study, noninvasive DECT imaging that provides structural and molecular information on unique fossil objects has the potential to address an unmet need in paleontology, avoiding defragmentation or destruction," Dr. Hamm said.

"The DECT approach has promise in other paleontological applications, such as age determination and differentiation of actual bone from replicas," added Oliver Hampe, Ph.D., senior scientist and vertebrate paleontologist from the Museum für Naturkunde Berlin. "The experimental design, including the use of a clinical CT scanner, will allow for broad applications."

Dr. Hamm and his colleagues also collaborated with paleontologists from the Chicago's Field Museum and colleagues from the Richard and Loan Hill Department of Biomedical Engineering at the University of Illinois at Chicago to perform a CT analysis of the world-famous T. rex "Sue" that is housed in the museum.

"With every project, our collaborative network grew and evolved into a truly multidisciplinary group of experts in geology, mineralogy, paleontology and radiology, emphasizing the potential and relevance of the results to different scientific fields," Dr. Hamm said.

Additional co-authors are Patrick Asbach, M.D., Torsten Diekhoff, M.D., and Lynn Savic, M.D.

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For patient-friendly information on CT, visit *RadiologyInfo.org*.

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Embargoed for release on Wednesday, Dec. 1, 2021, at 5:00 a.m. ET

MRI Reveals Altered Brain Structure in Fetuses Exposed to Alcohol

AT A GLANCE

- **Brain MRI revealed significant changes in the brain structure of fetuses exposed to alcohol compared to healthy controls.**
- **An increased volume in the corpus collosum and a decreased volume in the periventricular zone were seen in the brain images of the alcohol-exposed fetuses.**
- **This is the first time that a prenatal imaging study has been able to quantify these early alcohol-associated changes.**

CHICAGO – In the first MRI-based study to investigate pre-natal alcohol exposure, researchers found significant changes in the brain structure of fetuses exposed to alcohol compared to healthy controls. Results of the study are being presented today at the annual meeting of the Radiological Society of North America (RSNA).

"Fetal alcohol syndrome is a worldwide problem in countries where alcohol is freely available," said Gregor Kasprian, M.D., associate professor of radiology at the Medical University of Vienna in Austria. "It's estimated that 9.8% of all pregnant women are consuming alcohol during pregnancy, and that number is likely underestimated."

Fetal alcohol syndrome is the most severe form of a group of conditions called fetal alcohol spectrum disorders that result from alcohol exposure during pregnancy. Babies born with fetal alcohol spectrum disorders may have specific physical features, learning disabilities, behavioral problems or speech and language delays. According to Dr. Kasprian, one in 70 pregnancies with alcohol exposure results in fetal alcohol syndrome.

"There are many postnatal studies on infants exposed to alcohol," Dr. Kasprian said. "We wanted to see how early it's possible to find changes in the fetal brain as a result of alcohol exposure."

For the study, researchers recruited 500 pregnant women who were referred for a fetal MRI for clinical reasons. On an anonymous questionnaire, 51of the women admitted to consuming alcohol during their pregnancy. The questionnaires used were the Pregnancy Risk Assessment Monitoring System (PRAMS), a surveillance project of the Centers for Disease Control and Prevention and health departments, and the T-ACE Screening Tool, a measurement tool of four questions that identify risk drinking.

"We provided a safe environment where women could feel comfortable honestly answering the questions," Dr. Kasprian said.

After eliminating some of the fetal MRIs for reasons such as structural brain anomalies and/or poor image quality, the final study group consisted of 26 fetal MRI exams from 24 alcohol-positive fetuses and a control

group of 52 gender- and age-matched healthy fetuses. At the time of imaging, fetuses ranged in age between 20 and 37 weeks.

The researchers used super-resolution imaging, which allowed them to create one dataset to re-construct each fetal brain. Next, they completed an analysis of 12 different brain structures, computing total brain volume and segment volumes of specific brain compartments.

“One of the main hallmarks of our study is that we investigated so many smaller sub-compartments of the brain,” said co-author Marlene Stuempflen, M.D., scientific researcher at the Medical University of Vienna.

The statistical analysis revealed two major differences in the alcohol-exposed fetuses compared to healthy controls: an increased volume in the corpus collosum and a decreased volume in the periventricular zone.

“This is the first time that a prenatal imaging study has been able to quantify these early alcohol-associated changes,” Dr. Stuempflen said.

