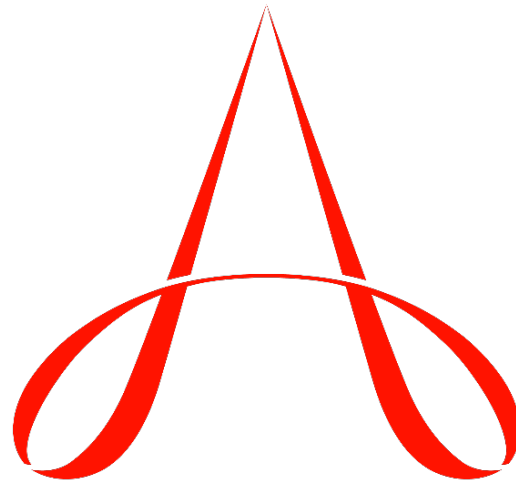




Supplemental Guide: Pathology



A C G M E

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Pathology Milestones. This is not designed to indicate any specific requirements for each level, but to provide insight into the thinking of the Milestone Work Group.

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information.

Review this guide with the CCC and faculty members. As the program develops a shared mental model of the Milestones, consider creating an individualized guide (Supplemental Guide Template available) with institution/program-specific examples, assessment tools used by the program, and curricular components.

Additional tools and references, including the Milestones Guidebook, Clinical Competency Committee Guidebook, and Milestones Guidebook for Residents and Fellows, are available on the [Resources](#) page of the Milestones section of the ACGME website.

Patient Care 1: Reporting (Anatomic Pathology/Clinical Pathology [AP/CP]) Overall Intent: To ensure resident can generate effective pathology reports for both simple and complex cases, while using nuanced language and providing appropriate recommendations	
Milestones	Examples
<p>Level 1 <i>Identifies the key elements of a report and demonstrates understanding of timely reporting</i></p> <p><i>Identifies the importance of a complete pathology report for optimal patient care</i></p>	<ul style="list-style-type: none"> • Lists the key elements of a surgical pathology report: clinical history, source of specimen, surgical procedure, gross description, microscopic description, and diagnosis (AP) • Engages with pathology attending to promote timely turnaround time
<p>Level 2 <i>Generates a timely report for a simple case, with assistance</i></p> <p><i>Identifies implications of the diagnosis in the report and makes simple recommendations</i></p>	<ul style="list-style-type: none"> • Develops a report for simple surgical pathology case, such as a tubular adenoma (AP), or a peripheral blood smear showing acute blood loss anemia (CP)
<p>Level 3 <i>Generates a timely report that includes synoptic templates and/or ancillary testing for a complex case, with assistance; independently generates reports for a simple case</i></p> <p><i>Generates an amended/addended report that includes updated information, with assistance</i></p> <p><i>Generates a report that includes the language of uncertainty, as appropriate, with assistance</i></p>	<ul style="list-style-type: none"> • Develops a surgical pathology report for a more complex specimen such as a colon resection for cancer, including College of American Pathologists (CAP) synoptic templates (AP) • Generates a transfusion reaction report for suspected transfusion-related acute lung injury (TRALI) (CP) with assistance; includes language of uncertainty if case was probable but not definitive TRALI
<p>Level 4 <i>Independently generates timely integrated reports for complex cases</i></p> <p><i>Generates an amended/addended report and documents communication with the clinical team, as appropriate</i></p> <p><i>Independently generates a report that includes the language of uncertainty and complex recommendations</i></p>	<ul style="list-style-type: none"> • Independently develops a surgical pathology report for complex case of colon cancer in Lynch syndrome, including microsatellite instability genetic testing (AP) • Documents discussion of complex transfusion reaction with clinical providers (CP) • Generates complex interpretations for coagulation studies, integrating multiple test results, and providing recommendations for any follow-up testing (CP)
<p>Level 5 <i>Independently generates a nuanced report that expresses the ambiguity and uncertainty for a complex case</i></p>	<ul style="list-style-type: none"> • Consistently generates complex reports, incorporating biomarkers with therapeutic implications, Her2/Neu testing for breast cancer, and Nottingham scores (AP) or complex

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	hematopathology reports incorporating flow cytometry, fluorescence in situ hybridization (FISH), and molecular studies (CP)
Assessment Models or Tools	<ul style="list-style-type: none"> • Review of reports at sign out (real-time or retrospective) • Prospective review of reports • Attending evaluation during daily sign out
Curriculum Mapping	•
Notes or Resources	<ul style="list-style-type: none"> • College of American Pathologists (CAP). Cancer Protocol Templates www.cap.org/cancerprotocols 2018. • Smith SM, Yearsley M. Constructing comments in a pathology report: advice for the pathology resident. <i>Arch Pathol Lab Med.</i> 2016; 140(10): 1023-1024. • Nakhleh RE, Myers JL, Allen TC, et al. Consensus statement on effective communication of urgent diagnoses and significant, unexpected diagnoses in surgical pathology and cytopathology from the College of American Pathologists and Association of Directors of Anatomic and Surgical Pathology. <i>Arch Pathol Lab Med.</i> 2012; 136(2): 148-154. • Rosai J, Bonfiglio TA, Carson JM, et. al. Standardization of the surgical pathology report. <i>Mod Pathol.</i> 1992; 5(2): 197-199.

Patient Care 2: Grossing (AP) Overall Intent: To ensure the resident can skillfully perform tissue triage, gross examination, dissection, sectioning, section selection, and documentation (grossing) for any and all specimen types in a timely manner while assuring specimen integrity	
Milestones	Examples
<p>Level 1 <i>Identifies the importance of grossing and uses appropriate resources</i></p> <p><i>Maintains specimen integrity to avoid sample misidentification</i></p> <p><i>Identifies the need for time management</i></p>	<ul style="list-style-type: none"> • Refers to appropriate anatomy textbooks, grossing aids • Rinses utensils between cases; one specimen on grossing bench at a time; triages cases • Confirms labeling on requisition, sample, and gross report in laboratory information system (LIS) • Discusses impact of breast fixation time on subsequent testing integrity
<p>Level 2 <i>Samples and documents simple cases, with assistance</i></p> <p><i>Identifies specimen integrity issues (e.g., fixation, floaters, clinical-pathologic correlation with operating room reports)</i></p> <p><i>Needs assistance to handle workload</i></p>	<ul style="list-style-type: none"> • Grosses gallbladder, appendix, skin shaves, and/or benign uterus • Takes care not to blend inks on breast specimens • Appropriately triages to optimize fixation • Recognizes need to replace formalin in cassette container at specified intervals
<p>Level 3 <i>Triages, samples, and documents complex cases, with assistance; independently triages, samples, and documents simple cases</i></p> <p><i>Resolves specimen integrity issues, with assistance</i></p> <p><i>Handles assigned workload with minimal to no assistance</i></p>	<ul style="list-style-type: none"> • Grosses a colon resection for carcinoma or pancreaticoduodenectomy specimen • Triages soft tissue for cytogenetics or lymph node for flow cytometry • Submits tumor for tissue banking using departmental protocols • Manages tissue to minimize contamination from other samples • Proactively submits additional tissue when needed
<p>Level 4 <i>Independently triages, samples, and documents complex cases</i></p> <p><i>Independently resolves specimen integrity issues, as needed</i></p> <p><i>Efficiently finishes own workload and assists others as needed</i></p>	<ul style="list-style-type: none"> • Grosses hemipelvectomy, complex head and neck specimens • Identifies specimen mix-up and resolves with histology laboratory

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<p>Level 5 <i>Applies innovative approaches of grossing to demonstrate optimal pathology in unique specimens</i></p> <p><i>Serves as an expert for gross examination</i></p>	<ul style="list-style-type: none"> • Is the person the department turns to for advice about unique and difficult cases that need grossing • Grosses explants from congenital heart disease with markedly distorted anatomy
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Assessment from pathology assistants • Portfolio • Competency assessment • Surgical pathology report (and/or gross specimen review) to determine accuracy of dictation and gross description • Grossing laboratory metrics review (number of cases/blocks grossed by a resident on a given day) • Surgical pathology metrics and quality review (number of floaters, number of poorly fixed specimens and quality trends, by resident)
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Departmental protocols • Lester SC. <i>Manual of Surgical Pathology</i>. 3rd ed. Philadelphia, PA: Elsevier Saunders; 2010. • CAP. Cancer Protocols. www.cap.org/cancerprotocols 2018. • CAP. Current CAP Guidelines (various) - https://www.cap.org/protocols-and-guidelines/current-cap-guidelines • Lott R, Tunnicliffe J, Sheppard E, et al. Practical guide to specimen handling in surgical pathology. Version 6.0. Revised November 2015 • Banks P, Brown R, Laslowski A, Daniels Y, et al. A proposed set of metrics to reduce patient safety from within the anatomic pathology laboratory. <i>Lab Med</i>. 2017; 48; 195-201

Patient Care 3: Clinical Consultation, including On-Call Interactions (AP/CP) Overall Intent: To provide a high-quality clinical consultation, including intra- and inter-departmental, formal, and informal	
Milestones	Examples
Level 1 <i>Describes the utility of a consultation and lists available resources useful in consultation</i>	<ul style="list-style-type: none"> Refers to testing algorithm to identify best test to diagnose Lyme disease Refers to test directory to identify procedure to have tissue sent out for karyotyping or sequencing
Level 2 <i>For simple consultations, delineates the clinical question, obtains appropriate additional clinical information, accesses available resources, recommends next steps, and documents appropriately with assistance</i>	<ul style="list-style-type: none"> Recommends performance of enzyme-linked immunosorbent assay testing to diagnose Lyme disease and if recommends performance of Western Blot; understands false positives and next steps; shares the published research and data with clinician after review with attending Clarifies need for cytogenetic testing on resected surgical specimen, recommends fresh tissue, and knows that frozen tissue is unacceptable
Level 3 <i>For complex consultations, delineates the clinical question, obtains appropriate additional clinical information, applies relevant resources, and recommends next steps with assistance; manages simple consultations independently</i>	<ul style="list-style-type: none"> Explains discrepant test result for Hepatitis B core antibody by clarifying clinical question, gathering and reviewing history and data, reviewing literature, developing a list of possible explanations for discrepant results, and recommends next steps to clinician (after review with attending) Recommends type and size of specimen for best test on tissue to determine v-Ki-ras2 Kirsten rat sarcoma mutation, considers other tests, scope of mutations needed, and current published guidelines; shares the published research and data with clinician after review with attending
Level 4 <i>Manages complex consultations independently</i>	<ul style="list-style-type: none"> Gathers and reviews history and data of patient with apparent blood transfusion reaction; recommends testing and evaluation; recommends management and subsequent transfusion plan to the clinician Attends and appropriately participates in a rapid onsite evaluation of patient with apparent transfusion reaction, reviews clinical history; evaluates adequacy of sample collected; generates differential diagnosis based on morphology; triages sample appropriately for ancillary testing For a patient with a pediatric soft tissue malignancy who initially presents after hours, emergently, and at an outside facility, provides comprehensive information (and consultation) to referring surgeon and oncologist regarding options for appropriate diagnostic tissue acquisition and analysis (i.e. FNA, frozen section, cytogenetics)
Level 5 <i>Recognized as an expert in providing comprehensive consultations</i>	<ul style="list-style-type: none"> Sought out by attending faculty members and/or clinicians for consultative expertise
Assessment Models or Tools	<ul style="list-style-type: none"> Direct observation Portfolio Chart review

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	<ul style="list-style-type: none"> • Review of on-call logs • Simulation
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Consultation can include a variety of interactions: <ul style="list-style-type: none"> ○ Clinician to resident ○ Resident to resident ○ Student to resident ○ Nursing, PA, or other health professional to resident ○ On-call, outpatient, and inpatient ○ Formal reports ○ Written or verbal advice and guidance • Schmidt RL, Panlener J, Hussong JW. An analysis of clinical consultation activities in clinical pathology: who requests help and why. <i>Am J Clin Pathol.</i> Sep;142(3):286-91.

