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Outline

If you have problems with access, faculty or resident registration, contact radexamsupport@acr.org

RadExam is a high quality question item and exam database developed by the APDR and ACR for Radiology programs to be able to provide R level specific (R level = resident year, R1=PGY2), formative knowledge based assessment of their residents.

The APDR/ACR RadExam system will be running as a free pilot until Dec 31st 2018 to all residency programs with limited functionality as it develops.

Note that we are continuing to improve and add to the software and content during this period.

Exam content currently available

- 70 Clinical exams, at least one per R level per specialty
- 7 Modality specific exams in physics
- 6 Non-interpretative skills exams (3 general, 3 patient safety)

The ability to:

- Review exam content
- Schedule exams to appropriate residents to be taken during a specified period
- Immediately review the results, with comparisons to other R level equivalent residents at your institution and nationally (as soon as sufficient examinees have taken the exam)
- Track results over time, within specialty and modality
- Compare your institutional overall results with other institutions
- Automatic emails to inform your residents that exams are scheduled and available
- Review with residents their exam and results, including explanations and comparative responses

The following are currently NOT available (planned release July-Dec 2018):

- Make your own exams from the database of questions
- Alter resident demographics (R level, add and remove residents) from within RadExam
- Assign specific access permissions to your faculty
- Mark incomplete exams as ‘completed’ so that scores appear
RadExam deployment and reporting summary

1. Use The Library Page to select the R level and specialty appropriate exam for a resident to take, exam content can be reviewed on the Exam details Page.
2. Use the The Assign Exam Page to assign the exam to a resident(s) and select the date range that they will take it within.
3. Residents should receive automatic emails that they will find exams on their Institutional Portal Interface available to be taken within those dates.
4. Track exam completion via the The Dashboard Page.
5. Check results of all exams with institutional and national comparisons via the The Reports Page.

Anticipated use

We anticipate that programs will assign the R level appropriate exam to residents during their last few days of a rotation. This timing will be at the program’s discretion, for example, this could be a window from Wed-Fri in the last week of the rotation or a set day each rotation (see The Assign Exam Page).

- Residents will be sent automatic emails on the day that their exam opens, the last day and also when overdue.
- All exams can be found on the Institutional Portal Interface, under ‘Not Started’ when available to be taken, and ‘In Progress’ when started or incomplete.
- Proctoring is not required although suggested, but please see the honor code below.
- Programs can use any or all exams as they feel appropriate.
- We HIGHLY recommend that you schedule exams according to the block resident schedule rather than scheduling all residents for a wide window (e.g for all their R level specific exams to be taken anytime in the next 4 months. This is more work up front, but will entail much less tracking and chasing later on and will likely result in much higher compliance by your residents who otherwise will not know when to take specific exams. It will also limit the use of these results for end of rotation evaluations.
- Narrow exam windows allow the automatic emails to work correctly
- If you do not link the exam schedules with resident rotations you will not be able to use the Dashboard to track compliance and will have to keep checking against individual resident schedule.

Using the results of RadExam

RadExam results can be used for continuous resident evaluation, assessing residents that need remediation, CCC and PEC meetings to evaluate both the programs and the individual residents. For more information watch this brief video.
Example of using block schedules with RadExam

In this example Residents have 6 day windows to complete exams

<table>
<thead>
<tr>
<th>Resident</th>
<th>R level</th>
<th>Rotation</th>
<th>Rotation finishes</th>
<th>Exam</th>
<th>RadExam scheduled dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones</td>
<td>1</td>
<td>Ultrasound</td>
<td>3/2/18</td>
<td>Ultrasound R1a V1</td>
<td>2/26-3/4</td>
</tr>
<tr>
<td>Davis</td>
<td>1</td>
<td>Nuclear</td>
<td>3/2/18</td>
<td>Nuclear R1a V1</td>
<td>2/26-3/4</td>
</tr>
<tr>
<td>Lewis</td>
<td>3</td>
<td>Chest</td>
<td>3/9/18</td>
<td>Chest R3a V1</td>
<td>3/7-3/10</td>
</tr>
<tr>
<td>Nyberg</td>
<td>2</td>
<td>Neuro</td>
<td>3/9/18</td>
<td>Neuro R2a V1</td>
<td>3/7-3/10</td>
</tr>
<tr>
<td>Lewis</td>
<td>3</td>
<td>Neuro</td>
<td>4/6/18</td>
<td>Neuro R3a V1</td>
<td>4/4-4/8</td>
</tr>
<tr>
<td>Jones</td>
<td>1</td>
<td>Chest</td>
<td>4/6/18</td>
<td>Chest R1a V1</td>
<td>4/4-4/8</td>
</tr>
</tbody>
</table>