The corpus collosum is the main connection between the brain’s two hemispheres. Dr. Stuempflen noted that it is fitting that this very central structure is affected, because the clinical symptoms of fetal alcohol spectrum disorders are highly heterogenous, or diverse, and cannot be pinpointed to one specific substructure of the brain.

“The changes found in the periventricular zone, where all neurons are born, also reflect a global effect on brain development and function,” she said.

The researchers said finding a thicker corpus collosum in the alcohol-positive fetuses was surprising because the corpus collosum is thinner in infants with fetal alcohol spectrum disorders.

“It appears that alcohol exposure during pregnancy puts the brain on a path of development that diverges from a normal trajectory,” Dr. Kasprian said. “Fetal MRI is a very powerful tool to characterize brain development not only in genetic conditions, but also acquired conditions that result from exposure to toxic agents.”

Additional co-authors are Ernst Schwartz, M.Sc., Mariana Diogo, M.D., Ph.D., Sarah Glatter, M.D., M.M.Sc., Birgit Pfeiler, Victor Schmidbauer, M.D., Lisa Bartha-Doering, Ph.D., Rainer Seidl, M.D., Elisabeth Krampl-Bettelheim, M.D., and Daniela Prayer, M.D.

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Cancer Patients Overlooked in COVID-19 Vaccine Rollout

AT A GLANCE

- **Almost two-thirds of U.S. states failed to prioritize cancer patients for COVID-19 vaccinations, despite recommendations from the CDC.**
- **Forty-three states included cancer among criteria for vaccination, but only 17 gave patients with cancer the same immunization priority as patients aged 65 to 74.**
- **Forty-two states did not clearly define the criteria for cancer patients to receive priority vaccination.**

CHICAGO – Almost two-thirds of U.S. states failed to prioritize cancer patients for COVID-19 vaccinations, despite recommendations from the Centers for Disease Control and Prevention (CDC), according to a study being presented today at the annual meeting of the Radiological Society of North America (RSNA).

Cancer patients are particularly vulnerable to the effects of COVID-19. Both the disease and treatments like chemotherapy and radiation therapy can leave their immune systems in a weakened state.

Available vaccines are highly effective, but initial supply limitations forced the CDC's Advisory Committee on Immunization Practices to make difficult patient prioritization decisions. People ages 16 to 64 with high-risk conditions were grouped into the final part of the first phase, along with people ages 65 to 74. However, this group encompassed 129 million people nationally, leading many states to sub-prioritize.

For the new study, researchers sought to determine the proportion of states that elected to follow CDC recommendations. They identified every states' COVID vaccination webpage through keyword-based internet search and set out to identify information about vaccination for cancer patients.

While 43 states included cancer among criteria for vaccination, only 17 gave patients with cancer the same immunization priority as patients aged 65 to 74, and a mere eight precisely defined a qualifying cancer diagnosis.

"Although the CDC recommended that all states consider people with significant medical conditions to have equal vaccination priority with people over the age of 65, we found that nearly two-thirds of states did not give equal vaccination priority to patients with cancer," said study lead author Rahul Prasad, M.D., from The Ohio State University Comprehensive Cancer Center in Columbus, Ohio.

Forty-two states did not clearly define the criteria for cancer patients to receive priority vaccination. This lack of clarity is problematic, Dr. Prasad noted, due to considerable variation within the cancer patient population.

"You could have someone diagnosed with breast cancer at age 40 who is now 55, in remission, and wondering if they're eligible," Dr. Prasad said. "On the other side of the spectrum, someone newly diagnosed with low-risk prostate cancer may not be particularly immunocompromised if they haven't started treatment yet."

Of the eight states that defined a qualifying cancer diagnosis for vaccine prioritization, six limited it to patients currently receiving treatment.

Dr. Prasad said the shortfall in the number of states that followed the CDC recommendations is partly due to attempts at streamlining vaccination efforts.

"I don't think anyone intended to push people to the back of the line," he said. "The efforts were well intentioned, but what ended up happening was that the CDC governing bodies' definition of high-risk medical conditions was too broad."

Early in the fall, the CDC approved a booster shot for seniors and high-risk individuals. Dr. Prasad said that these booster shots offer an opportunity to better mitigate disparities in vaccine access.

