

Pathology
Informatics
Essentials
for
Residents



Pathology Informatics Essentials for Residents

Getting Started With PIER

2025
Release 5

Access PIER releases at the Association of Pathology Chairs website

<http://www.apcprods.org/pier>

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1 INTRODUCTION

Pathology Informatics Essentials for Residents (PIER) is a research-based instructional resource developed by the CAP, AAPath, and API that presents training topics, implementation strategies, and resource options for program directors and faculty to effectively provide informatics training to their residents and meet ACGME informatics milestone requirements. PIER is also an effective resource for aspiring specialists to develop prerequisite pathology informatics knowledge and skills prior to advanced training or fellowships.

Successful implementation of PIER is intended to help residency programs provide a sufficient pipeline of residents trained in pathology informatics knowledge and skills required now and in the future.

Elements of PIER provide an organizer and process for residency programs to begin to develop their own self-study modules, lecture series, and blended learning units. It is beyond the scope of PIER to provide fully developed and ready-to-use downloadable self-study or didactic teaching materials.

2 PIER SCOPE AND SEQUENCE

2.1 Pier Essentials

PIER Essentials present up-to-date pathology informatics training topics organized into eight main topics. PIER exposes residents to information technology in pathology as they participate in their anatomic and/or clinical pathology rotations and residency activities related to management, quality assurance and control, regulatory and accreditation issues, as well as daily flow of information into and out of the laboratory and the proper utilization of that information.

2.2 PIER Essentials and the ACGME Informatics Milestones

While PIER enables residents to meet the ACGME Milestone Levels 1-4 (version 2.0), the PIER learning objectives and subtopics specify a complete set of pathology informatics knowledge and skills that a resident needs to have upon completion of their residency program to practice pathology. Therefore, PIER is scoped and sequenced to achieve the

outcomes, which is different than the high-level, general nature of the ACGME milestone statements.

ACGME Milestone Level 5 is beyond PIER's purpose and scope. The ACGME defines Level 5 as, "The resident has **advanced beyond performance targets set for residency** and is demonstrating "aspirational" goals which might **describe the performance of someone who has been in practice for several years. It is expected that only a few exceptional residents will reach this level**" (ACGME Pathology Milestone 2019). PIER focuses on preparing residents to achieve Levels 1-4 during residency and is not intended for residents participating in advanced training or fellowships.

3 RESIDENT ASSESSMENT TOOL

3.1 Introduction

Residency programs can utilize PIER while maintaining their own philosophies, rotations, approaches, customs, and preferences for how to educate and prepare residents for practice. The PIER Resident Assessment tool is available to help program directors and residents make good pathology informatics residency training decisions, scaling PIER's topics, and implementation to their own needs and circumstances.

3.2 PIER Resident Assessment Tool

The PIER Resident Assessment tool provides three functions. First, it is a high-level map containing the topics and subtopics in one document. Secondly, it acts as a self-reporting assessment tool allowing you and your residents to monitor their progress towards the attainment of the PIER learning objectives. Third, the document can be used as a permanent record of the resident's completion of PIER.

An example of this tool is shown on the following page.

PIER Map and Resident Assessment Tool

The map portion provides all 8 Topics and subtopics to be achieved by the resident. It also includes space to enter the name of the Practical Exercise(s) completed.

Topic 3: Data Availability and Security			Year	Rotation	Complete
Learning Objectives 3.1 Describe the competing demands of data availability and data security within and between health systems.	Subtopics <ul style="list-style-type: none"> Data security concepts Cyberattacks and malware: goals and types Data and system security assurance: goals and tactics Vulnerability scans and testing 				
3.2 List the regulatory requirements for PHI as it pertains to laboratory and patient data.	<ul style="list-style-type: none"> HIPAA: privacy, security and breach notification rules State regulation related to specific data types: substance abuse, HIV Business associate and data use agreement CAP checklist system security 				
3.3 Define high reliability as it pertains to health information systems and access to patient data.	<ul style="list-style-type: none"> Best practices for health care data warehouse Data and system backup: hardware, frequency, rotating vs. hot backups Data recovery 				
3.4 Describe how your department manages protected health information (PHI) (de-identification and re-identification risk) for educational and research use.	<ul style="list-style-type: none"> HIPAA safe harbor rule Existent institutional safeguards Definitions of public data, de-identified data and coded data 				
Practical Exercises (List exercises completed)					

The assessment portion provides a method for tracking the progress of the resident. This section is completed by inserting the following information.

Year – Enter the residency year (eg, PGY-1)

Rotation – Enter the location where the topics/sub topics and/or practical exercise occurred.

Complete – Enter the date the topic/outcome statements and/or practical exercise was completed.

These fields can be completed by either the resident or program director.

Program Director Signature: _____ Date Completed: _____

Resident's Signature: _____ Date Completed: _____

After each Topic there is space for the program director and resident to enter their signatures indicating the successful completion of the assigned topics and practical exercises assigned. Once all assigned Topics are completed, the document can then be used as a permanent record indicating the resident's participation in PIER.