An important note: Please only assign R level appropriate exams or it will invalidate our ability to assess exam and question difficulty effectively and maintain the quality and value of the tool to programs (e.g. only allow R3 residents to take R3 exams). RadExam is NOT meant as a self-assessment or learning tool by residents but as a formative evaluation tool by the program.

Resident benefits

RadExam gives residents the ability to regularly assess their specialty specific knowledge base as they complete each rotation, and compare their results with other R level comparable residents locally and nationally. Note: RadExam is NOT a self-study resource. The decision has been made to not make answers available to residents for exam security reasons. We recommend that you assign a section director or their designee who can review the answers and explanations with residents if they request it. This can be done via both the scheduling and the reporting pages.

Exam duration

Exam duration is 60 minutes. The only exception currently is the 100 question precall quiz which is 2 hours. Exams can be reset by the program coordinator if necessary. Residents should be encouraged to allow time to complete these exams once started. If the time expires, the exam will auto-submit.

Support

Clicking the green ‘Support’ tab on the right of each page will bring up a form which can be completed and submitted.

Urgent support can be obtained by calling 703-648-8373 9am-4pm Eastern Time or emailing radexamsupport@acr.org
• If PCs or PDs are having issues getting their residents into ATPU – contact ACR membership department (by phone at 1-800-347-7748 or by email at membership@acr.org from 8:30am to 5:00 pm Monday – Friday).
• Similarly if residents are having trouble with their username. If the list of residents in RadExam is not the same as ATPU or any issues with RadExam – contact RadExamsupport@acr.org with the list of residents and resident level.
• If Residents have issues with passwords – they can reset their password in using this link Reset password.

Incomplete exams and exam resets

Please encourage all residents to answer every question. Currently, if not all questions have been answered and the time expired, the exam will remain ‘in progress’. If the resident has answered the majority of the questions, please contact radexamsupport@acr.org with the exam number (E#), institution and resident name and they will complete the exam. Similarly, if an exam needs to be completely deleted (wiped out of system), e.g. if a resident only answered a handful of questions before being interrupted, you can do it via the scheduling page (see later).

Checking resident registrations

Eventually this will be done within RadExam itself, but currently please use the ACR APTU portal (as for DXIT) to ensure that your residents are registered and correctly assigned https://atpu.acr.org/. Following this, send your resident names, emails and R levels to RadExamsupport@acr.org if there are errors in RadExam. This is especially important in July.
How to videos

Short orientation videos of each section that give more detail can be found here:

1. Dashboard Page (3 mins)
2. Library Page (6 mins)
3. Scheduling exams (2 mins)
4. Schedules Page (5.5 mins)
5. Reports Page (10 mins)
6. Resident Portal (5 mins)

Accessing RadExam

Program director/Program coordinator site to assign exams and get reports: https://cortex.acr.org/RadExam
To access, use your ACR login and password. If you have lost these they can be retrieved at: https://login.acr.org/ForgotPasswordLookup.aspx. You can also access the system by using the institutional portal link below and then selecting RadExam from the top right drop down menu

Resident portal access to take exams is institutional specific and will be sent to you as a link. See Institutional Portal Interface for more details. You can update your program information (e.g. contact people) and check your portal link here.
Agreements with RadExam

When Faculty and Program Coordinators first sign into RadExam they will be asked to accept the following agreement. If you are not willing to agree to this, please contact Petra Lewis at petra.lewis@hitchcock.org

RadExam has been developed as a non-proctored assessment resource and should be given under an honor code. By clicking below, you agree that you will not download, photograph or convey the exam content in any form other than via the RadExam interface to your residents or others. You also agree that if your residents break this honor code, then your program would view this as a significant professionalism issue, treat this as a breach of professional standards, notify the RadExam creators, and manage according to your local residency program and GME protocols.

