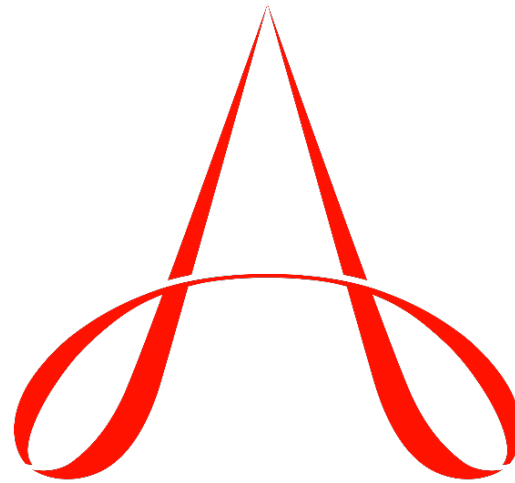




Supplemental Guide: Hematopathology



A C G M E

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Hematopathology 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: Interdisciplinary Consultation	
Overall Intent: To effectively manage interdisciplinary hematology and hematopathology consultations, including on-call responsibilities	
Milestones	Examples
Level 1 <i>For simple consultations, outlines next steps in basic hematology and hematopathology work-up and lists available resources useful in consultation</i>	<ul style="list-style-type: none"> ● When alerted by a technologist to the presence of “unclassified” cells in a peripheral smear, identifies the need to consult electronic health record (EHR) and review smear
Level 2 <i>Manages consultations (e.g., obtains appropriate additional clinical information, accesses available resources, recommends next steps, documents appropriately), with assistance</i>	<ul style="list-style-type: none"> ● When alerted by a technologist to the presence of “unclassified” cells in a peripheral smear, consults EHR, reviews smear, recommends additional studies to reclassify cells, and determines when a clinical team needs to be contacted, with assistance
Level 3 <i>Manages complex consultations, with assistance; manages simple consultations independently</i>	<ul style="list-style-type: none"> ● When alerted by a technologist to the presence of “unclassified” cells in a peripheral smear, independently consults the EHR, reviews smear, recommends additional studies to reclassify cells, and determines when a clinical team needs to be contacted ● When oncology team calls regarding possible circulating blasts in a patient with a history of myeloma, consults the EHR, reviews smear, recommends additional studies to classify cells, and appropriately communicates results with the clinical team, with assistance
Level 4 <i>Manages complex consultations independently</i>	<ul style="list-style-type: none"> ● When oncology team calls regarding possible circulating blasts in a patient with a history of myeloma, independently consults the EHR, reviews smear, recommends additional studies to classify cells, and appropriately communicates results with the clinical team
Level 5 <i>Recognized as an expert in providing comprehensive consultations</i>	<ul style="list-style-type: none"> ● Is sought out by technologists, clinicians, and hematopathologists for consultation on difficult cases
Assessment Models or Tools	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Global evaluation ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● College of American Pathologists. Effective Communication of Urgent Diagnoses and Significant Unexpected Diagnoses. https://www.cap.org/protocols-and-guidelines/cap-guidelines/current-cap-guidelines/effective-communication-of-urgent-diagnoses-and-significant-unexpected-diagnoses. 2020. ● Dintzis S. Improving pathologists communication skills. <i>AMA J Ethics</i>. 2016;18(8):802-808. https://journalofethics.ama-assn.org/article/improving-pathologists-communication-skills/2016-08. 2020.

Patient Care 2: Reporting

Overall Intent: To generate an understandable, concise, and integrated report

Milestones	Examples
<p>Level 1 <i>Identifies the importance of key elements of a report and timely reporting for optimal patient care</i></p> <p><i>Identifies the need for amended/addended reports when appropriate</i></p>	<ul style="list-style-type: none"> ● Recognizes the importance of complete blood count (CBC), clinical history, microscopic description, final diagnosis, flow cytometry, and other ancillary tests in a bone marrow report ● Understands institutional turnaround time for bone marrow reports ● Recognizes need for including cytogenetic results as an amendment or addendum into a finalized bone marrow report
<p>Level 2 <i>Generates a timely report including key elements for a simple case, with assistance</i></p> <p><i>Generates an amended/addended report that includes updated information, with assistance</i></p>	<ul style="list-style-type: none"> ● Completes a final report with integrated flow cytometry testing for a straightforward case of myeloma in a timely fashion, with assistance ● Generates an amended/addended report documenting additional immunohistochemical stains without change or refinement to the original diagnosis, with assistance
<p>Level 3 <i>Generates a timely report for a complex case, with assistance; independently generates well-organized reports for simple cases</i></p> <p><i>Independently generates an amended/addended report that includes updated information</i></p>	<ul style="list-style-type: none"> ● Completes a final report with integrated flow cytometry testing for myelodysplastic syndrome in a timely fashion, with assistance ● Independently completes a final report with integrated flow cytometry testing for a straightforward case of myeloma in a timely fashion ● Independently generates an amended/addended report documenting additional immunohistochemical stains without change or refinement to the original diagnosis
<p>Level 4 <i>Independently generates a timely, well-organized, integrated report for complex cases</i></p> <p><i>Generates an amended/addended report that includes updated information, and integrates findings into a final diagnosis</i></p>	<ul style="list-style-type: none"> ● Independently completes a final report with integrated flow cytometry testing for myelodysplastic syndrome in a timely fashion ● Generates an amended/addended report incorporating additional immunohistochemical staining that results in a change or refinement to the original diagnosis
<p>Level 5 <i>Independently generates a nuanced, integrated report that expresses the ambiguity and uncertainty for a complex case</i></p>	<ul style="list-style-type: none"> ● Independently completes a final report for a patient with borderline morphologic dysplasia and nonspecific genetic changes
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Global evaluation ● Records review

Curriculum Mapping	•
Notes or Resources	<ul style="list-style-type: none">• CAP. Cancer Protocol Template. https://www.cap.org/protocols-and-guidelines/cancer-reporting-tools/cancer-protocol-templates. 2020.• Goldsmith JD, Siegal GP, Suster S, Wheeler TM, Brown RW. Reporting guidelines for clinical laboratory reports in surgical pathology. <i>Archives of Pathology & Laboratory Medicine</i>. 2008;132(10):1608-1616. https://www.archivesofpathology.org/doi/full/10.1043/1543-2165%282008%29132%5B1608%3ARGFCLR%5D2.0.CO%3B2. 2020.• Swerdlow S, Campo E, Harris NL, et al. <i>WHO Classification of Tumors of Haematopoietic and Lymphoid Tissues</i>. 4th ed. (revised). World Health Organization Publishing; 2017.