Patient Care 4: Interpretation and Diagnosis (AP/CP)

Overall Intent: To appropriately use laboratory data to make correct diagnoses to direct effective patient care

Milestones	Examples
<p>Level 1 <i>Discusses importance of diagnoses and test results in patient care</i></p> <p><i>Identifies normal states and reference ranges</i></p> <p><i>Describes indications for common tests</i></p>	<ul style="list-style-type: none"> • Correctly uses and interprets basic chemistry and hematology tests, culture, and tissue-based approaches • Appreciates normal histology and basic histologic patterns
<p>Level 2 <i>Identifies pertinent test results and correlates to clinical findings to develop a differential diagnosis</i></p> <p><i>Distinguishes normal from abnormal findings</i></p> <p><i>Proposes appropriate initial tests</i></p>	<ul style="list-style-type: none"> • Correctly interprets hepatitis serology, discerns normal from infection from vaccination • Correlates radiologic findings to guide tissue sampling in anatomic pathology • Correctly interprets hyperplasia, neoplasia, metaplasia, and infectious processes
<p>Level 3 <i>Consistently integrates test results with clinical findings to refine differential and propose a diagnosis</i></p> <p><i>Identifies confounding factors, artifacts, and pre-analytic issues</i></p> <p><i>Proposes and interprets ancillary tests in clinical context</i></p>	<ul style="list-style-type: none"> • Correlates clinical impression and laboratory results to generate and focus a differential diagnosis • Identifies hemolysis leading to elevated potassium in blood samples or underfixed sections in surgical pathology • Correctly interprets most surgical pathology cases (non-neoplastic and neoplastic), can accurately interpret IHC stains, and can reconcile artifacts and floaters
<p>Level 4 <i>Makes accurate diagnoses and interpretations of test results</i></p> <p><i>Gives consideration to confounding factors in formulating an interpretation(s) and diagnoses</i></p> <p><i>Recommends further work-up using diagnostic algorithms and recommends therapeutic options, as appropriate</i></p>	<ul style="list-style-type: none"> • Correctly interprets culture, matrix-assisted laser desorption/ionization, and molecular methods to detect/characterize a microbe, recommends use of appropriate antibiotic • Histologically diagnoses cancer, recommends molecular studies needed, and selects an appropriate tissue sample • Identifies heterophile antibody or tumor regression following neoadjuvant chemotherapy
<p>Level 5 <i>Is an expert diagnostician</i></p>	<ul style="list-style-type: none"> • Manages complex cases and diagnoses correctly

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<i>Proposes optimal diagnostic and therapeutic strategies based on patterns within a population</i>	<ul style="list-style-type: none"> • Sought by attending faculty and/or clinicians for diagnostic expertise
Assessment Models or Tools	<ul style="list-style-type: none"> • Attending assessment of daily work encounters • Standardized assessments and practical exams • Structured case discussions, unknown conferences • Clinical management conferences
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Reddy VB, Gattuso P, David O, et al. <i>Differential diagnosis in surgical pathology</i>. 3rd Ed. Philadelphia, PA: Elviesier: 2014.

Patient Care 5: Intra-Operative Consultation (IOC), including Frozen Section (FS) (AP) Overall Intent: To provide efficient, high quality intraoperative consultations for both simple and complex cases, which are tailored to the individual clinical situation and patient	
Milestones	Examples
<p>Level 1 <i>Describes appropriate channels for communication regarding IOC</i></p> <p><i>Discusses specimen-dependent variability in approach to IOC</i></p> <p><i>Demonstrates understanding of utility of IOC</i></p>	<ul style="list-style-type: none"> Recognizes the need for timely communication with the surgeon and the implications of the information communicated
<p>Level 2 <i>Assesses requests for simple IOC and plans workflow, with assistance</i></p> <p><i>Procures tissue for diagnosis and prepares quality slides on simple specimens, with assistance</i></p> <p><i>Identifies broad diagnostic categories (i.e., benign versus malignant, normal versus abnormal) in routine IOC</i></p>	<ul style="list-style-type: none"> Recognizes the difference between specimens sent for margins to guide intraoperative strategy versus specimens sent for diagnosis Assesses request for IOC with communication with clinical team for clarification as needed Identifies lesional tissue before sampling <ul style="list-style-type: none"> With assistance, prepares frozen section on straightforward specimen (e.g., margin)
<p>Level 3 <i>For complex cases, addresses requests for IOC with assistance; independently assesses and manages requests for simple IOC and plans workflow</i></p> <p><i>Procures tissue for diagnosis and prepares quality slides for complex specimens with assistance and independently for simple specimens</i></p> <p><i>Interprets and communicates routine IOC/FS and correlates with final diagnosis, with assistance</i></p>	<ul style="list-style-type: none"> With assistance, prepares frozen section on pancreaticoduodenectomy resection Independently prepares frozen section on straightforward specimen (e.g., margins) <ul style="list-style-type: none"> Communicates interpretation of IOC to surgeon with faculty member assistance Prepares appropriate slides for squash preps for neurosurgical cases, touch preps to compare cytology, choosing an en face margin versus a perpendicular margin <ul style="list-style-type: none"> Appropriately prioritizes tissue allocation in specimens with limited amount (e.g., submitting tissue for flow cytometry versus permanent versus saving for tissue banking)
<p>Level 4 <i>For complex cases, independently manages and addresses requests for IOC</i></p>	<ul style="list-style-type: none"> Prepares frozen section on complex pancreaticoduodenectomy without assistance

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<p><i>Supervises junior residents and advises technical staff members in the performance of IOC</i></p>	<ul style="list-style-type: none"> • Communicates interpretation of IOC to surgeon with faculty backup as needed
<p><i>Independently interprets and communicates IOC/FS and correlates with final diagnosis in routine cases and in some complex cases</i></p>	<ul style="list-style-type: none"> • Appropriately triages intraoperative consultations when multiple cases are occurring simultaneously
<p>Level 5 <i>Expertly manages all IOC</i></p>	<ul style="list-style-type: none"> • Serves as a resource to others in the gross room in orienting complex specimens and identifying optimal sections for intraoperative consultation • Independently interprets all IOC (simple and complex) without backup
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation in gross room and review of quality of prepared slides for sign out (real time) • Correlation of IOC with final diagnoses (real time) • Portfolio review for a range of IOC specimens (retrospective)
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Powell SZ. Intraoperative consultation, cytologic preparations, and frozen section in the central nervous system. <i>Arch Pathol Lab Med.</i> 2005; 129(12): 1635-52. • Marchevsky AM, Blazer B, Abdul-Karim FW. <i>Intraoperative consultation: a volume in the series: foundations in diagnostic pathology.</i> 1st ed. Philadelphia, PA: Elsevier Saunders: 2014. • Taxy JB. <i>Biopsy interpretation: the frozen section.</i> 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins: 2010.

Patient Care 6: Autopsy (AP)

Overall Intent: To perform complete (routine, complex, unique) autopsies (including autopsy pre-work, gross dissection, preparation of preliminary and final reports, selection of appropriate ancillary studies as needed, and formulation of clinicopathologic correlations) in a timely manner, while adhering to institutional and regulatory guidelines; use aggregated autopsy data to inform ongoing patient care and advance medical knowledge

Milestones	Examples
<p>Level 1 <i>Describes the value of an autopsy</i></p> <p><i>Reviews clinical records and concisely presents clinical data and history; communicates with clinical team</i></p> <p><i>Properly identifies the decedent and verifies consent and limitations to extent of the autopsy</i></p>	<ul style="list-style-type: none"> • Concisely summarizes the relevant medical record, presents clinical information on an autopsy case to the faculty members, communicates with the clinical team, and formulates the question(s) to be answered by the autopsy • Understands and clearly articulates the value of the autopsy for clinicians and family members • Reviews the autopsy consent form prior to starting the case and verifies that autopsy consent form is signed by the legal next of kin (as defined by state law), recognizes limitations to the extent of autopsy and proceeds accordingly (adheres to autopsy limitations), and is able to properly identify the decedent and recognize discrepancies in decedent identity
<p>Level 2 <i>Plans and performs all aspects of routine autopsies, with assistance</i></p> <p><i>Generates preliminary anatomic diagnosis within accepted turnaround time</i></p> <p><i>Adheres to regulations with guidance, such as legal jurisdiction, statutes regarding device reporting and communicable diseases</i></p>	<ul style="list-style-type: none"> • Plans for any special techniques or ancillary studies (e.g., cultures) needed for routine autopsy • With assistance, performs all aspects of a routine autopsy for sudden death due to myocardial infarction in previously healthy individual, including autopsy pre-work, gross dissection, tissues/block selection, microscopic evaluation, and preparation of preliminary and final reports in a timely manner • Consistently meets institutional and regulatory guidelines for expected autopsy turnaround times, including preliminary and final reports • Identifies cases that need to be reported to the medical examiner or coroner, including risk management, patient safety, etc., in which legal or institutional processes and/or specific documentation must be implemented, such as reporting of previously undiagnosed communicable disease, device use, and discusses appropriate steps with faculty members
<p>Level 3 <i>Plans and performs all aspects of complex autopsies, with assistance</i></p> <p><i>Independently generates final report with clinicopathologic correlations on routine autopsies; with assistance, generates final</i></p>	<ul style="list-style-type: none"> • Performs all aspects of a routine autopsy for sepsis due to gangrenous cholecystitis in previously healthy individual, including autopsy pre-work, gross dissection, tissue/block selection, microscopic evaluation, preparation of preliminary and final reports, and formulation of clinicopathologic correlations independently and in a timely manner • With some assistance from an autopsy technician and/or senior level resident and/or faculty member, performs all aspects of a complex autopsy for a patient with previously