Data from RadExam may be used for research purposes and for improving question and exam item quality and performance. All such data will be anonymized as to resident name and residency program name but grouped data (e.g. by program size or geography) may be used. No identifiable program data will be distributed to other programs or individuals unless specific written consent is given by both parties.

When residents start an exam they will be required to agree to the following statement:

RadExam has been developed as a non-proctored assessment resource and is given under an honor code. By clicking below, you agree that you will not download, photograph or convey the exam content in any form to others. You also understand that if you break this agreement, that it would be seen as a significant professionalism issue by your Program Director, the APDR and the ACR.
<table>
<thead>
<tr>
<th>Section</th>
<th>Exams</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>R1, R2, R3, R4 (two versions of each)</td>
<td>Includes fluoro</td>
</tr>
<tr>
<td>Breast</td>
<td>R1, R2, R3 (two versions of each) R1 (one version)</td>
<td>Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Cardiac</td>
<td>R1, R2, R3, R4 (two versions of each)</td>
<td>All of the Cardiac exams, have greater weighting of cardiac content, but still incorporate some non-cardiac content. Cardiac specific exams will be developed later. Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Emergency radiology</td>
<td>R1, R2, R3, R4 (one version of each)</td>
<td>A ‘pre-call’ exam will be developed</td>
</tr>
<tr>
<td>Interventional</td>
<td>R1, R2, R3, R4 (two versions of each) R5 (one version)</td>
<td>Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>R1, R2, R3, R4 (two versions of each), Fellow (one version)</td>
<td>Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Neuroradiology</td>
<td>R1, R2, R3, R4 (two versions of each)</td>
<td>Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Non-interpretative skills</td>
<td>General (two versions), Patient safety (two versions)</td>
<td>Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Nuclear radiology</td>
<td>R1, R2, R3, R4 (one version of each)</td>
<td></td>
</tr>
<tr>
<td>Pediatric radiology</td>
<td>R1 (two versions) R2, R3, R4 (one version of each)</td>
<td>Versions 1 and 2 cover same content to allow for repeat exams/increase exam security</td>
</tr>
<tr>
<td>Physics</td>
<td>CT, IR/Fluoro, Mammo, MRI, Nuclear, Radiology, US (one version of each)</td>
<td></td>
</tr>
<tr>
<td>Thoracic</td>
<td>R1, R2, R3, R4 (two versions of each)</td>
<td>Thoracic Version 1 exams were designed for programs in which the Thoracic and Cardiac rotations are separate and focus on non-cardiac content. Thoracic Version 2 exams were designed for programs with more integrated Thoracic and Cardiac rotations.</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>R1, R2, R3, R4 (one version of each)</td>
<td></td>
</tr>
</tbody>
</table>
Navigating the RadExam interface

RadExam has 6 tabs on the top, select each to move to that section. Only the first 4 are functional for the pilot.

The Dashboard Page

This is the master date picker, changing this date will change the ranges shown on all pages

Filter by section or R level

Being taken

Out of scheduled time but within Grace period if assigned

Outside Grace period and not done

Exams completed

Not started but open

Click any box to see more details

Not yet available

Not yet available

This provides a quick snapshot of your residents progress

Lists all exams available. Exam content can be viewed and exams scheduled

Current and previous exam schedules can be viewed and edited

Current and prior exam results can be viewed and filtered
**EXAM DETAILS MODE**

Selecting Exam Library in the top left menu will bring up details of the available exams.