Patient Care 3: Procedure: Bone Marrow Aspiration and Biopsy Overall Intent: To understand the utility of and safely perform bone marrow aspiration and biopsy	
Milestones	Examples
Level 1 <i>Describes the indications and contraindications of bone marrow aspiration and biopsy</i>	<ul style="list-style-type: none"> • Lists unexplained anemia as an indication for bone marrow biopsy • Lists marked thrombocytopenia as a potential contraindication for bone marrow biopsy
Level 2 <i>Assists in the performance of bone marrow aspiration and biopsy</i>	<ul style="list-style-type: none"> • Gathers instruments and materials needed for bone marrow biopsy procedure • Maintains the sterile field for the bone marrow biopsy procedure • Identifies spicules and prepares aspirate smear
Level 3 <i>Performs bone marrow aspiration and biopsy, with supervision</i>	<ul style="list-style-type: none"> • Following guidance of the supervising proceduralist, uses appropriate technique to obtain bone marrow core biopsy and aspirate material • Assesses whether adequate material was obtained
Level 4 <i>Independently performs bone marrows aspiration and biopsy</i>	<ul style="list-style-type: none"> • Independently uses appropriate technique to obtain bone marrow core biopsy and aspirate material • Assesses whether adequate material was obtained
Level 5 <i>Teaches others to perform bone marrow aspiration and biopsy</i>	<ul style="list-style-type: none"> • Teaches bone marrow biopsy procedure workshop
Assessment Models or Tools	<ul style="list-style-type: none"> • Case log review • Direct observation • Global evaluation • Simulation
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Medscape. Bone Marrow Aspiration and Biopsy Technique. https://emedicine.medscape.com/article/207575-technique. 2020. • Observation can be performed by the practitioner who teaches the learner to perform the bone marrow biopsy procedure (physician, physician assistant, nurse, etc)

Patient Care 4: Specimen Handling and Triageing	
Overall Intent: To understand and apply specimen handling requirements for hematolymphoid tissues	
Milestones	Examples
<p>Level 1 <i>Describes specimen handling and processing requirements for blood, bone marrow, and body fluid samples</i></p> <p><i>Describes specimen handling and processing requirements for lymphoid tissue samples</i></p>	<ul style="list-style-type: none"> ● Describes the need for a green top tube for cytogenetic analysis ● Describes the need for fresh tissue for flow cytometry
<p>Level 2 <i>Designates blood, bone marrow, and body fluid for required ancillary testing given indication for procedure</i></p> <p><i>Designates lymphoid tissue for required ancillary testing given indication for procedure</i></p>	<ul style="list-style-type: none"> ● Appropriately designates bone marrow aspirate material for morphology, flow cytometry, molecular testing, and cytogenetics in cases of clinically suspected myelodysplastic syndromes (MDS) ● Appropriately designates portions of nodal excisional tissue for morphology and ancillary testing for suspected lymphoma
<p>Level 3 <i>Prioritizes blood, bone marrow, and body fluid for required ancillary testing given indication for procedure, including limited samples, under supervision</i></p> <p><i>Prioritizes lymphoid tissue for required ancillary testing given indication for procedure, including limited samples, under supervision</i></p>	<ul style="list-style-type: none"> ● Under supervision, prioritizes testing and triages bone marrow material from a myelofibrosis patient when no aspirate material is obtained ● Under supervision, prioritizes testing and triages needle core biopsies of a lymph node specimen based on clinical history
<p>Level 4 <i>Independently prioritizes blood, bone marrow, and body fluid for required ancillary testing given indication for procedure, including limited samples</i></p> <p><i>Independently prioritizes lymphoid tissue for required ancillary testing given indication for procedure, including limited samples</i></p>	<ul style="list-style-type: none"> ● Independently prioritizes testing and triages bone marrow material from a myelofibrosis patient when no aspirate material is obtained ● Independently prioritizes testing and triages needle core biopsies of a lymph node specimen based on clinical history
<p>Level 5 <i>Serves as a resource for specimen handling and triaging</i></p>	<ul style="list-style-type: none"> ● Develops procedure manual for laboratory staff and surgical pathology staff for handling hematolymphoid specimens
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Global evaluation

	<ul style="list-style-type: none"> ● Records review ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● Pearson LN, Miller JM, Lunde JH, Bryant RJ, Lewis MR, Tang ME. Combined pathology-driven algorithmic testing and integrated reporting for bone marrow examination. <i>Arch Pathol Lab Med</i>. 2019;143(6):732-737. https://www.archivesofpathology.org/doi/10.5858/arpa.2018-0161-OA?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed. 2020.

Medical Knowledge 1: Interpretation of Hematology Testing	
Overall Intent: To demonstrate knowledge of and interpret test results for hematology disorders	
Milestones	Examples
Level 1 <i>Describes basic methodology and pathophysiology of hematology disorders</i>	<ul style="list-style-type: none"> ● Describes the effect of abnormal hemoglobin production in sickle cell disease ● Explains that electrophoresis separates hemoglobin variants based on size and charge
Level 2 <i>Interprets testing results for common hematology disorders, with assistance</i>	<ul style="list-style-type: none"> ● Interprets hemoglobin acid and alkaline electrophoresis to identify hemoglobin S, with assistance
Level 3 <i>Independently interprets testing results for common hematology disorders and recognizes limitations of testing</i>	<ul style="list-style-type: none"> ● Independently interprets hemoglobin acid and alkaline electrophoresis to identify hemoglobin S ● Recognizes the impact of recent blood transfusion in altering hemoglobin S levels
Level 4 <i>Interprets testing results for complex hematology disorders and recognizes limitations of testing</i>	<ul style="list-style-type: none"> ● Interprets hemoglobin acid and alkaline electrophoresis to identify hemoglobin S/beta-thalassemia disease ● Recognizes limited ability of electrophoresis to identify thalassemia
Level 5 <i>Serves as an expert resource in hematology testing</i>	<ul style="list-style-type: none"> ● Serves as a resource in the laboratory to recognize complex hemoglobin variants in proficiency testing
Assessment Models or Tools	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Examinations, e.g., Fellow In-Service Hematopathology Examination (FISHE) ● Global evaluation ● Portfolio review
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● Glassy E. <i>Color Atlas of Hematology: An Illustrated Field Guide Based on Proficiency Testing</i>. 2nd ed. Northfield, IL: CAP Press; 2018. ● Greer J, et al. <i>Wintrubes Clinical Hematology</i>. 14th ed. Philadelphia, PA: Lippincott, Williams & Wilkins; 2019. ● Hoyer JDE. <i>Color Atlas of Hemoglobin Disorders: A Compendium Based on Proficiency Testing</i>. Northfield, IL: CAP Press; 2003. ●

Medical Knowledge 2: Interpretation of Coagulation Testing Overall Intent: To demonstrate knowledge of and interpret test results for coagulation disorders	
Milestones	Examples
Level 1 <i>Describes basic methodology and pathophysiology of coagulation disorders</i>	<ul style="list-style-type: none"> • Lists the indications for performing a mixing study
Level 2 <i>Interprets testing results for common coagulation disorders, with assistance</i>	<ul style="list-style-type: none"> • Interprets a mixing study with an inhibitor present, with assistance • Drafts a written comment for a mixing study with an inhibitor present
Level 3 <i>Independently interprets testing results for common coagulation disorders and recognizes limitations of testing</i>	<ul style="list-style-type: none"> • Independently interprets a mixing study with an inhibitor present
Level 4 <i>Interprets testing results for complex coagulation disorders and recognizes limitations of testing</i>	<ul style="list-style-type: none"> • Interprets a lupus anticoagulant panel • Writes a comment for interpretation of a weak inhibitor
Level 5 <i>Serves as an expert resource in coagulation testing</i>	<ul style="list-style-type: none"> • Educates colleagues and laboratory personnel about the Bethesda assay
Assessment Models or Tools	<ul style="list-style-type: none"> • Case discussion • Direct observation • Examinations, e.g., FISHE • Global evaluation • Portfolio review
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Greer J, et al. <i>Wintrob's Clinical Hematology</i>. 14th ed. Philadelphia, PA: Lippincott, Williams & Wilkins; 2019. • Kottke-Marchant K. <i>An Algorithmic Approach to Hemostasis Testing</i>. Northfield, IL: CAP Press; 2016.