4 PIER RESOURCE TOOLKIT

The Resource Toolkit includes the eight topics and their associated learning objectives, subtopics, recommended resources and practical exercises. Some resources may have to be purchased or require a special login to obtain the content.

5 GETTING STARTED WITH PIER

Developing and incorporating additional training content into an already full residency program may not be easy. This section provides ideas for how to get started with PIER. The following are suggestions from a few program directors that were successful in tailoring PIER to meet their residency training needs.

5.1 Planning/Set Up

Prior to implementing PIER, it is important to have the framework of the curriculum in place. The framework includes considering the structure of the topics which would include the postgraduate year (PGY) year that PIER is introduced, the frequency of presentation, the amount of time allowed for each topic, etc.

Planning and setup time will depend to some degree on the number of resources available to your program. Programs with more resources will require less setup time. A medium-sized program with some information technology infrastructure should be able to set up PIER in a few months. Smaller programs or those with limited resources might need more time. What is most important is to determine how you plan to structure training (PGY in which content is delivered, frequency, time allowed for topics) in addition to whether you integrate PIER into existing scheduled rotations or create a specific informatics rotation, deliver via didactic lecture, self-study, on-the-job practice or a mixture of delivery methods, etc. This step can take time but is a very important step. The following are some tips to consider as part of your planning and setup process:

- Review the PIER Resource Toolkit and determine which portions of the PIER curriculum you want to use/implement in your program that supports meeting the ACGME Milestones for informatics.

- Meet with faculty and technical staff with expertise and interest in informatics to review the curriculum.
- Meet with chief residents and/or residents as a group to get feedback on PIER implementation.
- Take stock of what you currently have in place for informatics training.
- Make note of existing informatics related activities and resources that can be continued as part of your PIER implementation (eg, resident participation in conferences, academic writing, accessing the EHR, online informatics resources).

Be sure to allow enough time to properly plan and set up your unique curriculum. Once the planning and setup steps are complete, the curriculum can be reused for each new group of incoming residents with only minor adjustments. Thus, the planning and setup time commitment will decrease over time.

5.2 Obtain Resources

Content

Access to PIER resource options is now easier and more convenient for both program directors and residents. PIER Release 5 provides electronic links to the majority of resources such as journal articles, online courses/presentations, web pages, and other online tools.

However, a few resources may require purchase or use of a membership login to obtain. You should obtain these resources during your curriculum planning and setup phase.

The following are additional tips for obtaining resources:

- Review what informatics content you may already have in place that could be modified and reused to map to the PIER curriculum.
- Identify the feasibility of setting up an informatics resource center or have residents share materials (eg, textbooks).
- Check out the PIER Resources for more information on recommended and supplemental resources that are available for the PIER curriculum.

Faculty

Faculty resources can be a challenge especially for smaller programs and those with limited resources. The following are some suggestions provided by program directors in similar situations who found ways to successfully implement PIER.

- Identify content experts or resources prior to beginning implementation.
 - Meet with any pathology faculty and technical staff with information technology or basic informatics knowledge to find out how they might be able to aid with didactic content, practical exercises, mentoring, or resources.
 - Identify non-pathology system information technology resources – both staff and faculty that could assist in didactic lectures or could support practical exercises.
 - Staff or faculty in institutional IT departments may be looking for ways to increase scholarly activity and may be interested in the opportunity to teach residents.
- Explore the possibility of partnering with other (non-pathology) residency programs at your institution. You may be surprised at how interested other programs are in introducing “informatics” into their curriculum. Support from multiple programs helps drive informatics curriculum at the graduate medical education level.
- Explore partnering with other pathology residency programs at different institutions.
 - For example, partner with a larger program to broadcast select informatics sessions to your residents.
- Establish elective options for residents to fill gaps.
- Support resident attendance at pathology annual conferences to get more in-depth exposure to this topic.

5.3 Map Out Your Course Content, Practical Exercises, and Scheduling Plans

The easiest method for mapping your course content, practical exercises, and scheduling plans is to begin with the Resource Toolkit. The Toolkit provides the curriculum that was built around the ACGME Milestones. Use PIER materials and the Resident Assessment tool as a guide to structure your course materials and resident’s schedules. Determine which topics will be delivered by lecture, self-study, peer conferences, and which may be delivered by other departmental staff, or external resources (eg, online training, guest lectures, conferences).

Next, you will want to determine the delivery schedule for each of the topics and the practical exercises you plan to use to support the various topics.

5.4 Assessing Your Resident's Knowledge

The following are suggestions for how you can effectively assess whether your resident achieves the objectives and ACGME associated Milestones.

