RadApp™: A digital solution to streamline communication, workflow, patient safety, and resident education

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The success of radiology operations largely depends on communication fluency, workflow efficiency, and access to the latest institutional/organizational guidelines.

**Common Challenges**
- Correct contacts difficult to find
- Finding proper algorithms slow
- Finding patient safety guidelines slow
- Educational schedules update frequently
- Clinical schedules in many locations

**Our Goal:** Develop a mobile tool to effectively address these issues.
The purpose of this case study in clinical management is to share our institutional experience developing this mobile tool (RadApp™) and its role in our workflow efficiency and the optimization of our radiological care delivery.
WHAT WAS DONE

- Usability, functionality, and ease-of-maintenance were prioritized in app development; RadApp™ was created with:
  - Capabilities to run on both Android and iOS mobile operating systems
  - Information that is easily searchable and accessible
  - Resources that remain accessible without an internet connection
  - Resources with associated functionality that are accessible from within the application
  - User-friendly backend maintenance that does not require programming experience
  - Security that is present but non-intrusive
WHAT WAS DONE

- RadApp™ populates menu options from the centrally maintained list
- Each time the RadApp™ is restarted, it checks to see if the central list has been updated
- After populating menu options from the central list, RadApp™ keeps local copies of any resources referenced by the central list when a user requests them, and then updates them on each subsequent request
- Using a centrally maintained list means that the app can be customized simply and easily for any department and hospital system
- This menu system can also be changed as the department’s needs change
WHAT WAS DONE

Common Challenges:
- Correct contacts difficult to find
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- Clinical schedules in many locations

RadApp Solutions:
- Searchable, sortable, updated list
- Include clinical guidelines within specific section
- Include hospital guidelines within specific section
- Compile schedules into specific section
- Access to all schedules from one place
RadApp™ was created with a focus on improving five core daily tasks:

1. Communication
2. Education
3. Networking
4. Workflow efficiency
5. Patient safety
1) COMMUNICATION

- In a recent poll, clinicians and radiologists agreed that they want improved communication for critical results including rapid, up-to-date access to direct contact details for the referring physician (1).

- Communication obstacles ultimately result in workflow inefficiencies (2).

- **RadApp™ Solution** → Hospital contacts can be called, text paged, and emailed directly, both on hospital campus and off-site:
  - Directory list that is searchable, sortable (by name, location, or unit)
  - Automatically updated each time the app is accessed
  - Call or text page any of the contacts directly from device even if outside the hospital Wi-Fi network.
2) EDUCATION

- Many factors challenge the modern radiologist’s ability to stay current with the literature and generate the best possible reports and patient recommendations
  - “RadApp Solution → “References” section for both hospital and national guidelines
  - User-friendly tables or chart summaries of relevant guidelines:
    - ACR RADS (BIRADS, PIRADS, LIRADS, LungRADS, and NIRADS)
    - Fleischner Society 2017 Guidelines for lung nodule follow-up
    - Recommendations for ovarian lesions, thyroid nodules, and adrenal nodules
    - Recommendations for contrast reactions, contrast extravasation, and foreign body clearance
    - Departmental guidelines
    - Downtime protocols
    - Daily cafeteria menu and dining choices
3) NETWORKING & SOCIAL MEDIA

- Social media platforms such as Twitter, Facebook, and LinkedIn allow radiologists and trainees to:
  - Network with one another, share cases
  - Advertise job opportunities
  - Interact with patients
  - Promote their institution’s brand, safety initiatives, highlight faculty appearances and research achievements (3-4)
  - Promote traffic to online radiology journals (5-6)
  - Positively affect the number of clinic appointments (7)

- **RadApp™ Solution** → a section of RadApp™ is dedicated to social media allowing fast access to:
  - Radiology social media platforms
  - Popular radiology sites such as AuntMinnie.com
  - Custom newsfeed that gathers the latest radiology articles and updates from across the web
4) WORKFLOW EFFICIENCY

- Frequent distractions are common in the reading room and may lead to decreased reading accuracy, increased total reading time, and increased report turnaround time (8-11)

- Distractions/inefficiencies include:
  - Inbound calls
  - Outbound calls
  - Non-RVU generating activities
  - Tracking down schedule information

- **RadApp™ Solution** → optimize communication, references, and provide:
  - Quick access to updated schedules for conferences and work assignments
  - Access to a web-based recording system, “Medhub”, for evaluations, duty-hours, and non-RVU generating activities (lectures, tumor boards, teaching, etc.)
5. PATIENT SAFETY

- Patients are also at risk anytime they are imaged, receive contrast, or undergo an image-guided procedure.

- Breakdown in workflow can lead to adverse impacts on patient care:
  - Delay in diagnosis and treatment, unnecessary alternative testing or surgical procedures (2)

- RadApp™ Solution → fast access to guidelines through the “References” tab, rapid search function, “Favorites” tab

- RadApp™ also comes equipped with a downtime protocol
  - Provides steps to maximize workflow until the system resumes full operations.
  - Contains a tool for sharing of system updates and/or known issues with the staff in real-time
  - Works even without an internet connection with many resources maintaining full functionality
DEMO

- https://www.youtube.com/watch?v=R5Rx0TPmzr0&feature=youtu.be
OUTCOMES

- RadApp™ was distributed to over 130 residents, fellows, and faculty members.
- It quickly became the go-to tool for our department.
- User reviews reflected that it was well-received as an innovative and comprehensive resource.
- Due to its user-friendly interface and simple operating system, it was easily adopted despite the staff not having received previous specialized training.
IMPLICATIONS

- RadApp™ is a tool that can be readily customized for any department, hospital system, medical center or clinic.
- Can be equipped with all desired protocols, contact information, schedules, and other key data.
- Online tutorials are available to guide first-time users through its functions, and maintenance is simple since updates are automatic.
CONCLUSION

- The ACR Imaging 3.0™ initiative calls for radiologists to lead the next step in healthcare, improving patient-centered care by focusing on imaging “appropriateness, quality, safety, efficiency and patient satisfaction” (12)

- RadApp™ contributes to this objective by providing a digital tool that:
  - Simplifies communication, linking healthcare providers together despite an often disjointed system
  - Expedites and streamlines access to guidelines, protocols, and department websites across multiple facilities or institutions
  - Utilizes social media to facilitate networking and interaction between trainees and their instructors
  - Increases radiologist and trainee efficiency by decreasing the amount of time spent on non-interpretive tasks

- As future research and feedback identify new areas of focus, additional features may be added to further fulfill Imaging 3.0’s aims and suit the needs of both radiology and other fields of medicine throughout the healthcare system.
Thank you.

If you have any further questions, please contact Mina Makary MD at mina.makary@osumc.edu
REFERENCES