"It's especially critical this time around to make sure these most at-risk people are getting their boosters in a timely fashion," Dr. Prasad said.

Co-author is Joshua Palmer, M.D.

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For patient-friendly information on cancer screening, imaging and treatment, visit *RadiologyInfo.org*.

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ADDITIONAL STORY IDEAS
RSNA 107th SCIENTIFIC ASSEMBLY AND ANNUAL MEETING

In addition to the presentations described in RSNA news releases, the following scientific presentations and posters have been identified as particularly newsworthy. Dates, times, locations and abstracts can be found in the online program at *http://rsna2021.rsna.org/sessions*.

Note: Availability of some presentations may be virtually on-demand only.

- **SSPD01-5** Brain Resting State Functional Networks In Infants With Prenatal Opioid And Substance Exposure
- **SDP-NPM-2** (On-Demand) A Telerobotic Ultrasound Clinic Model Of Ultrasound Service Delivery To Improve Access To Imaging In Rural And Remote Communities
- **SSNR01-3** Longitudinal Changes In Brain Connectivity In Hypertensive Patients From The SPRINT Trial: Intensive Blood Pressure Management Is Associated With Less Decline In Connectivity
- **SSCH07-5** Racial Disparities In COVID-19 Associated Pulmonary Embolism
- **SSCH08-6** Might Lung Cancer Screening Mortality Benefits Be Even Greater Than Expected Once More African American/Black Smokers Are Included?
- **IR03-A2** Healthcare Disparity: Lack of Access to Embolization Identified for Black Women Affected by Uterine Fibroids in Rural Alabama
- **SSBR06-6** Primary Treatment Of Low Risk Breast Cancers Using Image-Guided Cryoablation: A 6 Year Update Of The ICE3 Trial
- **SSNR06-2** Lost To Follow-up: A Nationwide Analysis Of Transient Ischemic Attack Patients Discharged From Emergency Departments With Incomplete Imaging Work-up
- **IR04-B2** Intra-articular Application Of Sluijter-teixera Poisson Pulsed Radiofrequency In Symptomatic Patients With Knee Osteoarthritis: Focus Upon Clinical Efficacy And Safety
- **SSNR13-4** Early Prediction Of Cognitive Deficit Using Quantitative Structural MRI In Very Preterm Infants With Ensemble Learning
- **NR02-B9** Deep Learning With Graph Convolutional Neural Networks Using Connectivity-based Features From Functional MRI For Diagnosis Of Autism Spectrum Disorder
- **SSBR04-6** Artificial Intelligence (AI) System Reduces False-Positive Findings In The Interpretation Of Breast Ultrasound (US) Exams
- **SDP-CH-40** (On-Demand) E-cigarette Use Among Self-described Former Smokers Undergoing Lung Cancer Screening

- **SSBR01-2** A Decade Of Digital Breast Tomosynthesis: How Has It Performed?
- **SSMK01-5** Intervertebral Disc Regeneration Techniques: Viable Allograft For Intervertebral Disc Supplementation - Viable Allograft Supplemented Disc Regeneration Trial (VAST)
- **RI02-A2** Reproductive Outcome Of Infertile Patients With Proximal Tubal Obstruction Treated With Selective Salpingography With Tubal Catheterization.
- **BR04-C9** Potential Utility Of SPRMs As A Novel Approach For Contraception And Breast Cancer Risk Reduction; A Randomized Control Trial
- **BR05-A8** Axillary Lymphadenopathy (LAD) On Breast Imaging After COVID-19 Vaccine
- **GI04-C10** Fly-In: A Robust Visualization Approach For CT Colonography
- **SSNI02** (On-Demand) Virtual Waiting Room; Digitized Pre-procedure Forms: Radiology Workflow Innovations Driven By The COVID-19 Pandemic
- **SDP-NPM-1** (On-Demand) Sociodemographic And Geographic Disparities In Obstetrical Ultrasound Imaging Utilization: A Population-based Study
- **SDP-PD-7** Could We Better Detect Pars Interarticularis Defects In Teens Before Completion?
- **NR03-C8** Introduction Of MRI-based AI Model In Prediction Of MCI Conversion To Dementia: Could It Be A Key To Early Diagnosis Of Alzheimer's Disease?
- **CH03-B3** Impact Of A Nurse Practitioner In A Diverse Inner-city Academic Lung Cancer Screening Program
- **SDP-NR-17** (On-Demand) D-dimer And Ferritin As Biomarkers Of Acute Stroke Risk In Patients With Severe COVID-19: A Case Series
- **SDP-NR-63** (On-Demand) Artificial Intelligence Substantially Improves Differential Diagnosis Of Dementia – Added Diagnostic Value Of Rapid Brain Volumetry
- **CH01-A5** Leveraging Serial CT Scans In Deep-feature Reinforcement Learning Model For Improvement Of Early Diagnosis Of Lung Cancer

