Supplementary Figure 3: Initial round of 10 draft Hematopathology fellowship EPAs

Step 1: HEWG members brainstorm chunks of entrustable professional activity.

Examples and associated knowledge and skills are paired with the chunks of entrustable professional activity (bullet points).

1. Physically process tissue
    - lymphoma, bone marrow, fluids
2. Render urgent diagnoses triggered by microscopic review
    - acute promyelocytic leukemia, thrombotic thrombocytopenic purpura, hemophagocytic lymphohistiocytosis, blasts in cerebrospinal fluid, organisms in cerebrospinal fluid
3. Order ancillary workup
    - immunohistochemistry, fluorescence in situ hybridization, flow cytometry, molecular)
4. Present to a multidisciplinary team
    - tumor board) or multidisciplinary faculty, interesting case conference where anatomic pathology faculty, clinical pathology faculty, or laboratory directors present
5. Sign out peripheral blood and body fluids
6. Sign out an integrated hematopathology report including flow cytometry, cytogenetics, molecular
    - bone marrow or lymph node
7. Provide test utilization consultation
8. Recommend appropriate testing
    - molecular, cytogenetics, immunohistochemistry, flow cytometry, other
9. Provide consultation regarding interpretation of test results and pursue laboratory investigation as needed
10. Convey/communicate ambiguity in a diagnosis
11. Perform the functions of a CLIA laboratory medical director or technical consultant
    - for hematology, coagulation, flow cytometry, molecular, cytogenetics, or bone marrow sections of the clinical laboratory
    - know or be aware of proficiency testing
    - adequacy of sample, *i.e.* bone marrow biopsy > 1.5cm; smears with/without spicules, touch preparations
12. Give preliminary result to clinical team prior to review by attending
13. Independently triage limited specimen for ancillary testing
14. Interpret clinical laboratory hematology tests
    - review and interpret abnormal results
    - suggest follow-up testing
    - provide a written report/comment as applicable
15. Compose a diagnostic report for bone marrow biopsy
    - define the clinical questions that need to be addressed
    - review and interpret morphologic findings to formulate differential diagnosis
    - order and interpret appropriate ancillary tests
    - write a complete and accurately edited report with final diagnosis, including relevant clinical correlation and correlation with cytogenetics/molecular results
    - communicate urgent diagnosis to clinicians

- recognize normal and abnormal findings including cellularity, blast morphology, dysplasia/atypia
- know the indications of marrow biopsy and their differential diagnosis
- know the cytogenetic and molecular abnormalities for various entities
- be able to correlate all the findings in the context of a given patient
- be able to write all the findings in the form of an accurate and complete report
- understand the clinical implications of the various diagnoses

16. Compose a diagnostic report for lymph node biopsy
    - triage fresh tissue for appropriate testing, if applicable
    - review and interpret morphologic findings to formulate a differential diagnosis
    - order and interpret appropriate ancillary studies
    - write a complete and accurately edited report with final diagnosis including correlation with clinical findings and results of ancillary tests such as flow cytometry and immunohistochemistry
    - request appropriate additional studies: FISH/molecular
    - interpret normal histology and immunophenotype of nodes
    - interpret morphology and immunophenotype of reactive and neoplastic lymphoproliferative disorders
    - know the cytogenetic and molecular abnormalities for various entities
    - understand the clinical implications of the various diagnoses

Step 2: HEWG condenses the 16 chunks of entrustable professional activity and bullet points into 10 EPAs with Knowledge and Skills statements.

These are aligned to the extent possible with proposed Pathology EPA statements from McCloskey C *et al* (see reference) to allow for continuity of evaluation from residency into fellowship.