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<p><i>report with clinicopathologic correlations on complex autopsies</i></p> <p><i>Independently adheres to regulations</i></p>	<p>undiagnosed metastatic disease and multiple tumors in multiple organs, including autopsy pre-work, gross dissection, tissue/block selection, microscopic evaluation, preparation of preliminary and final reports, selection of appropriate ancillary studies (immunohistochemistry on tumor samples), and formulation of clinicopathologic correlations, in a timely manner</p> <ul style="list-style-type: none"> • With guidance from faculty members, consistently follows institutional guidelines and regulations regarding all aspects of autopsy performance and reporting
<p>Level 4 <i>Independently plans and performs all aspects of complex autopsies in a timely manner</i></p> <p><i>Independently generates final report with clinicopathologic correlations on routine and complex autopsies</i></p> <p><i>Instructs junior level residents about regulations</i></p>	<ul style="list-style-type: none"> • Independently performs all aspects of a routine autopsy for a patient with pulmonary embolus due to recent long flight, no inherited conditions, including autopsy pre-work, gross dissection, tissue/block selection, microscopic evaluation, preparation of preliminary and final reports, and formulation of clinicopathologic correlations, in a timely manner • Independently performs all aspects of a complex autopsy for a patient with multiple organ failure and sepsis after a long-standing hospital course, multiple medical interventions, and with multiple pre-existing medical problems, including autopsy pre-work, gross dissection, tissue/block selection, microscopic evaluation, preparation of preliminary and final reports, selection of appropriate ancillary studies, as needed, and formulation of clinicopathologic correlations, in a timely manner • Consistently follows institutional guidelines and regulations regarding all aspects of autopsy performance and reporting, without guidance (independently)
<p>Level 5 <i>Uses advanced skills and non-routine approaches to unique autopsies</i></p> <p><i>Uses autopsy data to identify patterns that advance medical knowledge and improve patient care</i></p>	<ul style="list-style-type: none"> • Serves as a reliable departmental resource for complicated and unique autopsies by using advanced knowledge and skills in autopsy pathology (e.g., neonate with multiple congenital malformations, genetic testing required, consultation with outside agencies) • Regularly reviews own and/or institutional autopsy data to evaluate for trends, and contributes to new discoveries and/or implications to patient care
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Portfolio • Autopsy Case Log review • Autopsy pathology report review (includes gross and microscopic specimen review to determine accuracy of dictation and descriptions) • Written assessments (to evaluate for knowledge about legal and institutional guidelines and processes) • Autopsy pathology metrics and quality review (number of floaters, adequacy of fixation, turnaround time for reports, correlation statistics, adequacy of reporting “reportable” incidents, by resident)
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •

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Notes or Resources

- CAP. Autopsy Topic Center. <https://www.cap.org/member-resources/councils-committees/cancer-topic-center/autopsy-topic-center>
- Center for Disease Control and Prevention. Public Health Law Program: State Death Investigation Guidelines. www.cdc.gov/phlp/publications/coroner/investigations.html
- CAP. Accreditation Checklists. www.cap.org/web/oracle/webcenter/portalapp/pagehierarchy/accreditation_checklists.jsp
- Davis, G. et al Autopsy Working Group in Academic Pathology

Medical Knowledge 1: Diagnostic Knowledge (AP/CP) Overall Intent: To understand the vast body of knowledge required to practice pathology including cellular biology, pathophysiology, normal histology, abnormal histology, and both old and new testing methodologies	
Milestones	Examples
Level 1 <i>Demonstrates basic medical knowledge of anatomy, cellular, and molecular systems</i> <i>Demonstrates knowledge of normal histology and cell biology</i>	<ul style="list-style-type: none"> Identifies human papillomavirus (HPV) as a risk factor for cervical squamous cell carcinoma (AP) Identifies common causes of microcytic, hypochromic anemia
Level 2 <i>Applies anatomic, cellular, and molecular knowledge to identify pathologic processes</i> <i>Identifies abnormal histology and cell biology</i>	<ul style="list-style-type: none"> Identifies high risk HPV serotypes and can begin to explain the cellular biology behind its tumorigenesis (AP) Describes pathophysiologic basis of microcytic, hypochromic anemia, and discusses differential diagnosis thereof
Level 3 <i>Applies advanced knowledge of anatomic, cellular, and molecular pathology to common diagnoses</i>	<ul style="list-style-type: none"> Explains HPV-driven tumorigenesis independently and recognizes that other pathways can lead to carcinoma as well (AP) Compare and contrast different types of anemia (based upon pathophysiology) and apply that knowledge to accurate interpretation of patient results (CP)
Level 4 <i>Integrates advanced knowledge of anatomic, cellular, and molecular pathology to common and uncommon diagnoses</i>	<ul style="list-style-type: none"> Describes other non-HPV driven pathways (AP) Create differential diagnosis for complex CBC result, propose diagnostic work-up, and accurately diagnose results in case of rare hemoglobinopathy (all based upon pathophysiologic foundational knowledge) (CP)
Level 5 <i>Recognized as an expert in the integration of anatomic, cellular, and molecular pathology knowledge to disease</i>	<ul style="list-style-type: none"> Uses knowledge of molecular pathways to help guide clinicians with secondary testing for therapeutic options (AP)
Assessment Models or Tools	<ul style="list-style-type: none"> Direct observation Presentations Teaching evaluations Resident In-Service Examination (RISE)
Curriculum Mapping	<ul style="list-style-type: none">
Notes or Resources	<ul style="list-style-type: none"> Kumar V, Abbas AK, Aster JC. <i>Robbins & Cotran Pathologic Basis of Disease (Robbins Pathology)</i>. 9th Ed. Philadelphia, PA: Elsevier Saunders: 2015. Goldblum JR, Lamps LW, McKenney JK, Meyers JL. <i>Rosai and Ackerman's Surgical Pathology - 2 Volume Set</i>. 11th Ed. Philadelphia, PA: Elsevier, Inc.: 2015. McPherson RA, Pincus MR. <i>Henry's Clinical Diagnosis and Management by Laboratory Methods E-Book</i>. 23rd Ed. St. Louis, MO: Elsevier, Inc.: 2017.

Medical Knowledge 2: Clinical Reasoning (AP/CP)

Overall Intent: To approach a diagnostic work-up in an informed and logical manner using appropriate resources to guide decisions

Milestones	Examples
<p>Level 1 <i>Demonstrates a basic framework for clinical reasoning</i></p> <p><i>Identifies appropriate resources to inform clinical reasoning</i></p>	<ul style="list-style-type: none"> • Navigates electronic medical record, LIS, Internet, and literature to locate necessary information and assess validity of information for a surgical pathology case (e.g., eosinophilic esophagitis [AP]) or clinical pathology case (e.g., acute leukemia [CP])
<p>Level 2 <i>Demonstrates clinical reasoning to determine relevant information</i></p> <p><i>Selects relevant resources based on scenario to inform decisions</i></p>	<ul style="list-style-type: none"> • Extracts pertinent clinical findings from the patient’s medical record and distinguishes between relevant and extraneous data • Is aware of and uses appropriate algorithms, consensus guidelines, and published literature
<p>Level 3 <i>Synthesizes information to inform clinical reasoning, with assistance</i></p> <p><i>Seeks and integrates evidence-based information to inform diagnostic decision making in complex cases, with assistance</i></p>	<ul style="list-style-type: none"> • Employs consensus guideline data to appropriately order PDL1 stain by immunohistochemistry for case of lung cancer • Understands and can describe scientific basis for current screening recommendations for cervical cancer • Uses published literature and recommendations to correctly direct work-up of patient who traveled to a Zika-endemic area
<p>Level 4 <i>Independently synthesizes information to inform clinical reasoning in complex cases</i></p> <p><i>Independently seeks out, analyzes, and applies relevant original research to diagnostic decision making in complex clinical cases</i></p>	<ul style="list-style-type: none"> • Uses histopathologic and molecular data to diagnose central nervous system tumors, myeloid leukemia, or follicular thyroid neoplasms • Uses clinical, laboratory, and epidemiologic data to guide work-up of a patient with infectious encephalitis
<p>Level 5 <i>Demonstrates intuitive approach to clinical reasoning for complex cases</i></p>	<ul style="list-style-type: none"> • Sought by attending faculty members and/or clinicians for expertise
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Review of daily case reports • Clinical management conferences • Unknown slide conferences • Case Logs • Presentations
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Clinical reasoning relies on appropriate foundational knowledge that requires the trainee to apply that knowledge in a thoughtful, deliberate and logical fashion to clinical cases to inform clinical care

- Iobst WF, Trowbride R, Philibert I. Teaching and assessing critical reasoning through the use of entrustment. *J Grad Med Educ.* 2013 Sep;5(3):517-8.