RADIOLOGICAL SOCIETY OF NORTH AMERICA
820 JORIE BLVD, OAK BROOK, IL 60523
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RSNA.ORG

NEWS

107th SCIENTIFIC ASSEMBLY AND ANNUAL MEETING
RADIOLOGICAL SOCIETY OF NORTH AMERICA

Sunday, November 28 – Thursday, December 2, 2021
McCormick Place, Chicago, Illinois
(as of 10/30/21)

RSNA FACTS

- RSNA® has over 48,200 members in 145 countries.
- The RSNA Scientific Assembly and Annual Meeting is the premier annual radiology forum in the world. It has been held consecutively in Chicago since 1985. It typically hosts more than 50,000 attendees, including more than 27,000 healthcare professionals. McCormick Place was first used in 1975.
- Full RSNA members in North America pay 2021 dues of $615 annually. Membership benefits are worth at least $3,183 ($1,100 for annual meeting with advance registration, $800 for virtual meeting, $855 for online and print editions of *Radiology* and *RadioGraphics*, $408 for *Radiology: Artificial Intelligence, Cardiothoracic Imaging, Imaging Cancer* online editions and $20 for *RSNA News*—value based on nonmember North American subscription rates).
- Members receive free access to continuing medical education (SA-CME) credit, RSNA CME Repository, grant opportunities, and many indirect benefits.
- RSNA publishes five peer-reviewed medical journals.

  Editors:
  - *Radiology,* David A. Bluemke, M.D.
  - *RadioGraphics*, Christine (Cooky) O. Menias, M.D.
  - *Radiology: Artificial Intelligence*, Charles E. Kahn Jr., M.D., M.S.
  - *Radiology: Cardiothoracic Imaging*, Suhny Abbara, M.D.
  - *Radiology: Imaging Cancer*, Gary D. Luker, M.D.
- RSNA offers a comprehensive collection of online continuing education courses covering every subspecialty in radiology.
- Since 1984, the RSNA Research & Education (R&E) Foundation has awarded more than $70 million in grant funding for over 1,600 grant projects.
- RSNA employs 236 people.
- RSNA headquarters is located at 820 Jorie Blvd., Oak Brook, Ill.

RSNA ANNUAL MEETING FACTS

(as of 10/30/21, some numbers subject to change)

The Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA®) is the world's premier scientific and educational forum in radiology.

Facts about the meeting include:

- 5 days of educational programs for radiologists, radiation oncologists, physicists in medicine, radiologic technologists and allied healthcare professionals
- 495 in-person technical exhibits occupying 296,000 square feet
- 52 virtual exhibits, including 32 virtual-only exhibits
- 88 first-time exhibitors at RSNA
- 858 scientific papers in 18 subspecialties: breast; cardiac; chest; gastrointestinal; genitourinary; head & neck; informatics; interventional; multisystem; musculoskeletal; neuroradiology; noninterpretive skills/practice management; nuclear medicine/molecular imaging; pediatric; physics; radiation oncology; reproductive imaging; and vascular
- Over 300 education courses and 7 plenary sessions
- 1,521 education exhibits and 1,266 scientific posters featured in the Lakeside Learning Center