Medical Knowledge 3: Interpretation of Flow Cytometry	
Overall Intent: To demonstrate knowledge of and interpret test results for flow cytometry	
Milestones	Examples
Level 1 <i>Describes basic methodology of flow cytometry and patterns of antigen expression of hematopoietic cells</i>	<ul style="list-style-type: none"> • Describes the expected antigen profile for germinal center B-cells • Explains the properties of forward-scatter and side-scatter as measured by the flow cytometer
Level 2 <i>Interprets flow cytometry results for common disorders, with assistance</i>	<ul style="list-style-type: none"> • Interprets and identifies the abnormal B-cell population in chronic lymphocytic leukemia (CLL), with assistance
Level 3 <i>Independently interprets flow cytometry results for common disorders and recognizes pitfalls and limitations of testing</i>	<ul style="list-style-type: none"> • Independently interprets and identifies the abnormal B-cell population in CLL • Recognizes the diagnostic ambiguity between monoclonal B-cell lymphocytosis and CLL, including the necessity of correlating with (CBC) values
Level 4 <i>Interprets flow cytometry results for complex disorders and recognizes pitfalls and limitations of testing</i>	<ul style="list-style-type: none"> • Interprets flow cytometry evidence of myelodysplasia • Recognizes that nutritional deficiencies can mimic some of the effects of myelodysplasia
Level 5 <i>Serves as an expert resource in interpretation of flow cytometry</i>	<ul style="list-style-type: none"> • Serves as a resource for other hematopathologists to interpret a challenging B-acute lymphoblastic leukemia (ALL) minimal residual disease assessment
Assessment Models or Tools	<ul style="list-style-type: none"> • Case discussion • Direct observation • Examinations, e.g., FISHE • Global evaluation • Portfolio review
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Cherian S, Wood B. <i>Flow Cytometry in Evaluation of Hematopoietic Neoplasms: A Case-Based Approach</i>. Northfield, IL: CAP Press; 2012. • Porwit A, Béné MC. <i>Multiparameter Flow Cytometry in the Diagnosis of Hematologic Malignancies</i>. New York, NY: Cambridge University Press; 2018. • Weinberg OK, Kurzer JH. <i>Clinical Flow Cytometry: Approaches, Principles and Applications</i>. Hauppauge, NY: Nova Science Publishers; 2019.

Medical Knowledge 4: Morphologic Interpretation and Diagnosis	
Overall Intent: To demonstrate knowledge of and interpret morphologic features of hematology cases	
Milestones	Examples
<p>Level 1 <i>Demonstrates basic knowledge of peripheral blood, bone marrow, and body fluid morphology to identify simple pathologic diagnoses, with guidance</i></p> <p><i>Demonstrates basic knowledge of lymphoid tissue morphology to identify simple pathologic diagnoses, with guidance</i></p>	<ul style="list-style-type: none"> ● Identifies anemia with rouleaux, 70 percent lambda-restricted plasma cells to render diagnosis of plasma cell myeloma, with guidance ● Identifies nodular architectural distortion, lymphocytes with cleaved morphology, and a follicle center phenotype to render a diagnosis of follicular lymphoma, with guidance
<p>Level 2 <i>Independently applies knowledge of peripheral blood, bone marrow, and body fluid morphology to identify simple pathologic diagnoses</i></p> <p><i>Independently applies knowledge of lymphoid tissue morphology to identify simple pathologic diagnoses</i></p>	<ul style="list-style-type: none"> ● Independently identifies anemia with rouleaux, 70 percent lambda-restricted plasma cells to render diagnosis of plasma cell myeloma ● Independently identifies nodular architectural distortion, lymphocytes with cleaved morphology, and a follicle center phenotype to render a diagnosis of follicular lymphoma
<p>Level 3 <i>Applies knowledge of peripheral blood, bone marrow, and body fluid morphology to identify complex pathologic diagnoses, with guidance</i></p> <p><i>Applies knowledge of lymphoid tissue morphology to identify complex pathologic diagnoses, with guidance</i></p>	<ul style="list-style-type: none"> ● Identifies macrocytic anemia, hypogranular neutrophils, and 7 percent marrow blasts to render a diagnosis of myelodysplastic syndrome with excess blasts (MDS-EB-1), with guidance ● Identifies architectural distortion, atypical lymphocytes, and T-follicular helper phenotype to render a diagnosis of angioimmunoblastic T-cell lymphoma, with guidance
<p>Level 4 <i>Independently applies knowledge of peripheral blood, bone marrow, and body fluid morphology to identify complex pathologic diagnoses</i></p> <p><i>Independently applies knowledge of lymphoid tissue morphology to identify complex pathologic diagnoses</i></p>	<ul style="list-style-type: none"> ● Independently identifies macrocytic anemia, hypogranular neutrophils, and 7 percent marrow blasts to render a diagnosis of MDS-EB-1 ● Independently identifies architectural distortion, atypical lymphocytes, and T-follicular helper phenotype to render a diagnosis of angioimmunoblastic T-cell lymphoma

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<p>Level 5 <i>Recognized as an expert in the integration of hematolymphoid morphologic knowledge to pathologic diagnoses</i></p>	<ul style="list-style-type: none"> • Renders internal and external consultation on challenging hematolymphoid cases
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Case discussion • Direct observation • Examinations, e.g., FISHE • Global evaluation • Portfolio review
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • Swerdlow S, Campo E, Harris NL, et al. <i>WHO Classification of Tumors of Haematopoietic and Lymphoid Tissues</i>. 4th ed (revised). World Health Organization Publishing; 2017.

Medical Knowledge 5: Selection of Molecular and Cytogenetics Testing and Interpretation of Reports Overall Intent: To understand the indications for testing and interpret reports generated in molecular and cytogenetic laboratories	
Milestones	Examples
Level 1 <i>Describes available ancillary tests, including cytogenetics and molecular testing, based on morphologic findings</i>	<ul style="list-style-type: none"> • Understands different modalities for testing for breakpoint cluster region gene (BCR)-Abelson gene (ABL1) fusion in cases of newly diagnosed B-acute lymphoblastic leukemia (B-ALL)
Level 2 <i>Proposes appropriate ancillary tests for morphologic findings</i>	<ul style="list-style-type: none"> • Recommends BCR-ABL1 fluorescent in-situ hybridization (FISH) in cases of newly diagnosed B-ALL
Level 3 <i>Interprets simple ancillary test reports, considering technical limitations</i>	<ul style="list-style-type: none"> • Recognizes that a negative p210 BCR-ABL1 polymerase chain reaction (PCR) in a patient with a de novo B-ALL may be misleading due to existence of alternate break points
Level 4 <i>Interprets complex ancillary test reports including diagnostic uncertainty and clinical ramifications</i>	<ul style="list-style-type: none"> • Recognizes diagnostic/clinical ambiguity in next-generation sequencing report documenting a single DNA methyl transferase 3A (DNMT3A) mutation in a cytopenic patient
Level 5 <i>Serves as an expert resource for the interpretation of ancillary test reports</i>	<ul style="list-style-type: none"> • Assists in the design of a new myeloid next-generation sequencing panel by selecting appropriate genetic targets
Assessment Models or Tools	<ul style="list-style-type: none"> • Case discussion • Direct observation • Examinations, e.g., FISHE • Global evaluation • Portfolio review • Presentations
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • American Society of Hematology. ASH-CAP Guidelines for the Diagnosis of Acute Leukemia. https://www.hematology.org/Thehematologist/Mini-Review/7120.aspx. 2020. • National Comprehensive Cancer Network. NCCN Guidelines. https://www.nccn.org/professionals/physician_gls/default.aspx. 2020. • Swerdlow S, Campo E, Harris NL, et al. <i>WHO Classification of Tumors of Haematopoietic and Lymphoid Tissues</i>. 4th ed (revised). World Health Organization Publishing; 2017.