- Click on any header to sort
- Click to make one of these exams your favorites
- Click to assign an exam to residents
- Click dots or exam name to bring up the exam details and schedule menu
- Resident level this exam is intended for
- Use these drop downs to filter by section, exam R level or source of the exam
- This will search any field including exam name
- Click here to switch between exam library and exam statistics views

<table>
<thead>
<tr>
<th>Exam ID</th>
<th>Assign</th>
<th>Exam Name</th>
<th>Section</th>
<th>Exam Level</th>
<th>Administrations</th>
<th># Questions</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>E2018</td>
<td>Assign</td>
<td>RadExam Beta Body/GI</td>
<td>Gastrointestinal</td>
<td>R3</td>
<td>84</td>
<td>10</td>
<td>APDR</td>
</tr>
<tr>
<td>E2022</td>
<td>Assign</td>
<td>RadExam Beta MSK</td>
<td>Musculoskeletal</td>
<td>R3</td>
<td>70</td>
<td>10</td>
<td>APDR</td>
</tr>
<tr>
<td>E2067</td>
<td>Assign</td>
<td>RadExam Beta Neuro</td>
<td>Neuroangiology</td>
<td>R3</td>
<td>76</td>
<td>10</td>
<td>APDR</td>
</tr>
</tbody>
</table>
Exam Statistics Mode

Clicking on “Exam Statistics” in the top left of the Library page will bring up more detailed statistics of the exams (when available).

- **Number of times this exam has been taken nationally**
- **SD indicates the range of scores**
- **This is the mean score of ALL residents who have taken this exam. Ideally we want this value to be between 70-80%. Ones outside this value will show as red. At least 30 administrations are needed for reliability.**
- **Median score will give you an idea of how normally distributed the data is. The more similar to the mean, the less skewed the results.**
- **The mean discrimination index shows how well this exam's questions discriminate between high and low performers. Ideally this should be >0.1. Ones outside this value will show as red.**
EXAM DETAILS

Accessed by clicking the “…” on the Library table above then “Details”.

This is the mean score of ALL residents who have taken this exam. Ideally we want this value to be between 70-80%. At least 30 administrations are needed for reliability.

The mean discrimination index shows how well this exam’s questions discriminate between high and low performers. Ideally this should be >0.1. At least 200 administrations are needed for reliability.

Click on any question to see full details (see next page).

% residents who got this question correct.

Red bars show questions that have statistics that are suboptimal (P value <45% or >95%, or DI <0.1).

Click to assign to residents without returning to the library.

Return to library.

Click to assign to residents without returning to the library.

Click on any headers to sort.

Discriminatory Index per question.
Question details
Accessed by clicking on a question on the Exam Details page
The Assign Exam Page
Accessed through Exam Library...Assign

You can assign exams ahead of time according to the block schedule, but we recommend only doing within the current academic year.

**NOTE: ALL EXAMS MUST BE TAKEN WITHIN 60 MINUTES EXCEPT THE PRECALL EXAM (120 MINS). IF THE RESIDENT LOGS OUT, THE CLOCK DOES NOT STOP**
EMAILS TO RESIDENTS

1. Day the exam starts
2. Last day of the exam
3. When exam is overdue (they can ask the PC for an extension which you can change on the table above)
**TO SEE INDIVIDUAL RESIDENT ASSIGNMENTS**

Click on ‘Show Assignees’

```markdown
<table>
<thead>
<tr>
<th>Exam Name</th>
<th>Assigned To</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>US R1a Version 1 (E305)</td>
<td>(R1)</td>
<td></td>
</tr>
<tr>
<td>Neuro R1a Version 1 (E25)</td>
<td>(R1)</td>
<td></td>
</tr>
<tr>
<td>Thoracic R1a Version</td>
<td>(R1)</td>
<td></td>
</tr>
<tr>
<td>Cardiac R1a Version 1</td>
<td>(R1)</td>
<td></td>
</tr>
<tr>
<td>Body R1a Version 1</td>
<td>(R1)</td>
<td></td>
</tr>
<tr>
<td>Neuro R2a Version 1</td>
<td>(R2)</td>
<td></td>
</tr>
<tr>
<td>Thoracic R2a Version 1</td>
<td>(R2)</td>
<td></td>
</tr>
</tbody>
</table>
```
To see resident results of completed exams

Click on the status icon for any completed exam (showing green box)

Click to see what questions were answered

Click to review exam with resident (see later section)

Show and hide scores
**Removing and Editing Schedules**

Schedules can be edited (dates, times, residents) by clicking on the start or due date on the schedules table. Exams can be deleted by clicking on the 3 dots...delete. If the exam is currently active you will be given a warning as you may erase all examinee data for that schedule.
The Reports Page