RSNA® 2021
REDEFINING RADIOLOGY
November 28 to December 2

Corporate Symposiums and Lunch and Learns

INDUSTRY PRESENTATION	TIME	SUNDAY	MONDAY	TUESDAY	WEDNESDAY
MORNING CORPORATE SYMPOSIUMS	60 minute sessions hosted between 8 AM–12 PM; specific times to be determined		Bayer (IM1-CS103)	Philips (IT1-CS101)	SOPHiA GENETICS (IW1-CS101)
				Intelerad Medical Systems (IT1-CS102)	United Imaging (IW1-CS102)
LUNCH AND LEARNS	11:45 AM–12:45 PM	Subtle Medical, Inc. (IS1-LL101)			
		Dedalus (IS1-LL102)			
		Hologic, Inc. (IS1-LL103)			
	12:15 PM–1:15 PM		Konica Minolta Healthcare Americas, Inc. (IM1-LL101)	Kheiron Medical Technologies (IT1-LL101)	Intelerad Medical Systems (IW1-LL101)
			Hologic, Inc. (IM1-LL103)	Nuance Communications (IT1-LL102)	Dicom Systems, Inc. (IW1-LL102)
				Hologic, Inc. (IT1-LL103)	Hologic, Inc. (IW1-LL103)
AFTERNOON CORPORATE SYMPOSIUMS	60 minute sessions hosted between 1 PM–4 PM; specific times to be determined		Change Healthcare (IM2-CS104)	CureMetrix, Inc. (IT2-CS105)	Emovi (IW2-CS104)
			Bayer (IM2-CS105)	TeraRecon (IT2-CS106)	
			Microsoft (IM2-CS106)		

All times are listed in Central Time (CT). Current as of October 15, 2021.

RSNA® 2021
REDEFINING RADIOLOGY
November 28 to December 2

Virtual Industry Presentations and Virtual Product Theater Presentations

INDUSTRY PRESENTATION	TIME	MONDAY	TUESDAY	WEDNESDAY
PRE-SHOW PRESENTATIONS	7:00 AM–8:00 AM	Philips (IM1-VP101)	Intel (IT1-VP101)	Canon Medical Systems (IW1-VP101)
VIRTUAL PRODUCT THEATER MORNING PRESENTATIONS	9:00 AM–9:30 AM	Intelerad (IM1-VT101)	ContextVision (IT1-VT101)	
	10:30 AM–11:00 AM		Bayer (IT2-VT102)	
LUNCH HOUR PRESENTATIONS	12:15 PM–1:15 PM	Biogen (IM2-VP102)	Rhino Health (IT2-VP102)	Telix Pharmaceuticals (IW2-VP102)
VIRTUAL PRODUCT THEATER AFTERNOON PRESENTATIONS	2:30 PM–3:00 PM	Hyland Healthcare (IM3-VT103)	Subtle Medical, Inc. (IT3-VT103)	
	4:00 PM–4:30 PM	XACT Robotics (IM4-VT104)	NVIDIA (IT4-VT104)	

Vendor Workshops

Gain first-hand experience on an exhibiting company's proprietary systems by attending user training and product instruction in classroom space in the Technical Exhibits Halls. Workshop sessions may run from 10AM to 5PM CT each day, Sunday through Wednesday.

- GE Healthcare – Booth 8349, North Hall, Level 3
- GE Healthcare – Booth 8355, North Hall, Level 3

All times are listed in Central Time (CT). Current as of October 15, 2021.

RSNA® 2021
REDEFINING RADIOLOGY
November 28 to December 2

AI Theater Presentations

TIME	SUNDAY	MONDAY	TUESDAY	WEDNESDAY
10:30 AM–10:45 AM	Oxipit, UAB (IS1-AI101)	PMX, Inc. (IM1-AI101)	Therapixel, Inc. (IT1-AI101)	SpinTech MRI (IW1-AI101)
11:00 AM–11:15 AM	VUNO (IS2-AI102)	Bayer (IM2-AI102)	Circle Cardiovascular Imaging (IT2-AI102)	Within Health (IW2-AI102)
11:30 AM–11:45 AM	Zebra Medical Vision Ltd. (IS3-AI103)	annalise.ai (IM3-AI103)	GE Healthcare (IT3-AI103)	Blackford Analysis (IW3-AI103)
12:00 PM–12:15 PM	Median Technologies (IS4-AI104)	MedicalIP (IM4-AI104)	VIDA (IT4-AI104)	DiA Imaging Analysis (IW4-AI104)
12:30 PM–12:45 PM	SOYNET (IS5-AI105)	Kheiron Medical Technologies (IM5-AI105)	Fovia Ai (IT5-AI105)	contextflow (IW5-AI105)
1:00 PM–1:15 PM	DeepHealth, Inc. (IS6-AI106)	Nuance Communications (IM6-AI106)	OneMedNet Corporation (IT6-AI106)	Riverain Technologies (IW6-AI106)
1:30 PM–1:45 PM	AIRS Medical (IS7-AI107)	CureMetrix, Inc. (IM7-AI107)	Flywheel (IT7-AI107)	AI Metrics (IW7-AI107)
2:00 PM–2:15 PM	ClariPi Inc (IS8-AI108)	Subtle Medical, Inc. (IM8-AI108)	QYNAPSE (IT8-AI108)	Cortechs.ai (IW8-AI108)
2:30 PM–2:45 PM	Lunit (IS9-AI109)	neurophet (IM9-AI109)	IBM Watson Health (IT9-AI109)	ScreenPoint Medical (IW9-AI109)
3:00 PM–3:15 PM	deepc GmbH (IS10-AI110)	CARING (IM10-AI110)	SOPHiA GENETICS (IT10-AI110)	
3:30 PM–3:45 PM	RadiLens (IS11-AI111)	Aidoc (IM11-AI111)	Pure Storage (IT11-AI111)	
4:00 PM–5:00 PM		RSNA AI Challenge Winner Recognition Event (IM12-AI112)	Current State of AI in Radiology: A Fireside Chat (IT12-AI112)	**3:45 PM–4:45 PM:** NIBIB's Medical Imaging and Data Resource Center (MIDRC) (IW12-AI112)