Medical Knowledge 6: Clinical Reasoning in Hematopathology and Hematology	
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 resources to inform clinical reasoning</i></p>	<ul style="list-style-type: none"> ● Understands the differential diagnosis of anemia as based on mean corpuscular volume ● Lists EHR, laboratory information system, internet, and literature as possible tools to assist in the diagnosis of an acute leukemia patient
<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"> ● Understands that laboratory studies, nutritional and family history, and peripheral smear morphology are relevant when working up a case of anemia ● Recognizes the current <i>World Health Organization (WHO) Classification of Haematopoietic and Lymphoid Tumours</i> as the standard for diagnosis and subclassification of hematopoietic malignancies
<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"> ● Incorporates laboratory studies, nutritional and family history, and peripheral smear morphology in determining the etiology of anemia, with assistance ● Uses information from a recent journal club article on consensus-based guidelines to direct additional testing on a case of pyruvate kinase deficiency, with assistance
<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"> ● Independently incorporates laboratory studies, nutritional and family history, and peripheral smear morphology in determining the etiology of a multifactorial anemia ● Independently uses information from a recent article to direct additional esoteric testing on a case of anemia with unknown etiology
<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 in work-up of difficult anemia patients
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Examinations, e.g., FISHE ● Global evaluation ● Presentations
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●

Notes or Resources	<ul style="list-style-type: none">● Clinical reasoning relies on appropriate foundational knowledge that requires the fellow to apply that knowledge in a thoughtful, deliberate, and logical fashion to clinical cases to inform clinical care● Heiberg Engel PJ. <i>Tacit knowledge and visual expertise in medical diagnostic reasoning: Implications for medical education</i>. <i>Medical Teacher</i>. 2008;30(7):e184-e188. https://www.tandfonline.com/doi/full/10.1080/01421590802144260. 2020.● Iobst WF, Trowbride R, Philibert I. Teaching and assessing critical reasoning through the use of entrustment. <i>J Grad Med Educ</i>. 2013;5(3):517-518. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3771188/. 2020.
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Systems-Based Practice 1: Patient Safety and Quality Improvement (QI)	
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"> ● Understands mislabeled samples can cause patient safety events ● Discusses how to file a patient safety report for a mislabeled specimen based on institutional policies ● Explains Swiss Cheese model in the context of a mislabeled samples
<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"> ● Describes the potential pre-analytic errors that could lead to mislabeling ● Appropriately files a patient safety report for a mislabeled specimen based on institutional policies ● Is aware of quality monitors surrounding specimen labeling in the department
<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"> ● Participates in a root cause analysis for a mislabeled specimen and discusses with clinical teams or patients as appropriate ● Participates in a QI project pertaining to mislabeled specimens in the laboratory, 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"> ● Leads, rather than participates in, a root cause analysis for a mislabeled specimen and can competently communicate with clinical teams or patients/families about those events

<p><i>Demonstrates the skills required to identify, develop, implement, and analyze a QI project</i></p>	<ul style="list-style-type: none"> • Designs and completes a QI project pertaining to mislabeled specimens in the laboratory
<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"> • Serves as the director for patient safety or QI in the department • Leads an educational session on quality management for fellow learners • Initiates system wide program to decrease mislabeled specimens
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Examinations (FISHE, other) • Global evaluations • Patient safety event documentation • Portfolio • QI or patient safety project • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • ASCP. Patient Safety. https://store.ascp.org/productlisting/productdetail?productId=102472667. 2020. • CAP. Creating a Culture of Patient Safety. https://learn.cap.org/Activity/6577064/Detail.aspx. 2020. • CAP. Disclosing Serious Pathology Errors. https://www.cap.org/member-resources/articles/disclosing-serious-pathology-errors. 2020. • Institute of Healthcare Improvement. http://www.ihp.org/Pages/default.aspx. 2020.

Systems-Based Practice 2: Systems Navigation for Patient-Centered Care	
Overall Intent: To effectively navigate the interdisciplinary health care system; to adapt care to a specific patient population, ensuring 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</i></p>	<ul style="list-style-type: none"> ● Identifies the members of the interprofessional team, including technologists, pathologist assistants, other physicians, and nurses, and describes their roles but is not yet routinely collaborating with 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 a new leukemia patient presenting overnight ● Identifies at-risk patient populations within own health care system
<p>Level 2 <i>Coordinates care of patients/specimens 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 for the local population</i></p>	<ul style="list-style-type: none"> ● Contacts hematology-oncology fellow to coordinate care of a new patient with acute leukemia ● Ensures day coverage team is informed in a timely fashion of a new leukemia patient presenting overnight ● Understands a patient’s insurance status may impact the testing strategy
<p>Level 3 <i>Coordinates care of patients/specimens 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, engages in appropriate discussion of patient care testing options and impact on therapy for a patient with transformed disease and a history of targeted therapies ● Efficiently coordinates the care of a patient with leukemia when transferred between institutions ● Identifies opportunities to participate in a bone marrow donor drive
<p>Level 4 <i>Models effective coordination of patient-centered care among different disciplines and specialties</i></p>	<ul style="list-style-type: none"> ● Teaches a fellow learner to lead a tumor board presentation

<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"> ● At an intradepartmental meeting, presents strategies for coordination of care for the transfer of leukemia patients between institutions ● Identifies outpatient settings that would benefit from education on appropriate testing practices
<p>Level 5 <i>Analyzes 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 needs</i></p>	<ul style="list-style-type: none"> ● Initiates the restructuring of a multidisciplinary tumor board ● Implements innovative strategies for coordination of care for the transfer of leukemia patients between institutions ● Implements new testing practices at an outpatient setting for an at-risk patient population
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case discussions ● Chart review ● Direct observation ● Global evaluation ● Interdisciplinary rounds or tumor board ● Lectures/workshops on social determinants of health or population health
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● 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> 2009;133(6)926-932. https://www.archivesofpathology.org/doi/10.1043/1543-2165-133.6.926?url_ver=Z39.88-2003&rfr_id=ori:rid:crossref.org&rfr_dat=cr_pub%3dpubmed. 2020. ● Black-Schaffer WS, Morrow JS, Prystowsky MB, Steinberg JJ. Training pathology residents to practice 21st century medicine: a proposal. <i>Academic Pathology.</i> 2016;3:2374289516665393. https://journals.sagepub.com/doi/10.1177/2374289516665393#articleCitationDownloadContainer. 2020. ● Centers for Disease Control and Prevention. Population Health Training. https://www.cdc.gov/pophealthtraining/whatis.html. 2020.