Systems-Based Practice 1: Patient Safety and Quality Improvement (QI) (AP/CP)

Overall Intent: To engage in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals; to conduct a QI project

Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge of common patient safety events</i></p> <p><i>Demonstrates knowledge of how to report patient safety events</i></p> <p><i>Demonstrates knowledge of basic QI methodologies and metrics</i></p>	<ul style="list-style-type: none"> • Has basic knowledge of patient safety events, reporting pathways, and QI strategies, but has not yet participated in such activities
<p>Level 2 <i>Identifies system factors that lead to patient safety events</i></p> <p><i>Reports patient safety events through institutional reporting systems (simulated or actual)</i></p> <p><i>Describes departmental and institutional QI initiatives</i></p>	<ul style="list-style-type: none"> • Identifies and reports a patient safety issue (real or simulated), along with system factors contributing to that issue • Is aware of improvement initiatives within their scope of practice
<p>Level 3 <i>Participates in analysis of patient safety events (simulated or actual)</i></p> <p><i>Participates in disclosure of patient safety events to clinicians and/or patients and families, as appropriate (simulated or actual)</i></p> <p><i>Participates in departmental and institutional QI initiatives</i></p>	<ul style="list-style-type: none"> • Reviews a patient safety event (e.g., preparing for Morbidity and Mortality presentations, joining a Root Cause Analysis group) and has communicated with patients/families about such an event • Participates in a QI project, though they may not have yet designed a QI project
<p>Level 4 <i>Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)</i></p> <p><i>Discloses patient safety events to clinicians and/or patients and families, as appropriate (simulated or actual)</i></p>	<ul style="list-style-type: none"> • Collaborates with a team to lead the analysis of a patient safety event and can competently communicate with patients/families about those events • Initiates and completes a QI project, including communication with stakeholders

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<p><i>Demonstrates the skills required to identify, develop, implement, and analyze a QI project</i></p>	
<p>Level 5 <i>Actively engages teams and processes to modify systems to prevent patient safety events</i></p> <p><i>Role models or mentors others in the disclosure of patient safety events</i></p> <p><i>Creates, implements, and assesses QI initiatives at the institutional or community level</i></p>	<ul style="list-style-type: none"> • Competently assumes a leadership role at the departmental or institutional level for patient safety and/or QI initiatives, possibly even being the person to initiate action or call attention to the need for action
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Simulation • Reflection • Direct observation at bedside or in meetings • E-module multiple choice tests • Chart or other system documentation by fellow • Documentation of QI or patient safety project processes or outcomes • 360-degree evaluations • Portfolio
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Institute of Healthcare Improvement website (http://www.ihl.org/Pages/default.aspx) which includes multiple choice tests, reflective writing samples, and more

Systems-Based Practice 2: Systems Navigation for Patient-Centered Care (AP/CP)

Overall Intent: To effectively navigate the health care system, including the interdisciplinary team and other care providers, to adapt care to a specific patient population to ensure high-quality patient outcomes

Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge of case coordination</i></p> <p><i>Identifies key elements for safe and effective transitions of care and hand-offs</i></p> <p><i>Demonstrates knowledge of population and community health needs and disparities</i></p>	<ul style="list-style-type: none"> • Identifies the members of the interprofessional team, including histotechnologists, laboratory technicians, pathologist assistants, consultants, other specialty physicians, nurses, and consultants, and describes their roles but is not yet routinely using team members or accessing all available resources • Lists the essential components of an effective sign out and care transition including sharing information necessary for successful on-call/off-call transitions for blood banking apheresis procedure and ongoing surgical case in operating room requiring frozen sections • Identifies components of social determinants of health and how they impact the delivery of patient care
<p>Level 2 <i>Coordinates care of patients in routine cases effectively using interprofessional teams</i></p> <p><i>Performs safe and effective transitions of care/hand-offs in routine situations</i></p> <p><i>Identifies pathology’s role in population and community health needs and inequities for their local population</i></p>	<ul style="list-style-type: none"> • Contacts interprofessional team members for routine cases, but requires supervision to ensure all necessary referrals, testing, and care transitions are made and resource needs are arranged for limited platelets available (CP) or limited tissue available for testing (AP) • Performs a routine case sign out but still needs direct supervision to identify and appropriately triage cases or calls (priority versus non-priority case or call) and anticipatory guidance • Identifies different populations within own panel of patients, cases, and/or the local community • Knows which patients are at high risk for specific health outcomes related to health literacy concerns, cost of testing or therapy, LGBTQ status, etc.
<p>Level 3 <i>Coordinates care of patients in complex cases effectively using interprofessional teams</i></p> <p><i>Performs safe and effective transitions of care/hand-offs in complex situations</i></p> <p><i>Identifies opportunities for pathology to participate in community and population health</i></p>	<ul style="list-style-type: none"> • At interdisciplinary tumor boards (e.g., solid organ or hematopoietic malignancies), engages in appropriate discussion of patient care testing options and impact on therapy for complex pathologic cases (AP/CP) • For a patient undergoing apheresis in the intensive care unit (ICU) with pulmonary and renal failure, performs safe and effective transitions of care with pathology transfusion medicine service, blood bank staff, and/or clinical service at shift change (CP) • Appreciates the need for and uses clinic or local resources, such as when coordinating pathology case handling from an outside clinic to the hospital setting for a patient with acute leukemia identified at clinic laboratories who is being transferred to hospital; coordinates specimen handling, ordering of needed tests, and courier schedules (CP) • Appreciates the need for and uses clinic or local resources, such as when platelets or red blood cell products are in short supply, and calls upon available interprofessional team members to optimize care for multiple patients in need, noting this may require

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	<p>coordination with outside blood product suppliers as well as in-house physicians and blood bank personnel (CP)</p>
<p>Level 4 <i>Models effective coordination of patient-centered care among different disciplines and specialties</i></p> <p><i>Models and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems</i></p> <p><i>Recommends and/or participates in changing and adapting practice to provide for the needs of communities and populations</i></p>	<ul style="list-style-type: none"> • Role models and educates students and junior team members regarding the engagement of appropriate interprofessional team members, as needed for each patient and/or case, and ensures the necessary resources have been arranged (AP/CP) • Proactively calls the outpatient doctor to ensure a discharged patient will be followed for their international normalized ratio checks, provides efficient handoff to the ICU team at the end of an apheresis or critical transfusion event investigation, coordinates and prioritizes consultant input for a new high risk diagnosis (such as malignancy or thrombotic thrombocytopenic purpura) to ensure the patient gets appropriate follow up (CP) • Performs quality reviews and correlations between Pap smears and cervical biopsy results to assure appropriate follow up • Identifies patient populations at high risk for poor healthcare outcomes related to hemoglobin A1c or lipids due to health disparities and inequities in screening and implements strategies to improve care (AP/CP)
<p>Level 5 <i>Analyses the process of care coordination and leads in the design and implementation of improvements</i></p> <p><i>Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes</i></p> <p><i>Leads innovations and advocates for populations and communities with health care inequities</i></p>	<ul style="list-style-type: none"> • Works with hospital or ambulatory site team members or leadership to analyze care coordination and laboratory services in that setting, and takes a leadership role in designing and implementing changes to improve the care coordination and laboratory workflow/menu process and design (CP) • Works with a QI mentor to identify better hand-off tools for on-call pathology services or to improve teaching sessions (AP/CP) • Designs a social determinants of health curriculum to help others learn to identify local resources and barriers to care and laboratory testing; effectively uses resources, such as telehealth and telepathology for proactive outreach to prevent diagnostic errors in peripheral blood smear review (CP) at outlying clinics
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation (including discussion during rounds, case work-up and case presentations) • Objective structured clinical examination (OSCE) • Chart review • Pathology report review • Review of sign out tools, utilization and review of checklists between pathology services • 360-degree feedback from the interprofessional team • Case management quality metrics and goals mined from electronic health records (EHR), AP or CP laboratory informatics systems • Lectures/workshops on social determinants of health or population health with identification of local resources

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	<ul style="list-style-type: none"> • Interdisciplinary rounds for high-risk patients/cases
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • CAP Competency model for pathologists. 2015. • CDC. Population Health Training in Place Program (PH-TIPP) • Aller RD. Pathology's contributions to disease surveillance: sending our data to public health officials and encouraging our clinical colleagues to do so. <i>Archives of Path Lab Med.</i> June 2009;133(6)926-932. • Kaplan KJ. In pursuit of patient-centered care. March 2016. http://tissuepathology.com/2016/03/29/in-pursuit-of-patient-centered-care/#axzz5e7nSsAns

Systems-Based Practice 3: Physician Role in Health Care System (AP/CP)

Overall Intent: To understand his/her role in the complex health care system and how to optimize the system to improve patient care and the health system's performance

Milestones	Examples
<p>Level 1 <i>Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology)</i></p> <p><i>Describes basic health payment systems (e.g., government, private, public, uninsured care) and practice models</i></p>	<ul style="list-style-type: none"> • Recognizes the multiple, often competing forces, in the health care system (e.g., names systems and providers involved test ordering and payment) • Recognizes there are different payment systems, such as Medicare, Medicaid, the VA, and commercial third-party payers, and contrast practice models, such as a patient-centered medical home and an Accountable Care Organization; compares and contrasts types of health benefit plans, including preferred provider organization and health maintenance organization • With direct supervision, completes a report following a routine patient specimen and apply appropriate coding in compliance with regulations
<p>Level 2 <i>Describes how components of a complex health care system are inter-related, and how this impacts patient care</i></p> <p><i>Documents testing detail and explains the impact of documentation on billing and reimbursement</i></p>	<ul style="list-style-type: none"> • Understands the impact of health plans on testing workflow and reimbursement; demonstrates knowledge that is theoretical, but is not yet able to apply this knowledge to the care of patients without some direct attending input and/or prompting • Does not consistently think through clinical redesign to improve quality; does not yet modify personal practice to enhance outcomes • Completes a report following a routine patient specimen and applies appropriate coding in compliance with regulations, with oversight
<p>Level 3 <i>Discusses how individual practice affects the broader system (e.g., test utilization, turnaround time)</i></p> <p><i>Engages with clinicians and/or patients in shared-decision making, such as use of preauthorization for complex testing</i></p>	<ul style="list-style-type: none"> • Understands, accesses, and analyzes his/her own individual performance data; relevant data may include: <ul style="list-style-type: none"> ○ Autopsy Case Log ○ Consultation logs (e.g., on call cases) ○ Grossing log • Uses shared decision and adapts the choice of the most cost-effective testing depending on the relevant clinical needs
<p>Level 4 <i>Manages various components of the complex health care system to provide efficient and effective patient care and transition of care</i></p> <p><i>Practices and advocates for cost effective patient care with consideration of the limitations of each patient's payment model</i></p>	<ul style="list-style-type: none"> • Works collaboratively with the institution to improve patient resources or design the institution's testing needs assessment, or develop/implement/assess the resulting action plans

