PIER Resident Assessment Tool

The PIER Resident Assessment Tool containing the topics, learning objectives, and subtopics of PIER. It acts as a self-reporting assessment tool allowing you and your residents to monitor and track their progress towards the attainment of the PIER Essentials Learning Objectives

The section provides the topic, learning objectives, 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

Learning Objectives	Subtopics	Year	Rotation	Complete
3.1 Describe the competing demands of data availability and data security within and between health systems.	• 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.	• 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.	• 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.	• 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.

Topic 1: Informatics in Pathology Practice				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
1.1 Describe the differences between information technology and informatics.	• Distinction between informatics and information technology (IT) • Scope of pathology IT: systems and tasks • Pathology IT, informatics, lab administration relationship			
1.2 Explain the relevance of informatics to the practice of pathology and lab medicine.	• Scope of informatics knowledge and expertise necessary for daily practice of pathology • Data literacy for pathology practice (eg, how to extract, how to use, how to manage)			
1.3 Describe the appropriate relationship between pathology informatics and clinical informatics within a health system.	• Practices of and interactions between clinical and pathology informatics • Difference between pathology data (eg, specimen centric) from other sub-disciplines of health informatics (eg, patient centric) • Roles that pathologists can play in EMR-based laboratory IT environment			
1.4 Use correct terminology to describe the major types and components of computer hardware and software.	• Key components of computer hardware diagram and software • Networks: communications, architecture, protocols • Major types of software: system vs. application software • Architecture of software			
Practical Exercises (List exercises completed)				

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Topic 2: Data Science				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
2.1 Define the core aspects related to data.	• Data representation: unstructured vs. structured data • Data quality (i.e. accuracy, completeness, validity, consistency, uniqueness, timeliness and fitness for purpose) • Data flow in an organization from creation to use • Overview of data science applied to pathology			
2.2 Understand fundamentals of statistical approaches to data analysis.	• Descriptive Statistics (mean, median, standard deviation) • Inferential Statistics (hypothesis testing, confidence intervals) • Common Statistical Tests Used in Pathology Research			
2.3 Describe the major features of big data.	• Key Features of Big Data (5Vs of Big Data: volume, velocity, variety, veracity, value) • Sources of Big Data in Pathology (genomics, imaging, EHRs) • Integration of big data analytics in pathology practice			
2.4 Define artificial intelligence and machine learning.	• Algorithm categories, supervised vs. unsupervised learning, CNN • Generative AI: definition, applications in pathology (image analysis, diagnostics) • Best practices of performance verifications • Common performance problems: bias, drift, brittleness • Framework for AI implementation in pathology • Ethical and Regulatory Considerations of AI in Healthcare			
Practical Exercises (List exercises completed)				

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Practical Exercises (List exercises completed)				

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Topic 4: LIS Components and Functions				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
4.1 Define the core function, role, and LIS elements - dictionaries, interfaces, audit trails, billing, and dictation systems.	• Definition and major features of the LIS • Outreach systems			
4.2 Describe the role of the LIS in facilitating appropriate ordering of tests by clinicians.	• Role of the LIS in laboratory operation • AP and CP LIS similarities and differences • Specialized LIS (i.e., reasons, distinctions and uses)			
4.3 List and define commonly used automated operational rules in the laboratory.	• Automated Calculations: Built-in computations (e.g., eGFR, LDL cholesterol) • Autoverification: Automatic validation and release of test results • Reflex Testing Rules: Triggering additional tests based on results • Quality Control Checks: Delta checks and critical value alerts			
4.4 Describe importance of barcode technology applications and tracking as the key aspects of a positive patient identification process/protocol.	• Asset tracking systems: barcodes & RFID, software, hardware, dashboards • Benefits of tracking • Routing vs. tracking • Current barcode standards			
4.5 Explain the role of the LIS in monitoring the quality of lab performance and error tracking/reduction.	• Positive patient identification • Test utilization in the laboratory • Error tracking and reduction			
Practical Exercises (List exercises completed)				