- CAP. Competency Model for Pathologists. https://learn.cap.org/content/cap/pdfs/Competency_Model.pdf. 2020.
- Kaplan KJ. In Pursuit of Patient-Centered Care. <http://tissuepathology.com/2016/03/29/in-pursuit-of-patient-centered-care/#axzz5e7nSsAns>. 2020.

Systems-Based Practice 3: Physician Role in Health Care System	
Overall Intent: To understand own role in the interdisciplinary health care system and improve patient care and health system performance	
Milestones	Examples
<p>Level 1 <i>Identifies key components of the complex health care system (e.g., hospital, 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"> ● Identifies pertinent departmental, divisional, and laboratory leadership ● Lists payment systems, such as Medicare, Medicaid, the VA, and commercial third-party payers, including the role of the pathology department in International Classification of Disease (ICD) and Current Procedural Terminology (CPT) coding
<p>Level 2 <i>Describes how components of a complex health care system are interrelated, 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"> ● Describes the process for specimen retrieval from an offsite facility and the impact on turnaround time ● Documents immunohistochemistry in a patient report with appropriate disclaimers and codes
<p>Level 3 <i>Discusses how individual practice affects the broader system (e.g., test use, 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"> ● Analyzes own case turnaround time data and how it may impact patient care ● Works with hematology colleagues to discuss standard strategies for new patient testing
<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"> ● Expedites both in-house and send-out ancillary testing needed to improve patient care ● Cancels unnecessary testing to avoid additional cost to patient
<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"> ● Advocates for a systematic process to select cascading tests versus up front testing for myeloproliferative neoplasms ● Participates at the institutional level as an advocate to protect billing reimbursement

Assessment Models or Tools	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Global evaluation ● Lecture/workshops ● Portfolio review ● QI or patient safety project
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● Agency for Healthcare Research and Quality. Measuring the Quality of Physician Care. https://www.ahrq.gov/talkingquality/measures/setting/physician/index.html. 2020. ● AHRQ. Major Physician Measurement Sets. https://www.ahrq.gov/talkingquality/measures/setting/physician/measurement-sets.html. 2020. ● American Board of Internal Medicine. QI/PI Activities. https://www.abim.org/maintenance-of-certification/earning-points/qi-pi-activities.aspx. 2020. ● The Commonwealth Fund. Health Reform Resource Center. http://www.commonwealthfund.org/interactives-and-data/health-reform-resource-center#/f:@facasubcategoriesfacet63677=[Individual%20and%20Employer%20Responsibility. 2020. ● The Commonwealth Fund. Health System Data Center. http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1. 2020. ● Dzau VJ, McClellan M, Burke S, et al. Vital directions for health and health care: priorities from a National Academy of Medicine Initiative. <i>NAM Perspectives</i>. Discussion Paper, National Academy of Medicine, Washington, DC. https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/. 2020. ● The Kaiser Family Foundation. www.kff.org. 2020. ● The Kaiser Family Foundation: Topic: health reform. https://www.kff.org/topic/health-reform/. 2020.

<p align="center">Systems-Based Practice 4: Accreditation, Compliance, and Quality</p> <p>Overall Intent: To gain in-depth knowledge of the components of laboratory accreditation, regulatory compliance, and quality management</p>	
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"> ● Describes the basic role of Clinical Laboratory Improvement Amendments (CLIA) in laboratory accreditation ● Understands the general categories of quality control for the clinical hematology laboratory
<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 supervision</i></p>	<ul style="list-style-type: none"> ● Understands that implementation of paroxysmal nocturnal hemoglobinuria (PNH) testing requires validation of the method and participation in proficiency testing ● Assesses quality of quality control slides for immunohistochemical stains
<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"> ● Discusses the CLIA requirements for new PNH test validation ● Completes inspector training for College of American Pathologists (CAP) to understand process for achieving/maintaining regulatory/accreditation compliance ● Reviews investigations of past proficiency failures
<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 of the flow cytometry lab using a CAP checklist ● Assists in developing a strategy for handling quality control or proficiency testing failures

<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>Independently 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 ● Oversees laboratory quality management as part of duties as a medical director
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Documentation of inspector training ● Global evaluations ● Participation in CAP inspection ● Participation on quality committee ● Portfolio review ● QI or patient safety projects ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● CDC. (CLIA). https://www.cdc.gov/clia/index.html. 2020. ● CAP. Inspector Training. https://www.cap.org/laboratory-improvement/accreditation/inspector-training. 2020.

Systems-Based Practice 5: Utilization	
Overall Intent: To gain in-depth knowledge and apply best practices regarding laboratory utilization	
Milestones	Examples
Level 1 <i>Identifies general hematopathology work practices and workflow (e.g., molecular diagnostic, immunohistochemistry, chemical tests)</i>	<ul style="list-style-type: none"> • Lists testing available in-house and testing available as send-out via locating the online test menu
Level 2 <i>Explains rationale for utilization patterns in own practice setting</i>	<ul style="list-style-type: none"> • Understands ordering patterns used at own institution and explains why a given test is being “sent-out” • Understands why MDS FISH is unnecessary with an adequate cytogenetic analysis
Level 3 <i>Identifies opportunities to optimize utilization of pathology resources</i>	<ul style="list-style-type: none"> • Recognizes that some patient samples are unnecessarily being sent out or an actionable test is not being sent out • Cancels duplicative orders such as MDS FISH and karyotype
Level 4 <i>Initiates efforts to optimize utilization</i>	<ul style="list-style-type: none"> • Presents evidence-based arguments for establishing a reflex protocol for MDS FISH • Refers to “Choosing Wisely” initiatives regarding MDS FISH testing in light of cytogenetics results
Level 5 <i>Completes a utilization review and implements change</i>	<ul style="list-style-type: none"> • Investigates benefits and shortcomings to particular reference laboratories, and presents findings of a utilization review • Summarizes the benefits of a reflex strategy for MDS FISH and presents to medical leadership for implementation and/or writes a manuscript describing the impact of a reflex strategy
Assessment Models or Tools	<ul style="list-style-type: none"> • Case-based discussion • Direct observation • Lectures/workshops • Portfolio review • QI or patient safety project • Simulation
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • Choosing Wisely. https://www.choosingwisely.org/. 2020.