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<p>Level 5 <i>Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care</i></p> <p><i>Participates in health policy advocacy activities</i></p>	<ul style="list-style-type: none"> • Performs a LEAN analysis of laboratory practices to identify and modify areas of improvement to make laboratory testing more efficient
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Audit of testing usage • QI project (perhaps as part of a portfolio): The resident's QI project may serve as an excellent assessment model/tool to assess this subcompetency. The program can develop criteria to ensure the resident is able to access and analyze personal practice data, and work with others to design and implement action plans, and subsequently evaluate the outcome and the impact of the plan(s).
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Center for Medicare and Medicaid Services. The merit-based incentive payment system: advancing care information and improvement activities performance categories. https://www.cms.gov/Medicare/Quality-Payment-Program/Resource-Library/2018-Advancing-Care-information-Fact-Sheet.pdf 2018. • Center for Medicare and Medicaid Services: MIPS and MACRA https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/MACRA-MIPS-and-APMs.html 2018. • Agency for Healthcare Research and Quality (AHRQ): The Challenges of Measuring Physician Quality https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html 2016. • AHRQ. Major physician performance sets: https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/measurementsets.html 2018. • The Kaiser Family Foundation: www.kff.org, 2019. • The Kaiser Family Foundation: Topic: health reform: https://www.kff.org/topic/health-reform/ 2019. • The National Academy for Medicine, Dzau VJ, McClellan M, Burke S, et al. Vital directions for health and health care: priorities from a National Academy of Medicine Initiative. March 2016. https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/ • The Commonwealth Fund. Health system data center. 2017. http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1 • The Commonwealth Fund. Health reform resource center: http://www.commonwealthfund.org/interactives-and-data/health-reform-resource-

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| | <p>center#/f:@facasubcategoriesfacet63677=[Individual%20and%20Employer%20Responsibility</p> <ul style="list-style-type: none">• American Board of Internal Medicine. QI/PI activities. Practice Assessment: Modules that physicians can use to assess clinical practice. 2019. http://www.abim.org/maintenance-of-certification/earning-points/practice-assessment.aspx |
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Systems-Based Practice 4: Informatics (AP/CP)

Overall Intent: To acquire the knowledge, skills, and tools that will enable collection, management, use, and sharing of data and information to support the delivery of accurate, high-quality health care and promote optimal patient outcomes

Milestones	Examples
<p>Level 1 <i>Demonstrates familiarity with basic technical concepts of hardware, operating systems, databases, and software for general purpose applications</i></p>	<ul style="list-style-type: none"> • Explains the salient differences and similarities among pathology informatics, bioinformatics, public health informatics, health care information technology, and health knowledge informatics • Describes the major types and components of computer hardware, software, and computer networks • Defines the types and roles of standards used in pathology informatics • Understands the fundamentals of databases and how data storage affects data retrieval
<p>Level 2 <i>Understands laboratory specific software, key technical concepts and interfaces, workflow, barcode application, automation systems (enterprise systems architecture)</i></p>	<ul style="list-style-type: none"> • Describes LISs and other major systems to which they are connected and the role they play in laboratory operations and health care delivery • Describes patient and asset identification standards and tracking systems and how they are used to maximize patient safety and laboratory workflow • Discusses potential roles, uses, and limitations of whole slide imaging (WSI) in the laboratory setting
<p>Level 3 <i>Discusses the role of the pathologist in laboratory initiatives based on integrative pathology informatics and bioinformatics (e.g., laboratory information system implementation and configuration, QI initiatives)</i></p>	<ul style="list-style-type: none"> • Explains the role and responsibility of pathologists with regard to selection, oversight, and use of informatics systems in the laboratory
<p>Level 4 <i>Applies knowledge of informatics skills as needed in laboratory initiatives (e.g., data management and security, computational statistics, information governance)</i></p>	<ul style="list-style-type: none"> • Contributes to analysis and interpretation of integrated pathology and enterprise data sets for improving care, quality, and increasing the efficiency of care delivery
<p>Level 5 <i>Participates in operational and strategy meetings, troubleshooting with information technology staff members; able to utilize medical informatics in the direction and operation of the laboratory</i></p>	<ul style="list-style-type: none"> • Identifies and resolve issues, potential problems, and challenges in EHR handling of laboratory test results • Identifies opportunities to modify the LIS to improve operations, including evaluation, purchasing, and implementation of LIS
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Completion of University of Pathology Informatics (UPI) or Pathology Informatics Essentials for Residents (PIER) Assessment tools • Direct observation: how residents reflect their knowledge of LIS components in the health care system in the care of patients • Portfolio of completed projects
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •

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Notes or Resources

- American Society for Clinical Pathology. University of Pathology Informatics (UPI). <https://www.ascp.org/store/productlisting/productdetail?productId=59699545>
- Association of Pathology Chairs. Pathology Informatics Essentials for Residents (PIER). 2018. <https://www.apcprods.org/pier>
- Pantanowitz L, Tuthill JM, Balis UGJ, eds. *Pathology Informatics: Theory and Practice*. 1st ed. Chicago, IL: ASCP Press; 2012.
- de Baca ME, Spinosa JC, eds. *Clinical Informatics Resource Guide*. Northfield, IL: College of American Pathologists; 2018.

Systems-Based Practice 5: Accreditation, Compliance, and Quality (AP/CP)

Overall Intent: To gain in-depth knowledge of the components of laboratory accreditation, regulatory compliance, and quality management

Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge that laboratories must be accredited</i></p> <p><i>Discusses the need for quality control and proficiency testing</i></p>	<ul style="list-style-type: none"> • Attends departmental quality assurance (QA)/quality control (QC) meetings, Morbidity and Mortality conferences and accreditation/regulatory summation meetings (AP/CP)
<p>Level 2 <i>Demonstrates knowledge of the components of laboratory accreditation and regulatory compliance (Clinical Laboratory Improvement Amendments and others), either through training or experience</i></p> <p><i>Interprets quality data and charts and trends, including proficiency testing results, with assistance</i></p>	<ul style="list-style-type: none"> • Assesses quality of QC slides for immunohistochemical stains (AP) • Compares frozen section to final diagnosis for own cases (AP) • Interprets Levy-Jennings curves on Clinical Chemistry rotation (CP) • Interprets daily instrument QC and proficiency test reports (CP)
<p>Level 3 <i>Identifies the differences between accreditation and regulatory compliance; discusses the process for achieving accreditation and maintaining regulatory compliance</i></p> <p><i>Demonstrates knowledge of the components of a laboratory quality management plan</i></p> <p><i>Discusses implications of proficiency testing failures</i></p>	<ul style="list-style-type: none"> • Understands that a Food and Drug Administration (FDA) inspection for blood bank is regulatory whereas an American Association of Blood Banks (AABB) inspection is for accreditation; knows that citations found on an FDA inspection carry greater consequences than deficiencies found in an accreditation inspection • Completes inspector training for accreditation agency (e.g., College of American Pathologists [CAP]) to understand process for achieving/maintaining regulatory/accreditation compliance • Begins to actively participate in regular laboratory quality management duties; compares frozen section to final diagnosis log for department, slide limit regulations for cytology, blood utilization reports (AP/CP)
<p>Level 4 <i>Participates in an internal or external laboratory inspection</i></p> <p><i>Reviews the quality management plan to identify areas for improvement</i></p>	<ul style="list-style-type: none"> • Performs mock or self-inspection using a CAP checklist (AP/CP) • Assists in developing a strategy for handling QC or proficiency testing failures

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<p><i>Performs analysis and review of proficiency testing failures and recommends a course of action, with oversight</i></p>	
<p>Level 5 <i>Serves as a resource for accreditation at the regional or national level</i></p> <p><i>Creates and follows a comprehensive quality management plan</i></p> <p><i>Formulates a response for proficiency testing failures</i></p>	<ul style="list-style-type: none"> • Serves on a committee for a regional or national accreditation agency (AP/CP) • Oversees laboratory quality management as part of duties as a Medical Director (AP/CP)
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Rotation evaluations • Assignment of duties for departmental or hospital QA/QC committees • Presentation at Morbidity and Mortality conferences • Documentation of inspector training and participation in resident portfolio • Planning and completion of QI projects
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • CAP. Inspector Training Options. https://www.cap.org/laboratory-improvement/accreditation/inspector-training

Practice-Based Learning and Improvement 1: Evidence-Based Practice and Scholarship (AP/CP) Overall Intent: To incorporate evidence into clinical practice and is involved in contributing to the body of knowledge in pathology	
Milestones	Examples
<p>Level 1 <i>Demonstrates how to access and select applicable evidence</i></p> <p><i>Aware of the need for patient privacy, autonomy, and consent as applied to clinical research</i></p>	<ul style="list-style-type: none"> • Recognizes that molecular testing is useful in the work-up for gliomas • Identifies the need for an Institutional Review Board (IRB) when collecting cases for a possible research project
<p>Level 2 <i>Identifies and applies the best available evidence to guide diagnostic workup of simple cases</i></p> <p><i>Develops knowledge of the basic principles of research (demographics, Institutional Review Board, human subjects), including how research is evaluated, explained to patients, and applied to patient care</i></p>	<ul style="list-style-type: none"> • Orders a 1p-19q codeletion FISH on a glioma to look for the molecular signature of oligodendroglioma • Drafts an IRB protocol with attending oversight
<p>Level 3 <i>Identifies and applies the best available evidence to guide diagnostic work-up of complex cases</i></p> <p><i>Applies knowledge of the basic principles of research such as informed consent and research protocols to clinical practice, with assistance</i></p>	<ul style="list-style-type: none"> • Orders newer molecular testing (isocitrate dehydrogenase [IDH] and alpha-thalassamesia/mental retardation syndrome X-linked [ATRX] studies) to further classify gliomas based on the new World Health Organization criteria • Drafts an IRB protocol with minimal oversight or submits an abstract for a national meeting
<p>Level 4 <i>Critically appraises and applies evidence to guide care, even in the face of conflicting data</i></p> <p><i>Proactively and consistently applies knowledge of the basic principles of research such as informed consent and research protocols to clinical practice</i></p>	<ul style="list-style-type: none"> • Appropriately researches the primary literature to explain rare molecular findings that surface from additional molecular testing (e.g. FoundationOne) • Submits a paper for publication
<p>Level 5 <i>Teaches others to critically appraise and apply evidence for complex cases; and/or participates in the development of guidelines</i></p>	<ul style="list-style-type: none"> • Moderates a discussion with clinicians over disparate molecular, morphologic, and immunohistochemical findings of a tumor to formulate the best course forward based on the primary literature

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<p><i>Suggest improvements to research regulations and/or substantially contributes to the primary literature through basic, translational, or clinical research</i></p>	<ul style="list-style-type: none"> • Submits a grant proposal
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Research portfolio • Presentation • Oral or written examination
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • National Institutes of Health. Write Your Application. https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm • U.S. National Library of Medicine. PubMed Tutorial. 2018. https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html • Institutional IRB guidelines • Various journal submission guidelines