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Topic 5: Messaging Standards, Interoperability, and Interfaces				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
5.1 Understand the basics of the standards development process.	• Role of pathologist in development and adoption • Standard development organizations (SDOs) (eg, HL7, ISO, IHE, ONC)			
5.2 List the key features of the communication standard, HL7.	• Features of HL7, versions, benefits and limitations			
5.3 Describe the characteristics and appropriate applications of standard terminologies used to represent pathology data in the LIS and EHR.	• Definition and types of interoperability: syntactic vs. semantic • Clinical interoperability: CPT, ICD, SNOMED CT, DICOM, UCOM, and LOINC • AP interoperability: CAP cancer protocols			
5.4 Describe middleware, how it relates to the LIS, and roles for middleware in laboratory operations.	• Definition and types of laboratory interface • Middleware definitions, types, and roles in the laboratory			
5.5 Describe the importance of ancillary data (eg, from middleware, financial systems, business intelligence) to optimize the clinical, operational, and financial performance of the laboratory.	• Data-driven decision making (DDDM): steps, benefits, best practices and challenges			
Practical Exercises (List exercises completed)				

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Topic 6: Clinical Decision Support				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
6.1 Describe the role, architecture, and general guideline for an effective CDS.	• Systems of decision-making (type I vs. type II) • General guideline: the five rights and 10 commandments			
6.2 List categories and common applications of CDS.	• Resource utilization vs. result value (examples) • Categories: ordering, education, diagnostics			
6.3 Explain common limitations and challenges in CDS deployment.	• Alert fatigue, automation bias • Governance and implementation			
6.4 Describe the methods of evaluating CDS effectiveness.	• CDS tool and utilization metrics: acceptance rate • Outcome vs. process measure, longitudinal vs. randomized study • Examples of CDS success in your organization			
Practical Exercises (List exercises completed)				

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Topic 7: Digital Pathology Systems				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
7.1 Articulate the uses of digital pathology systems in the practice of pathology.	• Basic principles of imaging management (eg, capture, storage, retrieval, viewing) • Types of digital images (eg, static, dynamic, WSI) • Types of digital pathology applications (eg, telepathology video streaming, Whole slide imaging)			
7.2 Describe the impact of the format and resolution of images application in pathology.	• Image Formats in Digital Pathology: Understanding different file types and their appropriate uses (JPEG, TIFF, DICOM) • Image resolution vs. file size and storage: compression techniques (lossy vs. lossless) • Display and Viewing Requirements: Monitor specifications and calibration, Influence on image perception			
7.3 Explain the potential role of image analysis for patient care and pathologist productivity.	• Primary methods: image processing, pattern recognition • Computer aided diagnosis vs. prognosis • Applications: cell counting, mitosis detection, morphometry, etc.			
7.4 Explain validation and regulatory requirements of digital pathology systems.	• CAP guideline for validating anatomic pathology specimens: Recommendations and good practice statements			
Practical Exercises (List exercises completed)				

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Topic 8: Pathologist Role in LIS and EHR Projects				
Learning Objectives	**Subtopics**	**Year**	**Rotation**	**Complete**
8.1 Explain the role and responsibilities of pathologists in managing test ordering and lab result display in the EHR.	• Pathologist involvement in LIS and EHR projects, including decision support and troubleshooting order and result display issues • Common data challenges in the laboratory: orders, results, etc.			
8.2 Understand the process and requirements for test definitions.	• Process of building a test: request, vet information, build, test, copy, monitor • Characteristics of high-reliability system environment for test changes • Best practices for testing the build			
8.3 List the key steps in the evaluation, selection, and implementation of a new LIS or module.	• LIS life cycle: requirements, selection, installation and testing, operation and maintenance, termination • System selection: RFI vs. RFP • LIS system configuration (eg, test creation and maintenance, dictionaries maintenance) • LIS testing and training			
8.4 Understand the accreditation and regulatory aspects of information maintenance in the LIS.	• Laboratory IT procedure manual : General operation, LIS, other systems, interfaces, reports, quality assurance, security, disaster recovery • Change control document • CAP checklist			
Practical Exercises (List exercises completed)				

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