Practice-Based Learning and Improvement 1: Evidence-Based Practice and Scholarship Overall Intent: To incorporate evidence into clinical practice and contribute to the body of knowledge in hematology and hematopathology	
Milestones	Examples
<p>Level 1 <i>Demonstrates how to access and select applicable evidence</i></p> <p><i>Is aware of the need for patient privacy, autonomy, and consent as applied to clinical research</i></p>	<ul style="list-style-type: none"> ● Uses PubMed to search for appropriate molecular testing in the work-up for lymphoma ● Identifies the need for Institutional Review Board (IRB) approval when collecting cases for a possible research project
<p>Level 2 <i>Identifies and applies the best available evidence to guide diagnostic work-up 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"> ● Reviews WHO as a starting point for the recommended FISH testing for diffuse large B-cell lymphoma ● Drafts a research project/IRB protocol with attending oversight ● Understands the difference between IRB exemption and expedited review
<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 supervision</i></p>	<ul style="list-style-type: none"> ● Reviews current practice for Philadelphia chromosome-like acute lymphoblastic leukemia diagnosis ● Drafts a research project/IRB protocol with minimal oversight ● Applies evidence from journal club to clinical practice
<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 ● Implements a research project/IRB approved protocol ● Applies evidence from self-directed literature review to clinical practice

<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> <p><i>Suggests 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"> ● Participates in clinical advisory conference for modifying National Comprehensive Cancer Network (NCCN) guidelines ● Establishes publication record in a focused area of expertise
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation ● Portfolio review ● Presentation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● IRB approval modules CITI ● Institutional IRB guidelines ● National Institutes of Health. Write Your Application. https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm. 2020. ● U.S. National Library of Medicine. PubMed Tutorial. https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html. 2020. ● Various journal submission guidelines

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth Overall Intent: To seek feedback regarding all domains of practice in an interdisciplinary setting and develop clear objectives and goals for improvement	
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"> ● Articulates goals to improve report writing ● Compares self-assessment of milestones to faculty-assessed milestones ● Seeks out reading materials relevant to current rotation
<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"> ● Accepts constructive feedback when meeting with a fellowship director and is not defensive ● When given feedback that reports are not completed in a timely fashion, accepts responsibility and does not blame others ● Works with flow cytometry director to identify study set materials to correct past deficiencies in flow cytometry analysis
<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"> ● Respectfully asks for input from technologists, peers/colleagues, and supervisors to gain insight into personal strengths and areas for improvement ● Alters practice habits to issue timely reports, after receiving feedback ● Independently identifies study set materials to correct past deficiencies in flow cytometry analysis
<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"> ● Asks for feedback from multiple attendings on each rotation ● Monitors improvement after altering practice habits on timely reporting

<p><i>Uses performance data to measure the effectiveness of the learning plan and improves it when necessary</i></p>	<ul style="list-style-type: none"> ● Uses in-service examination scores to evaluate efficacy of flow cytometry learning plan
<p>Level 5 Models seeking performance data and accepting feedback with humility</p> <p><i>Coaches others in reflective practice</i></p> <p><i>Facilitates the design and implementing learning plans for others</i></p>	<ul style="list-style-type: none"> ● Encourages others to ask for feedback from multiple attendings on each rotation ● Leads a session on giving and receiving feedback ● Guides a resident rotating through flow cytometry on selection of appropriate study sets
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation ● Lectures/workshops ● Milestones self-assessment ● Portfolio review ● Review of learning plan ● Self-reflection
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● Bing-You R, Hayes V, Varaklis K, Trowbridge R, Kemp H, McKlevy D. Feedback for learners in medical education: what is known? A scoping review. <i>Acad Med</i>. 2017;92(9):1346-1354. https://journals.lww.com/academicmedicine/fulltext/2017/09000/Feedback_for_Learners_in_Medical_Education_What.37.aspx. 2020. ● 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. https://www.academicpedsjnl.net/article/S1876-2859(13)00333-1/fulltext. 2020. ● Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. <i>Academic Medicine</i>. 2009;84(8):1066-1074. https://journals.lww.com/academicmedicine/fulltext/2009/08000/Measurement_and_Correlates_of_Physicians_Lifelong.21.aspx. 2020. ● Lockspeiser TM, Schmitter PA, Lane JL, Hanson JL, Rosenberg AA, Park YS. Assessing residents' written learning goals and goal writing skill: validity evidence for the learning goal scoring rubric. <i>Academic Medicine</i>. 2013;88(10):1558-1563. https://journals.lww.com/academicmedicine/fulltext/2013/10000/Assessing_Residents_Written_Learning_Goals_and.39.aspx. 2020. ● Resident and Fellow Milestones Guidebook

- Stone D, Heen S. *Thanks for the Feedback The Science and Art of Receiving Feedback Well*. New York, NY: Penguin Books; 2014.

Professionalism 1: Professional Behavior and Ethical Principles	
Overall Intent: To promote ethical and professional behavior, address lapses, and appropriately manage 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"> ● Describes the ethical relevance of informed consent for bone marrow biopsy ● Discusses methods for reporting professional lapses at own institution
<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 one's own professionalism lapses</i></p>	<ul style="list-style-type: none"> ● Understands that delayed reports can lead to patient stress or suffering ● Takes responsibility when running late to tumor board
<p>Level 3 <i>Recognizes the need and uses relevant 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"> ● Reaches out to genetic counselor when a possible germline mutation is identified on a sequencing panel ● Maintains composure when dealing with an unprofessional colleague in an interdisciplinary setting
<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"> ● Calls risk management upon identifying a missed diagnosis and participates in the recommended resolution ● Proactively mediates conflict in tumor board after identifying a controversial case
<p>Level 5 <i>Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution</i></p>	<ul style="list-style-type: none"> ● Serves as a member of the IRB or Ethics Committee

<p><i>Coaches others when their behavior fails to meet professional expectations</i></p>	<ul style="list-style-type: none"> ● Leads workshop in resolving professional dilemmas
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case discussion ● Direct observation ● Global evaluation ● Lectures/workshops ● Presentation ● Self-reflection exercises ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● American Board of Internal Medicine, ACP-ASIM Foundation, 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-Millenium-A-Physician-Charter.pdf. 2020. ● American Medical Association. Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. 2020. ● 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;141:1349-1401. https://www.archivesofpathology.org/doi/10.5858/arpa.2016-0477-CP. 2020. ● Byyny RL, Papadakis MA, Paauw DS. <i>Medical Professionalism Best Practices</i>. Menlo Park, CA: Alpha Omega Alpha Medical Society; 2015. https://alphaomegaaalpha.org/pdfs/2015MedicalProfessionalism.pdf. 2019. ● 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. 2018;5: 2374289518773493. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6039899/. 2020. ● 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. <i>Acad Pathol.</i> 2015; 2:2374289515592887. https://journals.sagepub.com/doi/10.1177/2374289515592887. 2020. ● Domen RE, Johnson K, Conran RM, et al. Professionalism in pathology: a case-based approach as a potential education tool. <i>Arch Pathol Lab Med.</i> 2017;141:215-219.

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Professionalism 2: Accountability and Conscientiousness	
Overall Intent: To take responsibility for one’s own actions including 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 bone marrow reports
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"> ● Without prompting, completes bone marrow reports on time to include applicable ancillary studies ● 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"> ● Coordinates coverage when going on vacation ● Contacts contributing pathologists or clinical team members to inform that the diagnosis may be delayed due to pending molecular studies
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"> ● Completes colleague’s cases when the colleague is out of town for a conference
Level 5 <i>Takes ownership of system outcomes, and implements new strategies when necessary</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 ● Develops a procedure to ensure that reference laboratory test results are received and reported in a timely manner
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Global evaluations, including from program coordinator ● Lectures/workshops ● Quality metrics ● Self-reflection exercises ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ASA. Ethics Resources. https://monitor.pubs.asahq.org/article.aspx?articleid=2623185&_ga=2.195503080.594041218.1580135281-292330288.1579657750. 2020. ● Code of conduct from fellow/resident institutional manual ● Expectations of residency program regarding accountability and professionalism ● Papadakis MA, Teherani A, Banach MA, et al. Disciplinary action by medical boards and prior behavior in medical school. <i>N Engl J Med</i>. 2005;353:2673-2682. https://www.nejm.org/doi/full/10.1056/NEJMsa052596. 2020.

