Key Takeaways:

- RCMS makes it easy for radiologists and institutions to organize, create, and share the educational content they need to deliver improved patient care.
- Radiologists can repurpose the same data to create customized learning experiences for different skill levels.
- Content can be distributed within a single institution and among different institutions.

One of the best ways for radiologists to become better at what they do is through regular exposure to unusual cases and excellent examples of a particular imaging finding. But discovering interesting cases and using them for educational purposes can be challenging, even when the cases come from within one's own institution. First, radiologists have to know where to find such cases, and then they have to gain access to them. But beyond that, radiologists' ability to use the cases to test their knowledge or create advanced learning activities for trainees is limited because hiding the study outcomes, and manipulating and sequencing is difficult. To overcome those hurdles and make sharing educational content easier, the ACR has developed a platform called the Radiology Case Management System (RCMS).

A cloud-based solution, RCMS is a content management system that allows radiologists and institutions to collect, store, develop, access, and distribute radiology knowledge in various formats. The ACR initially developed the system to organize its own educational content and allow radiologists to search for ACR assets based on disease entity, subspecialty, and/or modality. “Radiologists liked the system so much that they wanted use it to create and disperse educational content within their own institutions and perhaps share content with other institutions,” says Jose Cayere, director of product development for the ACR. “So we opened up the platform to allow access for users outside of the ACR and developed infrastructure to allow institutions to add and distribute their own content,” he says. “We also created simplified workflows and utilities to allow the institutions to control how their own people and others access and use the system.” The ACR is currently piloting this institution-focused solution at several sites.

Nabile M. Safdar, MD, MPH, vice chair for imaging informatics at Emory University School of Medicine in Atlanta, Ga, says RCMS gives radiologists and residency programs access to the resources they need to provide better patient care. “A big part of the ACR Imaging 3.0™ process is for radiologists to be advocates for their patients, consult with other physicians, and be experts in their fields,” Safdar says. “To do all of that, they need learning tools, decision support resources, and simulation systems integrated into their existing work environments. RCMS makes those materials readily available to radiologists who want to improve their skills.”

Knowledge Sharing

RCMS allows institutions and individual radiologists to subscribe to and access ACR content, such as Case in Point case studies and Resident & Fellow Section teaching files, and upload their own cases, including reports and images, to the system. Once in the system, the content can be manipulated to create various educational materials, including pre- and post-test simulations, exams, lessons, and curriculum. The materials can be tailored for different skill levels, revealing as much or as little pathology as desired.
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and grouped together to create entire courses on specific topics. Templates are available for developing the materials, and radiologists can choose their own layouts. "The database content is not tied to the presentation. This separation allows the same content to be displayed many different ways and can be changed very quickly," Cayere says. "It can be presented one way for a course, and then presented in a different way for another course."

RCMS also facilitates the sharing of content between institutions. Because data is stored in the cloud, users with the appropriate access have the ability to share new learning activities as desired with other members of the ACR community. For instance, a faculty member who develops an exam can then give his residents permission to access the activity and take the exam. Or he or she can grant colleagues permission to access the activity and administer the exam to their own students. When users log in through their institutions’ RCMS portal, the system alerts them to newly accessible files and allows them to organize the content they collect. "You can save your available content into groups to study later or for future reference," Cayere explains.

The platform also benefits institutions that may not have the resources or time to publish through a traditional publishing house or software development vendor. "A lot of institutions are interested in creating curriculum from published research that has numerous well-respected educators and researchers," Cayere says. "RCMS allows them to work with those institutions to organize and package their content to extend the value of their work by creating learning opportunities based on the latest research and knowledge." RCMS also benefits residents by tracking how well they perform on lessons and comparing their performance to their peers across the country and around the world. Residents can go through their activities and benchmark themselves to understand how they’re doing compared to a year ago or compared to other residents at their same level. "Program directors, faculty, and residents can use that information to determine where they are on the learning spectrum and identify any gaps they need to fill," explains Safdar.

A Flexible, Modular System

The ACR has been careful to address institutions’ concerns about content ownership, quality, and security. An institution retains ownership of the uploaded content in their institution’s portal with access limited to individuals approved by that institution. "They can re-use their content within multiple learning activities and share that content as desired," Cayere says. In addition to controlling which of their radiologists are permitted to access and distribute content, institutions can implement their own review processes for authorship and quality control prior to publication. "We have a controlled workflow within RCMS to make sure the content goes through the institution’s proper verification and review process before it is published beyond a radiologist’s own repository of content," Cayere explains.

Many radiologists have inquired about how to automate uploading their content to the system once they identify candidate studies. While the process of uploading a case is relatively straightforward, the ACR has begun to work with vendors to create methods of uploading data that dovetail with day-to-day workflows. In particular, the ACR has begun working with Montage Healthcare Solutions, Inc. to integrate MONTAGE™ Search and Analytics into RCMS. MONTAGE is an intuitive radiology data mining and analytics solution that allows users to easily access radiology report data and make it useful, says Woojin Kim, MD, co-founder of Montage Healthcare Solutions. "The first step in creating content for RCMS is finding a case of interest," Kim says. "MONTAGE Search and Analytics enables users to quickly search for content within millions of reports within one’s RIS. Once a case is found, users click a single button to easily transfer it over to RCMS for further authoring and editing of case-based radiology content."

Creating and sharing educational content through RCMS will lead to improved patient care by allowing radiologists to study many different cases outside of high-pressure clinical settings, Safdar says. "As radiologists, we all need to be constantly exposed to normal imaging cases, unique cases, rare cases, and a broad variety of cases, because we get better by looking at all of them," he says. "When we see those cases in a live clinical situation, the stakes are much higher, but RCMS allows us to run through our paces in a way that’s high fidelity — while enjoying the safety of a teaching or simulation context." Safdar thinks RCMS will bring a great deal of value to the radiology community and looks forward to an upcoming pilot at Emory University. "RCMS is one of the most..."
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robust radiology content management systems for the purpose of teaching and simulation that I’ve seen. Its viewing capabilities are excellent, it has integrated dictation capabilities, and it allows multiple presentation states for the same underlying data. Taken together, these capabilities help us access the information necessary to improve our patient care skills in ways previously not possible.

Next Steps
Radiologists who want to leverage RCMS to organize, create, and distribute educational content within their own institutions and with other institutions should:

- Visit http://3s.acr.org/info to learn more.
- Contact the ACR to develop an implementation plan.
- Read a case study about how the University of Florida is using RCMS to develop a radiology simulation program.

Join the Discussion
Want to join the discussion about how the RCMS allows radiologists to collect, develop, distribute, and access educational content? Let us know your thoughts on Twitter at #imaging3.

Have a case study idea you’d like to share with the radiology community? Please submit your idea to http://bit.ly/CaseStudyForm.

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