All times are listed in Central Time (CT). Current as of October 15, 2021.

RSNA 2021

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3M M*Modal	3123
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AB-CT Advanced Breast-CT GmbH	8134
ACE Marketing Inc	4024
Advanced Mobility by Kentucky Trailer	7910
AFC Industries Inc	1701
Affiliated Professional Services Inc	6634
Agamon	5336
Agfa HealthCare	2541
AHRA: The Association For Medical Imaging Management	1111G
AI In Practice Demonstration	4529
AI Medic Inc.	4400
AI Metrics	4742
Aidence	4451
Aidoc	4342
AIRS Medical	4157
AIXSCAN	5055
AlgoMedica Inc.	4437
Allegheny Health Network	6857
Allm	4406
Allm North America known as Allm	4406
Alpha Source Group	7937, MS 412
Altamont Software	6510
Ambra Health	2949
AmCad BioMed	1750

American Association of Physicists in Medicine	1108
American Board of Radiology	1012
American College of Radiology	3100, MS 100
American Institute of Architects (AIA)	1111A
American Society of Neuroradiology	1004
American Society of Radiologic Technologists	1111B, 1519
AMRA Medical	4104
Amrad Medical/Summit Industries, LLC	2129
Analogic Corporation	MS 307
annalise.ai	
Apollo Enterprise Imaging Corp	6603
Applied Radiology	6907
Aquyre Biosciences	1407
ARALE Laboratory Inc.	6334A
Arineta Cardio Imaging	7800
ARRT, The American Registry of Radiologic Technologists	1700
ARTERYS	4121
Ascelia Pharma	1749
ASG Superconductors	1553
Asher Orion Group, LLC	5159
Aspect Imaging	2905
Associated Sciences Consortium	1111E
Association of Educators in Imaging and Radiologic Sciences	1111H
Association of Vascular and Interventional Radiographers	1111C
Atlantic Health System	4204
AuntMinnie.com	1900
Avalon Holographics	7149
AWS	2942, MS 103, MS 104
Axial3D	8301

Bacon Healthcare	3153
Barco	1323
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Beacon Display Technology Co, Ltd	3925
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Beekley Medical	1705
Beijing Crealife Technology Co Ltd	
Beijing Wandong Medical Technology Co Ltd	
Belkin	4105
Best Medical International	1905, 2005
Biodex known as Mirion Technologies	6525
Biogen	
BioMind®	6658
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Blackford Analysis	5146
Block Imaging	6707
Boca Terry	4600
Bontech Co., Ltd.	6545
Bracco	1129
Brainlab / Mint Medical	4853, 8138
Brainreader	4145
CAD BLU, Inc	8300
CaliberMRI, Inc	3001
Cambridge Research Systems	7801
Camerad Technologies LLC	6632
Canadian Association of Medical Radiation Technologists	1111F
Candelis Inc	2934
Canon Electron Tubes & Devices	MS 306
Canon USA Inc	