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Professionalism 3: Self-Awareness and Help-Seeking Overall Intent: To identify, use, manage, improve, and seek resources 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"> ● Receptive to feedback regarding a pattern of incorrect diagnoses, and acknowledges role in deficit ● Does not provide a preliminary diagnosis to oncologist when unsure and seeks attending advice before communicating ● Recognizes signs of being under stress, with assistance from others
<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"> ● Recognizes the pattern of incorrect diagnoses and seeks out guidance in rectifying deficit ● Does not provide a preliminary diagnosis to oncologist when unsure ● Recognizes the signs of being under stress and contacts program director
<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"> ● Recognizes the pattern of incorrect diagnoses, and forms a learning plan to address the deficit, with guidance ● Solicits extra training or understanding of how to relay preliminary diagnosis to oncologist ● When under stress, works with employee health to implement a mental health plan
<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"> ● Recognizes the pattern of incorrect diagnoses and forms a learning plan independently to correct their deficit ● Correctly provides preliminary diagnosis to oncologist after completing extra training ● When under stress, implements healthy coping behaviors
<p>Level 5 <i>Serves as a resource or consultant for developing a plan to remediate or improve the knowledge/ skills/behaviors</i></p>	<ul style="list-style-type: none"> ● Recognizes the pattern of incorrect diagnoses in others, and guides them to develop their own learning plans

<p><i>Coaches others when responses or limitations in knowledge/skills do not meet professional expectations</i></p>	<ul style="list-style-type: none"> • Aids others in identifying resources or healthy coping behaviors to deal with stress
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Global evaluation, including from program coordinator • Institutional online training modules • Lectures/workshops • Self-reflection exercises • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • This subcompetency is not intended to evaluate a fellow’s well-being, but to ensure each fellow has the fundamental knowledge of factors that impact well-being, the mechanisms by which those factors impact well-being, and available resources and tools to improve well-being. • ACGME. “Well-Being Tools and Resources.” https://di.acgme.org/pages/well-being-tools-resources. 2020. • 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;5:2374289518773493. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6039899/. 2020. • Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: personal and professional development. <i>Acad Pediatr</i>. 2014;14(2 Suppl):S80-97. https://linkinghub.elsevier.com/retrieve/pii/S1876-2859(13)00332-X. 2020. • 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;128(6):911-919. https://academic.oup.com/ajcp/article/128/6/911/1764982. 2020. • Papadakis MA, Teherani A, Banach MA, et al. Disciplinary action by medical boards and prior behavior in medical school. <i>N Engl J Med</i>. 2005;353:2673-2682. https://www.nejm.org/doi/full/10.1056/NEJMsa052596. 2020. • Local resources, including Employee Assistance

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication Overall Intent: Within the scope of hematopathology practice, to deliberately use language and behaviors to form constructive relationships with patients and families	
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>	<ul style="list-style-type: none"> ● When addressing a patient/family affected by a mislabeled specimen, speaks clearly with a serious tone ● Prior to a bone marrow biopsy, explains the role of a hematopathologist in patient’s care and avoids using medical jargon ● Is aware of the interpreter services available at the institution
<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>	<ul style="list-style-type: none"> ● When speaking to a patient/family affected by a mislabeled specimen, listens to concerns with head nodding to signify understanding ● Explains what to expect during the bone marrow biopsy procedure in the context of the patient’s health literacy ● Discusses the difficulties in explaining a high-grade lymphoma transformation to a patient with limited English understanding or education
<p>Level 3 <i>Sensitively and compassionately delivers medical information, with supervision</i></p> <p><i>When prompted, reflects on biases while attempting to minimize communication barriers</i></p>	<ul style="list-style-type: none"> ● Delivers the news of a mislabeled specimen leading to an incorrect diagnosis to a patient/family while pausing on occasion to allow for silence or questions, vocalizing empathic statements such as “I know this is frustrating,” and maintaining an affect congruent with that of the patient/family, with supervision ● Communicates the discomfort of the bone marrow procedure and proactively counsels the patient ● When asked, admits to difficulty in speaking with patients from a different background
<p>Level 4 <i>Independently, sensitively, and compassionately delivers medical information and acknowledges uncertainty and conflict</i></p>	<ul style="list-style-type: none"> ● Explains to a patient/family that a mislabeled specimen has led to the need for an additional procedure, pausing on occasion to allow for silence or questions, and vocalizing empathic statements ● Explains a complicated lymphoma diagnosis to a patient/family while acknowledging this was a diagnosis of exclusion with some inherent uncertainty, pausing on occasion to allow for silence or questions, and vocalizing empathic statements ● Sensitively communicates the possibility that the bone marrow procedure might be non-diagnostic

<p><i>Independently recognizes biases while attempting to proactively minimize communication barriers</i></p>	<ul style="list-style-type: none"> ● Attends an institutional continuing education session on methods to minimize communication barriers with patients from different backgrounds
<p>Level 5 <i>Mentors others in the sensitive and compassionate delivery of medical information</i></p> <p><i>Models self-awareness while teaching a contextual approach to minimize communication barriers</i></p>	<ul style="list-style-type: none"> ● Provides feedback to a colleague who delivered a new diagnosis of lymphoma to a patient during a family meeting ● Gives a seminar or writes a paper on the topic of compassionate delivery of medical information including when errors have occurred
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation ● Lectures/workshops ● Self-reflection exercises ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● The examples can be seen in an actual patient encounter or simulated experience. ● Dintzis S. Improving pathologist’s communication skills. <i>AMA J Ethics</i>. 2016;18(8):802-808. https://journalofethics.ama-assn.org/article/improving-pathologists-communication-skills/2016-08. 2020. ● Dintzis SM, Stetsenko GY, Sitlani CM, et al. Communicating pathology and laboratory errors: anatomic pathologists’ and laboratory medical directors’ attitudes and experiences. <i>Am J Clin Pathol</i>. 2011;135(5):760-765. https://academic.oup.com/ajcp/article/135/5/760/1766306. 2020. ● Laidlaw A, Hart J. Communication skills: an essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. <i>Med Teach</i>. 2011;33(1):6-8. https://www.tandfonline.com/doi/full/10.3109/0142159X.2011.531170. 2020. ● Makoul G. Essential elements of communication in medical encounters: the Kalamazoo consensus statement. <i>Acad Med</i>. 2001;76(4):390-393. https://journals.lww.com/academicmedicine/Fulltext/2001/04000/Essential_Elements_of_Communication_in_Medical.21.aspx#pdf-link. 2020. ● Makoul G. The SEGUE Framework for teaching and assessing communication skills. <i>Patient Educ Couns</i>. 2001;45(1):23-34. https://www.sciencedirect.com/science/article/abs/pii/S0738399101001367?via%3Dihub. 2020.