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth (AP/CP) Overall Intent: To seek clinical performance information with the intent to improve care; reflects on all domains of practice, personal interactions, and behaviors, and their impact on technologists, colleagues and patients (if applicable) (reflective mindfulness); develop clear objectives and goals for improvement in some form of a learning plan	
Milestones	Examples
<p>Level 1 <i>Accepts responsibility for personal and professional development by establishing goals</i></p> <p><i>Identifies the gap(s) between expectations and actual performance</i></p> <p><i>Actively seeks opportunities to improve</i></p>	<ul style="list-style-type: none"> • Is aware of need to improve • Is beginning to seek ways to determine where improvements are needed and makes some specific goals that are reasonable to execute and achieve
<p>Level 2 <i>Demonstrates openness to receiving performance data and feedback in order to inform goals</i></p> <p><i>Analyzes and reflects on the factors which contribute to gap(s) between expectations and actual performance</i></p> <p><i>Designs and implements a learning plan, with assistance</i></p>	<ul style="list-style-type: none"> • Increasingly able to identify performance gaps in terms of diagnostic skills and daily work; uses feedback from others • After working with an attending for a week, asks him/her about performance and opportunities for improvement • Uses feedback with a goal of improving communication skills with technologists, peers/colleagues, staff, and patients (if applicable) the following week
<p>Level 3 <i>Seeks performance data and feedback with humility</i></p> <p><i>Institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance</i></p> <p><i>Independently creates and implements a learning plan</i></p>	<ul style="list-style-type: none"> • Takes input from technologists, peers/colleagues, and supervisors to gain complex insight into personal strengths and areas to improve • Humbly acts on input and is appreciative and not defensive • Documents goals in a more specific and achievable manner, such that attaining them is reasonable and measurable
<p>Level 4 <i>Actively and consistently seeks performance data and feedback with humility</i></p> <p><i>Critically evaluates the effectiveness of behavioral changes in narrowing the gap(s) between expectations and actual performance</i></p>	<ul style="list-style-type: none"> • Is clearly in the habit of making a learning plan for each rotation • Consistently identifies ongoing gaps and chooses areas for further development

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<p><i>Uses performance data to measure the effectiveness of the learning plan and improves it when necessary</i></p>	
<p>Level 5 Models seeking performance data with humility</p> <p><i>Teaches others reflective practice</i></p> <p><i>Facilitates the design and implementing learning plans for others</i></p>	<ul style="list-style-type: none"> • Actively discusses learning goals with supervisors and colleagues; may encourage other learners on the team to consider how their behavior affects the rest of the team
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Review of learning plan
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. <i>Acad Med.</i> 2009 Aug;84(8):1066-74. <i>Contains a validated questionnaire about physician lifelong learning.</i> • Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: practice-based learning and improvement. <i>Acad Pediatr.</i> 2014;14: S38-S54. • Lockspeiser TM, Schmitter PA, Lane JL et al. Assessing residents' written learning goals and goal writing skill: validity evidence for the learning goal scoring rubric. <i>Acad Med.</i> 2013 Oct;88(10)1558-63.

Professionalism 1: Professional Behavior and Ethical Principles (AP/CP)	
Overall Intent: To recognize and address lapses in ethical and professional behavior, demonstrates ethical and professional behaviors, and use appropriate resources for managing ethical and professional dilemmas	
Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge of the ethical principles underlying informed consent, surrogate decision making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related topics</i></p> <p><i>Describes when and how to appropriately report professionalism lapses, including strategies for addressing common barriers; identifies and describes potential triggers for professionalism lapses</i></p>	<ul style="list-style-type: none"> • Identifies and describes potential triggers for professionalism lapses, describes when and how to appropriately report professionalism lapses, and outlines strategies for addressing common barriers to reporting • Discusses the basic principles underlying ethics (beneficence, nonmaleficence, justice, autonomy) and professionalism (professional values and commitments), and how they apply in various situations (e.g., informed consent process) • Obtains informed consent for procedures
<p>Level 2 <i>Analyzes straightforward situations using ethical principles</i></p> <p><i>Demonstrates insight into professional behavior in routine situations; takes responsibility for own professionalism lapses</i></p>	<ul style="list-style-type: none"> • Demonstrates professional behavior in routine situations and uses ethical principles to analyze straightforward situations, and can acknowledge a lapse without becoming defensive, making excuses, or blaming others • Apologizes for the lapse when appropriate and taking steps to make amends if needed • Articulates strategies for preventing similar lapses in the future Monitors and responds to fatigue, hunger, stress, etc. in self and team members • Recognizes and responds effectively to the emotions of others
<p>Level 3 <i>Recognizes the need and uses appropriate resources to seek help in managing and resolving complex ethical situations</i></p> <p><i>Demonstrates professional behavior in complex or stressful situations</i></p>	<ul style="list-style-type: none"> • Analyzes complex situations, such as how the clinical situation evokes strong emotions, conflicts (or perceived conflicts) between patients/providers/staff or between professional values; the resident navigates a situation while not at his/her personal best (due to fatigue, hunger, stress, etc.), or the system poses barriers to professional behavior (e.g., inefficient workflow, inadequate staffing, conflicting policies) • Recognizes own limitations and seeks resources to help manage and resolve complex ethical situations such as: <ul style="list-style-type: none"> ○ consulting with a genetic counselor about the implications of genetic testing ○ requesting an ethics consult (e.g., Jehovah's Witness patient with potential transfusion needs) ○ submitting IRB review for a research project • Analyzes difficult real or hypothetical ethics and professionalism case scenarios or situations, recognizes own limitations, and consistently demonstrates professional behavior

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<p>Level 4 <i>Independently resolves and manages complex ethical situations</i></p> <p><i>Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others</i></p>	<ul style="list-style-type: none"> • Actively seeks to consider the perspectives of others • Models respect for patients and expects the same from others • Recognizes and utilizes appropriate resources for managing and resolving ethical dilemmas (e.g., ethics consultations, literature review, risk management/legal consultation) • Serves as the resident member of the IRB or Ethics Committee
<p>Level 5 <i>Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution</i></p> <p><i>Coaches others when their behavior fails to meet professional expectations</i></p>	<ul style="list-style-type: none"> • Coaches others when their behavior fails to meet professional expectations, either in the moment (for minor or moderate single episodes of unprofessional behavior) or after the moment (for major single episodes or repeated minor to moderate episodes of unprofessional behavior) • Identifies and seeks to address system-wide factors or barriers to promoting a culture of ethical and professional behavior through participation in a work group, committee, or task force (e.g., ethics committee or an ethics sub-committee, risk management committee, root cause analysis review, patient safety or satisfaction committee, professionalism work group, IRB, trainee grievance committee, etc.)
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Global evaluation • Multisource feedback • Mentor and program director observations • Oral or written self-reflection (e.g., of a personal or observed lapse, ethical dilemma, or systems-level factors) • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • American Medical Association Code of Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics 2019. • American Board of Internal Medicine; American College of Physicians-American Society of Internal Medicine; European Federation of Internal Medicine. Medical professionalism in the new millennium: a physician charter. <i>Ann Intern Med.</i> 2002;136:243-246. http://abimfoundation.org/wp-content/uploads/2015/12/Medical-Professionalism-in-the-New-Millennium-A-Physician-Charter.pdf • Byyny RL, Papadakis MA, Paauw DS. Medical Professionalism Best Practices. Alpha Omega Alpha Medical Society, Menlo Park, CA. 2015. https://alphaomegaalpha.org/pdfs/2015MedicalProfessionalism.pdf • Levinson W, Ginsburg S, Hafferty FW, Lucey CR. <i>Understanding Medical Professionalism</i>. 1st ed. McGraw-Hill Education; 2014.

- Domen RE, Talbert ML, Johnson K, et al. Assessment and management of professionalism issues in pathology residency training: results from surveys and a workshop by the graduate medical education committee of the College of American Pathologists. *Acad Pathol.* 2015; 2:2374289515592887. doi: 10.1177/2374289515592887
- Domen RE, Johnson K, Conran RM, et al. Professionalism in pathology: a case-based approach as a potential education tool. *Arch Pathol Lab Med.* 2017; 141:215-219. doi: 10.5858/arpa.2016-2017-CP
- Brissette MD, Johnson K, Raciti PM, et al. Perceptions of unprofessional attitudes and behaviors: implications for faculty role modeling and teaching professionalism during pathology residency. *Arch Pathol Lab Med.* 2017; 141: 1349-1401. doi: 10.5858/arpa.2016-0477-CP
- Conran RM, Zein-Eldin Powell S, Domen RE, et al. Development of professionalism in graduate medical education: a case-based educational approach from the College of American Pathologists'

Professionalism 2: Accountability and Conscientiousness (AP/CP) Overall Intent: To take responsibility for one’s own actions and the impact on patients and other members of the health care team	
Milestones	Examples
Level 1 <i>Responds promptly to instructions, requests, or reminders to complete tasks and responsibilities</i>	<ul style="list-style-type: none"> • Responds promptly to reminders from program administrator to complete work hour logs • Timely attendance at conferences • Responds promptly to requests to complete preliminary anatomic diagnosis report on an autopsy (AP)
Level 2 <i>Takes appropriate ownership and performs tasks and responsibilities in a timely manner with attention to detail</i>	<ul style="list-style-type: none"> • Completes autopsy reports in a timely manner and recognizes when he/she will have trouble completing that task (e.g., going out of town, awaiting brain cutting) and knows deadline for autopsy completion during vacation time (AP) • Completes cases (any) in a timely manner, with attention to detail, including reporting of all immunohistochemical stains (AP/CP) • Completes routine transfusion reaction work-up in advance of blood bank rounds with attending (CP) • Completes and documents safety modules, procedure review, and licensing requirements (e.g., administrative duties and tasks)
Level 3 <i>Recognizes situations that may impact own ability to complete tasks and responsibilities in a timely manner and describes the impact on team</i>	<ul style="list-style-type: none"> • Appropriately notifies resident on day service about overnight call events during transition of care or hand-off in order to avoid patient safety issues and compromise of patient care • Completes tasks in stressful situations and preempts issues that would impede completion of tasks (e.g., notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from other residents or faculty members, if needed) • Reviews Case Logs, RISE scores, evaluations, and portfolio and develops a learning plan to address gaps/weakness in knowledge, case exposure, and skills
Level 4 <i>Anticipates and intervenes in situations that may impact others’ ability to complete tasks and responsibilities in a timely manner</i>	<ul style="list-style-type: none"> • Identifies issues that could impede other residents from completing tasks and provides leadership to address those issues (e.g., senior residents advise junior residents how to manage their time in completing patient care tasks); escalates to communicating with program director if problem requires a system-based approach and needs addressing at a higher administrative level • Takes responsibility for potential adverse outcomes from mishandled specimen and professionally discusses with the interprofessional team
Level 5 <i>Takes ownership of system outcomes</i> <i>Designs new strategies to ensure that the needs of patients, teams, and systems are met</i>	<ul style="list-style-type: none"> • Sets up a meeting with the lead technologist to streamline a reflex testing algorithm and follows through with a system-based solution • Leads team to find solutions to problem
Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation

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	<ul style="list-style-type: none"> • Multisource global evaluations, including from program administrator • Self-evaluations and reflective tools • Compliance with deadlines and timelines • Simulation • Mentor and program director observations • Quality metrics of turnaround time on cases
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • ASA Code of ethics (https://www.asahq.org/resources/ethics-and-professionalism website insert) • Code of conduct from fellow/resident institutional manual • Expectations of residency program regarding accountability and professionalism

Professionalism 3: Self-Awareness and Help-Seeking (AP/CP) Overall Intent: To identify, use, manage, improve, and seek help for personal and professional well-being for self and others	
Milestones	Examples
<p>Level 1 <i>Recognizes limitations in the knowledge/skills/ behaviors of self or team, with assistance</i></p> <p><i>Recognizes status of personal and professional well-being, with assistance</i></p>	<ul style="list-style-type: none"> • Accepts feedback and exhibits positive responses to criticism
<p>Level 2 <i>Independently recognizes limitations in the knowledge/skills/ behaviors of self or team and seeks help when needed</i></p> <p><i>Independently recognizes status of personal and professional well-being and seeks help when needed</i></p>	<ul style="list-style-type: none"> • Identifies possible sources of personal stress or lack of clinical knowledge and independently seeks help
<p>Level 3 <i>Proposes and implements a plan to remediate or improve the knowledge/ skills/behaviors of self or team, with assistance</i></p> <p><i>Proposes and implements a plan to optimize personal and professional well-being, with assistance</i></p>	<ul style="list-style-type: none"> • With supervision, assists in developing a personal learning or action plan to address gaps in knowledge or stress and burnout for self or team
<p>Level 4 <i>Independently develops and implements a plan to remediate or improve the knowledge/skills/ behaviors of self or team</i></p> <p><i>Independently develops and implements a plan to optimize personal and professional well-being</i></p>	<ul style="list-style-type: none"> • Independently develops personal learning or action plans for continued personal and professional growth, and limits stress and burnout for self or team
<p>Level 5 <i>Serves as a resource or consultant for developing a plan to remediate or improve the knowledge/ skills/behaviors</i></p> <p><i>Coaches others when responses or limitations in knowledge/skills do not meet professional expectations</i></p>	<ul style="list-style-type: none"> • Mentors patients and colleagues in self-awareness and establishes health management plans to limit stress and burnout

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Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation • Self-assessment and personal learning plan • Individual interview • Group interview or discussions for team activities • Participation in institutional well-being programs • Mentor and program director observations • Institutional online training modules
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Local resources, including Employee Assistance • Conran RM, Powell SZ, Domen RE, et al. Development of professionalism in graduate medical education: a case-based educational approach from the College of American Pathologists' Graduate Medical Education Committee. <i>Acad Pathol.</i> 2018 Jun 26;5:2374289518773493. • Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: personal and professional development. <i>Acad Pediatr.</i> 2014 Mar-Apr;14(2 Suppl):S80-97. • Joseph L, Shaw PF, Smoller BR. Perceptions of stress among pathology residents: survey results and some strategies to reduce them. <i>Am J Clin Pathol.</i> 2007 Dec;128(6):911-9. • ACGME Tools and Resources on Physician Well-Being https://www.acgme.org/What-We-Do/Initiatives/Physician-Well-Being/Resources

Interpersonal and Communication Skills 1: Patient and Family-Centered Communication (AP/CP)

Overall Intent: To deliberately use language and behaviors to form constructive relationships with patients, to identify communication barriers including self-reflection on personal biases, and minimize them in the doctor-patient relationships; organize and lead communication around shared decision making

Milestones	Examples
<p>Level 1 <i>Uses language and nonverbal behavior to demonstrate respect and establish rapport</i></p> <p><i>Identifies common barriers to effective communication (e.g., language, disability) while accurately communicating own role within the health care system</i></p> <p><i>Identifies the need to adjust communication strategies based on assessment of patient/family expectations and understanding of their health status and treatment options</i></p>	<ul style="list-style-type: none"> • Self-monitors and controls tone, non-verbal responses, and language and asks questions to invite patient/family participation • Accurately communicates their role in the health care system to patients/families • Identifies common communication barriers in patient care • Avoids medical jargon when talking to patients, makes sure communication is at the appropriate level to be understood by a lay-person
<p>Level 2 <i>Establishes a relationship in straightforward encounters using active listening and clear language</i></p> <p><i>Identifies complex barriers to effective communication (e.g., health literacy, cultural)</i></p> <p><i>Organizes and initiates communication with patient/family by introducing stakeholders, setting the agenda, clarifying expectations and verifying understanding of the clinical situation</i></p>	<ul style="list-style-type: none"> • Establishes a developing, professional relationship with patients/families, with active listening, attention to affect, and questions that explore the optimal approach to daily tasks • Prior to an apheresis procedure, uses language to best explain what to expect with an understanding of the patients level of health literacy • Prior to a fine needle aspiration (FNA), organizes and initiates the informed consent process • Meets with blood donors who have been deferred from donation and explains the patient or donor safety issue • Understands that when sharing autopsy results that selected words may have a negative impact on family members (e.g., cut-open)
<p>Level 3 <i>Establishes a relationship in challenging patient encounters, as appropriate</i></p> <p><i>When prompted, reflects on personal biases while attempting to minimize communication barriers</i></p> <p><i>Sensitively and compassionately delivers medical information, elicits patient/family values,</i></p>	<ul style="list-style-type: none"> • Demonstrates respect for a Jehovah's Witness who does not want to a transfusion with thorough explanation of the risks and alternatives • During an FNA, appropriately discusses the level of specimen adequacy with the patient • Shares autopsy findings with next of kin in a compassionate manner • Acknowledges uncertainty in daily tasks

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<p><i>goals and preferences, and acknowledges uncertainty and conflict, with guidance</i></p>	
<p>Level 4 <i>Easily establishes relationships, with attention to patient/family concerns and context, regardless of complexity</i></p> <p><i>Independently recognizes personal biases while attempting to proactively minimize communication barriers</i></p> <p><i>Independently, sensitively, and compassionately delivers medical information, elicits patient/family values, goals and preferences, and acknowledges uncertainty and conflict</i></p>	<ul style="list-style-type: none"> • Is an active member of patient care team in discussion with family regarding difficult to transfuse patients • Participates in the sharing of autopsy findings in face of family anger or medical error
<p>Level 5 <i>Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships</i></p> <p><i>Models self-awareness while teaching a contextual approach to minimize communication barriers</i></p> <p><i>Models shared decision making in patient/family communication including those with a high degree of uncertainty/conflict</i></p>	<ul style="list-style-type: none"> • Leads the sharing of autopsy findings in face of family anger or medical error
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Standardized patients or structured case discussions • Self-assessment including self-reflection exercises • Kalamazoo Essential Elements Communication Checklist (Adapted) • Skills needed to set the state, Elicit information, Give information, Understand the patient, and End the encounter (SEGUE)
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Dintzis S. Improving pathologist’s communication skills. <i>AMA J Ethics</i>. 2016 Aug 1;18(8):802-8.

- Dintzis SM, Stetsenko GY, Sitlani CM, *et al.* Communicating pathology and laboratory errors: anatomic pathologists' and laboratory medical directors' attitudes and experiences. *Am J Clin Pathol.* 2011 May;135(5):760-5.
- Laidlaw A, Hart J. Communication skills: an essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. *Med Teach.* 2011;33(1):6-8.
- Makoul G. Essential elements of communication in medical encounters: The Kalamazoo consensus statement. *Acad Med.* 2001;76:390-393.
- Makoul G. The SEGUE Framework for teaching and assessing communication skills. *Patient Educ Couns.* 2001;45(1):23-34.
- Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in fellows. *BMC Med Educ.* 2009; 9:1.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication (AP/CP) Overall Intent: To effectively communicate with the health care team (i.e. laboratory team, resident/fellow team, faculty/resident team, interdisciplinary care team, or any other functioning team in the program), including both inter- and intra-departmental and consultants, in both straightforward and complex situations	
Milestones	Examples
Level 1 <i>Uses language that values all members of the health care team</i> <i>Describes the utility of constructive feedback</i>	<ul style="list-style-type: none"> • Shows respect in health care team communications through words and actions such as in requests for intraoperative consultation or clinical consultation for apheresis • Uses respectful communication to clerical and technical staff • Listens to and considers others' points of view, is nonjudgmental and actively engaged, and demonstrates humility
Level 2 <i>Communicates information effectively with all health care team members</i> <i>Solicits feedback on performance as a member of the health care team</i>	<ul style="list-style-type: none"> • Verifies understanding of his/her communications within the health care team (i.e., closed loop communications, restating for critical values and unexpected diagnoses, follows up in laboratory with technologists) (AP/CP) • Demonstrates active listening by fully focusing on the speaker (other health care provider, patient), actively showing verbal and non-verbal signs (eye contact, posture, reflection, questioning, summarization) • Communicates clearly and concisely in an organized and timely manner during consultant encounters, as well as with the health care team in general • Seeks feedback at sign out (AP/CP)
Level 3 <i>Uses active listening to adapt communication style to fit team needs</i> <i>Integrates feedback from team members to improve communication</i>	<ul style="list-style-type: none"> • Verifies understanding of his/her communications by restating critical values and unexpected diagnoses (AP/CP) • Raises concerns or provides opinions and feedback when needed to others on the team • Respectfully provides feedback to junior members of the medical team for the purposes of improvement or reinforcement of correct knowledge, skills, and attitudes, when appropriate
Level 4 <i>Coordinates recommendations from different members of the health care team to optimize patient care</i> <i>Communicates feedback and constructive criticism to superiors</i>	<ul style="list-style-type: none"> • Offers suggestions to negotiate or resolve conflicts among health care team members; raises concerns or provides opinions and feedback, when needed, to superiors on the team • Adapts communication strategies in handling complex situations
Level 5 <i>Models flexible communication strategies that value input from all health care team members, resolving conflict when needed</i> <i>Facilitates regular health care team-based feedback in complex situations</i>	<ul style="list-style-type: none"> • Communicates with all health care team members, resolves conflicts, and provides feedback in any situation • Organizes a team meeting to discuss and resolve potentially conflicting points of view on a plan of care (e.g., therapeutic apheresis for rare neurological condition, use of rare resources)