Capio	8001
Care IO	
CareCredit	3254
CareRay Digital Medical Technology Co., Ltd.	3751
Carestream Health	7316, MS 402
Carina AI	4304
CARING	5346
CBR Colegio Brasileiro de Radiologia	1007
CCD	6504
CEIA USA Ferromagnetic Division	6601
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Character Farms LLC	1859
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CorTechs Labs	4542

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Dicom Systems Inc	7711
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DLL Financial Solutions Partner	2801
DOTmed.com, Inc	6801
Double Black Imaging & Image Systems	3129
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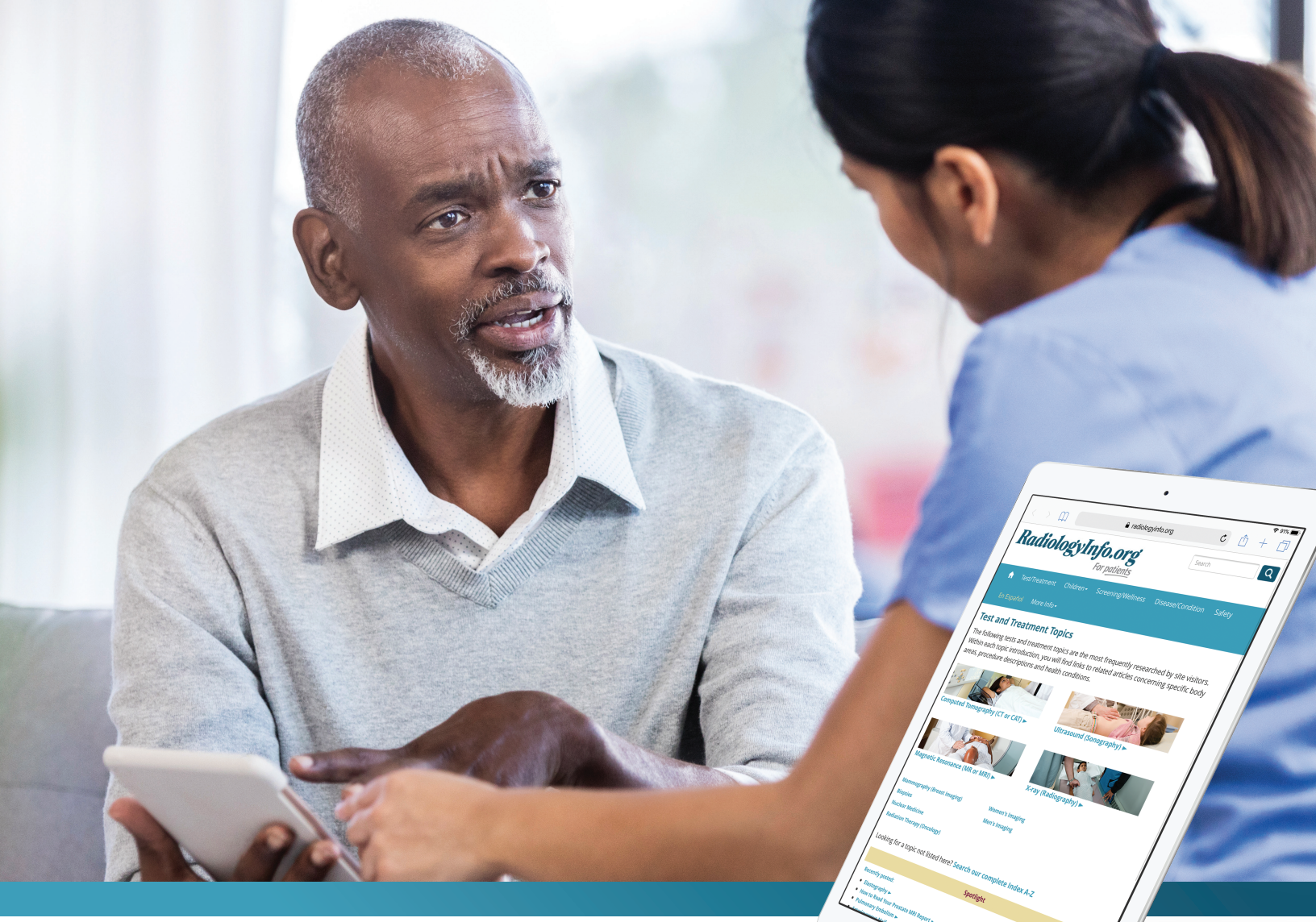

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