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- Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in residents. *BMC Med Educ*. 2009;9:1. <https://bmcmmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1>. 2020.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication Overall Intent: To effectively communicate with the interdisciplinary health care team	
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"> ● Uses respectful communication with clerical and technical staff members ● Articulates how feedback from a technologist informed practice
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"> ● Communicates preliminary diagnostic information to hematology-oncology fellow and technologist with appropriate level of detail ● Asks for feedback on report formatting from the hematology/oncology team
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 own communications by restating critical values and unexpected diagnoses ● Uses feedback from multiple attendings to speak more slowly during tumor boards
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"> ● Collaborates with interventional radiology and hematology/oncology team to appropriately triage core biopsy samples ● Completes rotation evaluations with suggestions to improve clinical case distribution
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"> ● Demonstrates how to report results to a nurse versus an oncologist to ensure understanding and that questions are addressed ● Organizes a team meeting to discuss and resolve potentially conflicting points of view on a care plan
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation ● Lectures/workshops ● Presentations ● Self-reflection exercises ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●

Notes or Resources

- 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;141:1394-1401.
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Interpersonal and Communication Skills 3: Communication within Health Care Systems Overall Intent: To effectively and safely communicate patient health information 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"> ● Recognizes discussion of a new leukemia patient should only occur through institutional email and private voice communication and knows to avoid publicly discussing protected information ● Identifies the need to contact hematology/oncology fellow on service via pager or private cell phone call when a new leukemia is suspected in the laboratory ● Understands there is a need for relaying some patient results directly to providers and that there are institutional policies for relaying urgent and non-urgent results
<p>Level 2 <i>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 that flow results for a known CLL patient may only need to be emailed to the ordering physician but flow results for a new acute leukemia patient often need a phone call or page to the hematology/oncology fellow on service ● Reports a critical value for a hemoglobin of 3.9 to the physician caring for the patient, and ensures confirmatory readback by phone ● Respectfully vocalizes concern for possible treatment delay to attending when the on-call medicine resident is alerted of a possible new acute promyelocytic leukemia instead of the hematology/oncology fellow
<p>Level 3 <i>Communicates while ensuring security of personal health information, with supervision</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"> ● Reports a new diagnosis of acute leukemia in a patient to the hematology/oncology fellow on service by paging the fellow and discussing the findings by phone, with supervision ● Suggests to attending that all new possible leukemias be called to hematology/oncology fellow on service first, then allow that fellow to communicate to any other teams as needed ● Discusses better ways to report critical values at institutional quality assurance/QI meeting
<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"> ● Independently reports a new diagnosis of acute leukemia in a patient to the hematology/oncology fellow on service by paging the fellow and discussing the findings by phone ● Meets with hematology/oncology team about the communication of possible new leukemias and suggests they be responsible for disseminating the pathologic impression to other health care teams seeing the patient

<p>Level 5 Guides departmental or institutional communication around policies and procedures regarding the security of personal health information</p> <p>Facilitates dialogue regarding systems issues among larger community stakeholders (institution, health care system, field)</p>	<ul style="list-style-type: none"> • Writes a departmental policy and procedures for appropriate forms of communicating patient health information through a new hospital app • Leads a task force established by the hospital QI committee to develop a plan to reduce the turn-around time of lymph node biopsies
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Chart review • Direct observation • Global evaluation • Institutional online training modules • Lectures/workshops • QI or patient safety project • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<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;29(4):420-432. https://www.tandfonline.com/doi/full/10.1080/10401334.2017.1303385. 2020. • Haig KM, Sutton S, Whittington J. SBAR: a shared mental model for improving communication between clinicians. <i>Jt Comm J Qual Patient Saf.</i> 2006;32(3):167-175. https://www.jointcommissionjournal.com/article/S1553-7250(06)32022-3/fulltext. 2020. • Patterson K, Grenny J, McMillan R, Switzler A, Roppe L. <i>Crucial Conversations: Tools for Talking When Stakes Are High.</i> New York, NY: McGraw-Hill; 2012. • Starmer AJ, et al. I-pass, a mnemonic to standardize verbal handoffs. <i>Pediatrics.</i> 2012;129(2):201-204. https://pediatrics.aappublications.org/content/129/2/201?sso=1&sso_redirect_count=1&nfstatus=401&nftoken=00000000-0000-0000-0000-000000000000&nfstatusdescription=ERROR%3a+No+local+token. 2020.

To aid programs transition to the new version of the Milestones, the original Milestones 1.0 have been mapped to the new Milestones 2.0. Below indicates where the subcompetencies are similar between versions. These are not exact matches but include some of the same elements. 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: Analyzes, appraises, formulates, generates, and effectively reports consultation	PC1: Interdisciplinary Consultation PC2: Reporting
PC2: Reporting: Integrates complex data to generate accurate, complete but concise, easily understood, and timely reports	PC2: Reporting
PC3: Procedures: Performing bone marrow aspiration and biopsy	PC3: Procedure: Bone Marrow Aspiration and Biopsy PC4: Specimen Handling and Triaging
MK1: Interpretation of clinical laboratory hematology testing	MK1: Interpretation of Hematology and Coagulation Testing MK2: Interpretation of Flow Cytometry
MK2: Teaching	None
MK3: Interprets and demonstrates diagnostic knowledge for tissue-based specimens and peripheral blood and fluid samples requiring an “anatomic” diagnosis	PC4: Specimen Handling and Triaging MK1: Interpretation of Hematology and Coagulation Testing MK2: Interpretation of Flow Cytometry MK3: Morphologic Interpretation and Diagnosis MK4: Selection of Cytogenetics Testing and Interpretation of Reports
MK4: Hematology Knowledge: Demonstrates attitudes, knowledge, and practices that incorporate evidence-based medicine and promote life-long learning	MK1: Interpretation of Hematology and Coagulation Testing PBL1: Evidence-Based Practice and Scholarship MK5: Clinical Reasoning in Hematopathology and Hematology
SBP1: Regulatory	SBP4: Accreditation, Compliance, and Quality
SBP2: Health care teams	SBP2: Systems Navigation for Patient-Centered Care ICS2: Interprofessional and Team Communication
SBP3: Lab Management: Resource Utilization (personnel and finance)	SBP 3: Physician Role in Health Care System SBP5: Utilization
SBP4: Lab Management: Test Utilization: Explains, recognizes, summarizes, and is able to apply test utilization	SBP5: Utilization
PBL1: Scholarly Activity	PBL1: Evidence-Based Practice and Scholarship
PBL2: Evidence-based Utilization	PBL1: Evidence-Based Practice and Scholarship SBP5: Utilization
PBL3: Process Improvement and Patient Safety	SBP1: Patient Safety and Quality Improvement
PROF1: Receives and provides feedback	PBL2: Reflective Practice and Commitment to Personal Growth

PROF2: Demonstrates accountability, honesty, and integrity	PROF1: Professional Behavior and Ethical Principles PROF2: Accountability and Conscientiousness PROF3: Self-Awareness and Help Seeking
PROF3: Cultural Competency	SBP2: Systems Navigation for Patient-Centered Care ICS1: Patient and Family-Centered Communication
ICS1: Communicates with health care providers, families, and patients	ICS1: Patient and Family-Centered Communication ICS2: Interprofessional and Team Communication
ICS2: Personnel Management and Conflict Resolution	ICS2: Interprofessional and Team Communications
	ICS3: Communication within Health Care Systems

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>

Learn at ACGME has several courses on Assessment and Milestones - <https://dl.acgme.org/>