EPA 1: Triage specimen and guide selection of flow, immunohistochemistry, cytogenetic, fluorescence in situ hybridization (FISH) and molecular ancillary testing

Skills:

- order ancillary workup necessary for diagnosis and management for lymphoid and myeloid neoplasia and non-neoplastic causes of adenopathy and blood count abnormalities
- stewardship of limited tissue (cerebrospinal fluid, fine needle aspiration/needle core biopsy)
- provide test utilization consultation
- intervene in inappropriate test ordering, potential areas of test overutilization

Knowledge areas:

- pathogenesis, clinical correlation and prognostic significance
- diagnostic and relevant clinical practice guidelines for hematolymphoid neoplasia, congenital, infectious, and other specific nonneoplastic entities

Related pathology residency EPA: 1. Perform gross dissection of simple and complex specimens

EPA 2: Complete workup and diagnostic reporting of simple hematolymphoid specimen

fluorescence in situ hybridization (FISH) and molecular ancillary testing

Skills:

- order appropriate initial and, if indicated, next round ancillary studies based on clinical setting and differential diagnosis
- integrate immunohistochemistry/flow cytometry, cytogenetics, FISH, targeted molecular studies
- provide preliminary report to patient-facing team
- write succinct and complete final report including indicated synoptic reporting

Knowledge areas:

- acute leukemias and B cell lymphomas involving bone marrow aspirate and core biopsy, lymph node, extranodal, peripheral blood and body fluids
- Indications for and interpretation of immunohistochemistry, flow cytometry, cytogenetics, FISH, targeted molecular studies

Related pathology residency EPA: 2. Compose diagnostic report for surgical pathology specimens

EPA 3: Complete workup and diagnostic reporting of complex hematolymphoid specimen

Skills:

- as above, plus: integrating relevant literature/reference, integrating expert consultation

Knowledge areas:

- in addition to above, indications for and interpretation of NGS panel testing and esoteric/sendout testing; techniques and technical limitations of ancillary studies

Related pathology residency EPA: 2. Compose diagnostic report for surgical pathology specimens

EPA 4: Identify and communicate actionable preliminary results

Skills:

- render urgent diagnoses triggered by microscopic review of any specimen type
- interdisciplinary communication skills (critical values)
- documentation of urgent communication

Related pathology residency EPA: 3. Perform intraoperative consultations and frozen sections

EPA 5: Compose an interpretive report for flow cytometry

Skills:

- recognize common technical and gating errors in flow cytometry and know how to avoid them
- accurately describe and interpret a flow cytometric immunophenotype. Incorporate flow cytometry data into clinical and morphologic context.

Knowledge areas:

- flow cytometry techniques, including specimen processing and analysis, as well as pitfalls

Related pathology residency EPA: 9. Compose a diagnostic report for clinical laboratory testing

EPA 6: Interpret hematology tests and provide consultation
Knowledge areas:

- automated hematology analyzers, coagulation testing, red cell disorder testing, hemoglobinalyses

Related pathology residency EPA: 9. Compose a diagnostic report for clinical laboratory testing

EPA 7: Perform bone marrow aspiration and biopsy.
Related pathology residency EPA: 11. Perform other procedures, for example, bone marrow aspiration and biopsy, apheresis

EPA 8: Provide guidance on testing parameters and limitations for routine hematology, ancillary, or coagulation testing
Knowledge areas:

- appropriate indications, technical requirements and techniques for routine and special hematology testing, special testing, flow cytometry, cytogenetics, FISH, molecular, coagulation study specimens

Related pathology residency EPA: 12. Provide guidance for the resolution of preanalytical testing issues

EPA 9: Actively participates in interdisciplinary conferences and effectively communicates in a consultative role
Skills:

- Interdisciplinary communication skills (presentation)

Related pathology residency EPA: 13. Provide pathology support for interdisciplinary conferences

EPA 10: Improve quality of care and patient safety
Skills:

- lead a quality improvement project (evaluate, choose, validate a new test, instrument, assay); suggested - (mock) inspection
- report patient safety events, including near misses, at the clinical site

Related pathology residency EPA: 16. Improve quality and patient safety

Reference: McCloskey CB, Domen RE, Conran RM, et al. Entrustable Professional Activities for Pathology: Recommendations From the College of American Pathologists Graduate Medical Education Committee. Acad Pathol. 2017;4.