Note that this can take a few seconds to load as it has to process the data

**INDIVIDUAL**

Switch between individual and institutional reports

Filter by section, exam or level, note reset filters button

Click on resident names to get details of all exams

Mean score across ALL exams unless filters are used

Percentile rank at institution for their level. Only reported if >10 exams taken

Percentile rank nationally for their level. Only reported if >100 exams taken

Export the data on this screen as a PDF or Excel file
Individual Detail Report

Accessed by clicking on Report…Individual…Resident’s name
Data can be looked at in 4 different views by selecting the top right button

Grouped by Exam

Select the view you want

Export results as pdf or excel

Select resident

Use date picker to decide date range

Score peaks and troughs
Exam means by section

Hover or click on bar to see results

Drag the bars to narrow the time interval

National mean (green - hover to see)

Institutional mean (red - hover to see)

All exams mean by section
Exams grouped by section

Exams are grouped by section sequentially by date.
Exam means by modality

All exams mean by modality
INSTITUTIONAL REPORTS
Accessed by Reports...Institution
Reviewing resident exams

Resident exams can only be reviewed via a faculty login, and should not be unsupervised for security reasons. The interface can be accessed from 2 places:

1. The schedules page
2. The individual reports pages (Exam, Section or Section Grouped).

To review the exam, click on the result bar…then review

This will bring up the resident’s exam in a new tab for them you to review
Institutional Portal Interface

The institutional portal is where both residents and faculty will take exams and other activities. This is currently under significant development and the screenshots below may change during the pilot period. Your portal is institutional specific and will be sent to you or can be found here. Login is via the same ACR login and Password (retrieve at: https://login.acr.org/ForgotPasswordLookup.aspx).

Feedback links will be enabled for both exams and specific questions (may not be available at pilot start).
Status levels

Currently “In progress” can mean that you are still taking the exam (within the time allotted), or that you did not answer all the questions. This will be remedied in future upgrades.

Either:
Exam that you are in the process of taking (still in time and available to you)
OR
Exam that you did not answer all the questions within the allotted time (no longer available to you).

Exam open to be taken but not yet started

All questions answered and exam submitted or time expired
**NOTE: ALL EXAMS MUST BE TAKEN WITHIN 60 MINUTES EXCEPT THE 2 HOUR PRECALL EXAM. IF THE RESIDENT LOGS OUT, THE CLOCK DOES NOT STOP**

**HONOR CODE**

Before starting any exam the candidate will be asked to accept the following honor code

RadExam has been developed as a non-proctored assessment resource and is given under an honor code. By clicking below, you agree that you will not download, photograph or convey the exam content in any form to others. You also understand that if you break this agreement, that it would be seen as a significant professionalism issue by your Program Director, the APDR and the ACR.

**QUESTION INTERFACE**

After ALL questions have been answered, a **SUBMIT** button will become available. If you do not submit the exam before the time is up, then it will autosubmit after the one hour time period.
Image functions

- Zoom and dezoom
- Return zoom to original
- Return gray scale to original
- Full screen mode
- Show image original size
- Adjust gray scale
- Pan image
**RESIDENT ACCESS TO THEIR REPORTS**

Note this is currently under development. Only scores can be obtained, answers cannot be reviewed here. Accessed through the ‘Reports’ tab on the main page.

To review your exam with questions, answers and comparative national data, you will need a faculty to login and be under supervision. Again, honor code applies. Please see your Program Director to see which faculty have access at your institution.
Report detail

Practice physics exam
Individual Result

Activity Summary

User Name: Petra Lewis Radiologist

Resident Group

User Average: 67%
Instance Average: 67%
Institution Average: 67%
National Average: 67%

Scores

Click on report will bring up your exam report with comparison to your institution and national data
Support for residents and exam feedback

Accessed by the green tabs. Please tell us the exam you are having an issue with. Urgent support can be obtained during the pilot period by calling 703-648-8373 9am-4pm Eastern Time or emailing cortexsupport@acr.org

Updated August 5, 2018
petra.lewis@hitchcock.org