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Assessment Models or Tools	<ul style="list-style-type: none"> • Direct observation • Global assessment • Multi-source assessment • Simulation encounters • Record or chart review for professionalism and accuracy in written communications
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Nakhleh RE, Myers JL, Allen TC, et al. Consensus statement on effective communication of urgent diagnoses and significant, unexpected diagnoses in surgical pathology and cytopathology from the College of American Pathologists and Association of Directors of Anatomic and Surgical Pathology. <i>Arch Pathol Lab Med.</i> 2012;136(2):148-154. • Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. <i>Med Teach.</i> 2018 Jul 21:1-4. doi: 10.1080/0142159X.2018.1481499. [Epub ahead of print] • Brissette MD, Johnson K, Raciti PM, et al. Perceptions of unprofessional attitudes and behaviors: implications for faculty role modeling and teaching professionalism during pathology residency. <i>Arch Pathol Lab Med.</i> 2017;141:1394-1401. doi: 10.5858/arpa.2016-0477-CP • Conran RM, Zein-Eldin Powell S, Domen, RE, et al. Development of professionalism in graduate medical education: a case-based educational approach from the College of American Pathologists' graduate medical education committee. <i>Acad Pathol.</i> 2018 Jun 26;5:2374289518773493 • Green M, Parrott T, Cook G., Improving your communication skills. <i>BMJ</i> 2012;344:e357 doi: https://doi.org/10.1136/bmj.e357 • Henry SG, Holmboe ES, Frankel RM. Evidence-based competencies for improving communication skills in graduate medical education: a review with suggestions for implementation. <i>Med Teach.</i> 2013 May; 35(5):395-403. doi: 10.3109/0142159X.2013.769677.

Interpersonal and Communication Skills 3: Communication within Health Care Systems (AP/CP) Overall Intent: To effectively communicate using a variety of methods	
Milestones	Examples
<p>Level 1 <i>Safeguards patient personal health information by communicating through appropriate means as required by institutional policy (e.g., patient safety reports, cell phone/pager usage)</i></p> <p><i>Identifies institutional and departmental structure for communication of issues</i></p>	<ul style="list-style-type: none"> • Identifies when it is acceptable to include protected health information in various forms of communication • Identifies institutional and departmental communication hierarchy for concerns and safety issues
<p>Level 2 <i>Appropriately selects forms of communication based on context and urgency of the situation</i></p> <p><i>Respectfully communicates concerns about the system</i></p>	<ul style="list-style-type: none"> • Identifies method for sharing results needing urgent attention • Recognizes that a communication breakdown has happened and respectfully brings the breakdown to the attention of the chief resident or faculty member • Reports a patient safety event
<p>Level 3 <i>Communicates while ensuring security of personal health information, with guidance</i></p> <p><i>Uses institutional structure to effectively communicate clear and constructive suggestions to improve the system</i></p>	<ul style="list-style-type: none"> • Communicates opportunities for improvement in the LIS/EHR interface • Knows when to direct concerns locally, departmentally, or institutionally – appropriate escalation • Uses appropriate method when sharing results needing urgent attention
<p>Level 4 <i>Independently communicates while ensuring security of personal health information</i></p> <p><i>Initiates conversations on difficult subjects with appropriate stakeholders to improve the system</i></p>	<ul style="list-style-type: none"> • Talks directly to a colleague about breakdowns in communication in order to prevent recurrence • Participates in task force to update policy for sharing abnormal results • Improves methods for communicating system-wide call schedules, conference scheduling, etc.
<p>Level 5 <i>Guides departmental or institutional communication around policies and procedures regarding the security of personal health information</i></p> <p><i>Facilitates dialogue regarding systems issues among larger community stakeholders (institution, health care system, field)</i></p>	<ul style="list-style-type: none"> • Leads a task force established by the hospital QI committee to develop a plan to improve house staff hand-offs • Works with information systems to implement improvements in the LIS/EHR interface
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Observation of sign outs, observation of requests for consultations

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	<ul style="list-style-type: none"> • 360-degree evaluation of verbal communications • Chart review for documented communications
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Bierman JA, Hufmeyer KK, Liss DT, Weaver AC, Heiman HL. Promoting responsible electronic documentation: validity evidence for a checklist to assess progress notes in the electronic health record. <i>Teach Learn Med.</i> 2017 Oct-Dec;29(4):420-432. • Starmer, Amy J., et al. I-pass, a mnemonic to standardize verbal handoffs. <i>Pediatrics.</i> 2012;129.2:201-204. • Haig, K.M., Sutton, S., Whittington, J. SBAR: a shares mental model for improving communications between clinicians. <i>Jt Comm J Qual Patient Saf.</i> 2006 Mar;32(3):167-75.

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In an effort to aid programs in the transition to using the new version of the Milestones, we have mapped the original Milestones 1.0 to the new Milestones 2.0. Below we have indicated where the subcompetencies are similar between versions. These are not necessarily exact matches, but are areas that include some of the same elements. Note that not all subcompetencies map between versions. Inclusion or exclusion of any subcompetency does not change the educational value or impact on curriculum or assessment.

Milestones 1.0	Milestones 2.0
PC1: Consultation (AP and CP)	PC3: Clinical Consultation, including On-Call Interactions (AP/CP) PC4: Interpretation and Diagnosis (AP/CP)
PC2: Interpretation and reporting (CP)	PC4: Interpretation and Diagnosis (AP/CP)
PC3: Interpretation and diagnosis (AP)	PC4: Interpretation and Diagnosis (AP/CP)
PC4: Reporting (AP)	PC1: Reporting (AP/CP) PC4: Interpretation and Diagnosis (AP/CP)
PC5: Procedure: Surgical Pathology grossing (AP)	PC2: Grossing (AP)
PC6: Procedure: Intra-operative consultation/frozen sections (AP)	PC5: Intra-Operative Consultation, including Frozen Section (AP)
PC7: Procedures: If program teaches other procedures (AP/CP)	None
MK1: Diagnostic Knowledge (AP/CP)	PBL1: Evidence-Based Practice and Scholarship (AP/CP)
MK2: Teaching (AP/CP)	None
MK3: Procedure: Autopsy (AP)	PC6: Autopsy (AP)
None	MK1: Diagnostic Knowledge (AP/CP)
None	MK2: Clinical Reasoning (AP/CP)
SBP1: Patient Safety (AP/CP)	SBP1: Patient Safety and Quality Improvement (AP/CP)
SBP2: Lab Management: Regulatory and compliance (AP/CP)	SBP5: Accreditation, Compliance, and Quality (AP/CP)
SBP3: Lab Management: Resource utilization (AP/CP)	None
SBP4: Lab Management: Quality, risk management, and laboratory safety (AP/CP)	SBP1: Patient Safety and Quality Improvement (AP/CP)
SBP5: Lab Management: Test utilization (AP/CP)	SBP3: Physician Role in Health Care Systems (AP/CP)
SBP6: Lab Management: Technology assessment (AP/CP)	None
SBP7: Informatics (AP/CP)	SBP4: Informatics (AP/CP)
None	SBP2: Systems Navigation for Patient-Centered Care (AP/CP)

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PBLI1: Recognition of Errors and Discrepancies (AP/CP)	PBLI2: Reflective Practice and Commitment to Personal Growth (AP/CP)
PBLI2: Scholarly Activity (AP/CP)	PBLI1: Evidence-Based and Scholarship (AP/CP)
PROF1: Licensing, certification, examinations, credentialing (AP/CP)	None
PROF2: Demonstrates honesty, integrity, and ethical behavior (AP/CP)	PROF1: Professional Behavior and Ethical Principles (AP/CP) PROF2: Accountability and Conscientiousness (AP/CP)
PROF3: Demonstrates responsibility and follow-through on tasks (AP/CP)	PROF2: Accountability and Conscientiousness (AP/CP)
PROF4: Gives and receives feedback (AP/CP)	ICS2: Interprofessional and Team Communication (AP/CP)
PROF5: Demonstrates responsiveness to each patient's unique characteristics and needs (AP/CP)	ICS1: Patient and Family-Centered Communication (AP/CP)
PROF6: Demonstrates personal responsibility to maintain emotional, physical, and mental health (AP/CP)	PROF3: Self-Awareness and Help-Seeking (AP/CP)
ICS1: Intra-departmental and Development of Leadership Skills (AP/CP)	ICS2: Interprofessional and Team Communication (AP/CP)
ICS2: Inter-departmental and Health Care Clinical Team Interactions (AP/CP)	ICS2: Interprofessional and Team Communication (AP/CP)
None	ICS1: Patient and Family-Centered Communication (AP/CP)
None	ICS3: Communication within Health Care Systems (AP/CP)

Available Milestones Resources

Milestones 2.0: Assessment, Implementation, and Clinical Competency Committees Supplement, 2021 - <https://meridian.allenpress.com/jgme/issue/13/2s>

Milestones Guidebooks: <https://www.acgme.org/milestones/resources/>

- *Assessment Guidebook*
- *Clinical Competency Committee Guidebook*
- *Clinical Competency Committee Guidebook Executive Summaries*
- *Implementation Guidebook*
- *Milestones Guidebook*

Milestones Guidebook for Residents and Fellows: <https://www.acgme.org/residents-and-fellows/the-acgme-for-residents-and-fellows/>

- *Milestones Guidebook for Residents and Fellows*
- *Milestones Guidebook for Residents and Fellows Presentation*
- *Milestones 2.0 Guide Sheet for Residents and Fellows*

Milestones Research and Reports: <https://www.acgme.org/milestones/research/>

- *Milestones National Report*, updated each fall
- *Milestones Predictive Probability Report*, updated each fall
- *Milestones Bibliography*, updated twice each year

Developing Faculty Competencies in Assessment courses - <https://www.acgme.org/meetings-and-educational-activities/courses-and-workshops/developing-faculty-competencies-in-assessment/>

Assessment Tool: Direct Observation of Clinical Care (DOCC) - <https://dl.acgme.org/pages/assessment>

Assessment Tool: Teamwork Effectiveness Assessment Module (TEAM) - <https://team.acgme.org/>

Improving Assessment Using Direct Observation Toolkit - <https://dl.acgme.org/pages/acgme-faculty-development-toolkit-improving-assessment-using-direct-observation>

Remediation Toolkit - <https://dl.acgme.org/courses/acgme-remediation-toolkit>