1. **Direct Observation** – Use the practical exercises as both a learning tool and means by which faculty can observe the residents knowledge/skill in an applied situation.
2. **Faculty Feedback** – Depending on how a program is implementing PIER, there could be one or more faculty who has interacted with the resident. If multiple faculty members are involved, they should work together to reach a consensus on the resident's achievement. Also, if the program director is the point of contact for the checklist, he/she should talk to the faculty directly involved in teaching PIER (ie, not just rely on the resident self-assessment).
3. **Assessment** – Programs can certainly develop their own in-house tests. Consider who beyond your department (or institution) might be a good resource to involve in this effort in order to ensure any tests are aligned with the training provided (ie, similar to the teaching of PIER, it does not only have to be pathology faculty who are involved).
4. **Peer/Other Feedback** – Do any of the practical exercises require residents to work with each other or with non-pathology faculty (eg, informatics staff)? If so, requesting feedback from these people would be an appropriate step to take as well prior to meeting with the resident.

6 IMPLEMENTATION: HELPFUL HINTS AND TIPS

The following are some helpful hints and tips provided by program directors who have successfully implemented PIER into their curriculum.

Content Design and Practical Exercises

Question: My facility does not have any preexisting informatics teaching content. Do you have any suggestions for creating content from scratch? Is there a form that can be used to ensure the main points for each topic are covered?

PIER provides a significant number of resources with most of them free or at a low cost. If you don't have any existing teaching material, review the PIER resources for content that you can

use to either develop lecture material or to assign self-study material for the resident. Other resources that may be of assistance in developing informatics content:

- CAP [Clinical Informatics Resources](#) webpage
- CAP resource guides for **Clinical Informatics** and **Digital Pathology**:
<https://www.cap.org/member-resources/pathology-resource-guides>.

Question: How much depth should I go into for each topic?

Use the PIER learning objectives and subtopics to help determine how deeply you should cover a topic. The only caveat would be to allow your faculty/informatics experts to add content as they feel necessary.

Remember this is a basic curriculum. The intention of PIER is to provide the resident with the basic knowledge to meet the first four levels of the ACGME Milestone requirements.

Faculty

Question: What do I do if I do not have informatics experts on staff to assist with PIER training or topic content development?

Explore non-pathology resources such as your information technology or information system staff. You may find some form of information technology support at the institutional level. PIER has significant resources that include different types of learning options that allow the resident to be more in control of what, when, and how they learn.

There will almost certainly be staff at your institution with experience in information technology. The challenge for non-laboratory staff will be to modify their knowledge and expertise to fit the PIER curriculum. Another option is to partner with other pathology programs in your local area that may have established informatics programs or technical expertise. You may also want to determine if any of your residents have informatics expertise or a special interest in the topic. Utilize these residents to assist with lecture content development or to make informal presentations to residents.

Scheduling PIER with Resident Rotations

Question: Resident schedules are already tightly packed with other curriculum content; how do I add the PIER curriculum to the schedule?

Incorporate the PIER curriculum into current rotations or set up a standalone informatics rotation. Some topics do lend themselves to integration with certain rotations. For example, molecular pathology is very “bioinformatics” heavy, so you could include informatics in such a rotation. Scheduling specific time during the four year curriculum seems to allow for better continuity in learning the PIER topics and has made scheduling much easier. However, creating a dedicated rotation is not something that every program would be able or want to do.

Make a conscious decision to give PIER significant importance in your curriculum. Consider carving out a block of time (eg, four weeks) to devote to informatics education. For example, replace a four week elective with the PIER curriculum. The PIER curriculum may not demand the full four weeks but there are lots of creative ways to make good use of the time. For example, you can look at incorporating other topics in this same time period (eg, genomics or bioinformatics). Another benefit of a four week rotation is the ability to participate in a large informatics project (part of the final assessment) that can be a benefit both to the residents and the department. The practical exercises may provide you with possible ideas for projects.

Question: How might I map the PIER topics to residency rotations to better facilitate completing all the PIER topics?

Associating PIER topics with a specific residency rotation is probably going to be unique for each residency program. During the initial set up of your PIER curriculum, discuss the topic and practical exercise alignment with your faculty and information technology experts. They can help you to identify the best opportunities for associating PIER topics and practical exercises with a designated rotation. The following are two examples of different methods demonstrating the implementation of PIER within rotations.

Example 1: Traditional Classroom

Establish a one week course during the first six months of your resident’s PGY-2 year to provide the basics of informatics. Reinforce the basics through practical exercises that align to predetermined rotations during the remainder of PGY-2 through PGY-4.

Example 2: Active Learning

Limit the number of didactic lectures to the very basic concepts. Start with a lecture and then follow it up with a project or assignment of applicable practical exercises for the Essentials topic. Increase the number of team based interactive learning activities (eg, residents lead topic

discussions, experience sharing, sharing of an informatics project, and group discussions). One or more hours are required for this type of session, so be prepared to include this time within the rotation schedule. It is suggested for this method that you begin with the PGY-1 year.

More Hints and Tips

Do you have hints or tips related to PIER implementation that you would like to share? Send your suggestions or tips to Sarah Bootz, PIER Project Lead at sbootz@cap.org.