Advancing Fellowship Training in Selective Pathology
Design and Implementation of the Milestones 2.0

Ian S. Hagemann, MD, PhD; Robin Elliott, MD; Alexandra Kalof, MD; Elaine S. Keung, MD, MPH; Ninad Patil, MD; Jo Elle G. Peterson, MD

Context.—Program requirements for Selective Pathology fellowships in the United States were established by the Accreditation Council for Graduate Medical Education (ACGME) in 2011 to govern fellowships providing advanced training in surgical pathology, focused anatomic pathology, or focused clinical pathology. Selective Pathology entered the ACGME’s Next Accreditation System in 2015 with the introduction of the Selective Pathology Milestones 1.0, a set of benchmarks for evaluating fellow progress in each of the 6 ACGME core competencies. In 2019, the ACGME convened a work group for a planned periodic update to these milestones.

Objective.—To summarize changes to the Selective Pathology milestones.

Design.—The study design featured expert opinion and survey.

Results.—The Patient Care milestones for anatomic pathology—focused fellowships contain a renewed emphasis on both gross and microscopic examination, whereas for clinical pathology—focused fellowships, the emphasis is on interpretation of laboratory assays. The milestones for the non—Patient Care, non—Medical Knowledge competencies have been updated to a harmonized set of milestones designed to extend across all specialties and subspecialties. New to the milestones program is a supplemental guide that provides examples, suggested assessment tools, and references to aid in implementation. Public comments were supportive of the changes.

Conclusions.—The Milestones 2.0 are set for implementation in July 2021. Updates in the new milestones are aimed at facilitating training and harmonizing evaluation across subspecialties.

Arch Pathol Lab Med. doi: 10.5858/arpa.2021-0112-OA
training, the ACGME initially worked on establishing 6 general competencies: patient care (PC), medical knowledge (MK), practice-based learning and improvement (PBLI), interpersonal and communications skills (ICS), professionalism (PROF), and systems-based practice (SBP). This schema was formally launched as the Outcome Project in July 2001, after which individual training programs developed and implemented competency-based goals and assessment tools. In the mid-2000s, concerns were raised by stakeholders such as the Institute of Medicine, Medicare, and public interest groups about the lack of success of evaluation methods in ensuring attainment of competency as well as the lack of uniform standards across programs. In response, toward the end of the 2000s, the ACGME developed a new accreditation framework: the Next Accreditation System (NAS), in which competency-based milestones serve to monitor trainee progress by describing the learning trajectory within the core competencies. Key features of this system include 5 scale steps for each milestone, with level 1 corresponding to a beginner in the specialty or subspecialty, level 4 considered a graduation target for a proficient practitioner, and level 5 being an aspirational goal for advanced trainees. Each scale step is illustrated by narrative anchors, which allows for trainees and faculty members to mutually understand the expectations of the specialty. Trainees are evaluated against the milestones at least semiannually, and progress is reported to the ACGME via its Accreditation Data System (WebADS).

The core residency program in anatomic and clinical pathology entered the NAS in 2014,2,3 and pathology subspecialties entered the NAS in 2015. Entry into the NAS provided an opportunity to define milestones for Selective Pathology, resulting in a set of milestones that went into effect in 2015. In 2019, as part of a regular update cycle, the ACGME convened a work group to develop version 2.0 of the Selective Pathology milestones, which will come into effect in July 2021. The present working paper describes the process that was undertaken, as well as the considerations that went into the new Milestones 2.0 definitions.

### MATERIALS AND METHODS

The ACGME Department of Milestones issued a call for volunteers within the pathology community in September 2018 and appointed the members of the Selective Pathology Milestones 2.0 group. The panel met for face-to-face meetings in Chicago in October and December 2019. Facilitated by ACGME staff, the group undertook a revision of the milestones using a consensus process and authored the Supplemental Guide.

In February 2020, ACGME distributed the draft Milestones and Supplemental Guide to Selective Pathology to program directors and coordinators for comment through an anonymous survey. Respondents were asked to assess each milestone based on the following statements and to indicate their degree of agreement based on a 4-point Likert scale:

1. This milestone set represents a realistic progression of knowledge, skills, and behaviors.
2. This milestone set discriminates between meaningful levels of competency.
3. I know how to assess this milestone set effectively.
4. The Supplemental Guide was a useful resource in understanding this milestone set.

The work group reviewed public comments and made edits using a consensus approach to reach the final milestones and Supplemental Guide.

Institutional Review Board approval was not required for this education research activity.

### RESULTS

The members of the work group appointed by ACGME (n = 6 members) had relevant experience as directors of surgical pathology (n = 2), directors of Selective Pathology programs (n = 3), and/or graduates of Selective Pathology programs (n = 5).

The old (1.0) and new (2.0) milestones for PC are summarized in Table 2, and for MK in Table 3. The work group adopted the harmonized non-PC, MK milestones for Selective Pathology, summarized in Table 4. The full text of the Selective Pathology Milestones 2.0 is available online at the ACGME Web site.

The group authored the Supplemental Guide by adapting language initially created for the core pathology residency milestones. Along with defining the overall intent for each subcompetency, the work group provided examples for each level, and suggested assessment models, references, and additional useful information. The full text of the final Supplemental Guide is available online.

The ACGME staff distributed the public comment survey by email to 256 Selective Pathology program directors and coordinators. Because respondents were invited to share the survey widely with other faculty, residents, fellows, society members, and other stakeholders, the true response rate is not known, but 9 individuals responded.

Respondents indicated agreement or strong agreement with the survey statements (see Materials and Methods) for milestones PC2–5, MK1–2, SBP1, SBP5, PBLI1–2, PROF1–3,
and ICS1–2, with none indicating disagreement or strong disagreement (Figure).

Some respondents indicated disagreement with some of the statements for milestones PC1, SBP2–4, and ICS3, although most indicated either agreement or strong agreement, and no respondent indicated strong disagreement.

Narrative comments were few, and they mostly expressed perceived difficulty in assessing the milestones, particularly in the SBP milestones that address systems navigation for patient-centered care (SBP2), the physician’s role in the health care system (SBP3), and accreditation, compliance, and quality (SBP4). One respondent questioned whether the milestones were sufficiently relevant to forensic pathology. Because this specialty is out of scope for this project and has its own milestones, the individual can be assumed to have responded in error.

Comments on the overall milestone set (n = 3) felt that they had overlap, were more appropriate for residency, or were “comprehensive.”

**DISCUSSION**

**Patient Care**

Selective Pathology Milestones 1.0 contained a single milestone for the competency of PC.3 For tracks A and B, this milestone assessed “surgical pathology grossing and histologic exam,” whereas for the more diverse track C there was no additional description provided for the milestone, on the rationale that the implications of the milestone could differ across the diverse fellowships. Gross examination seemed to be the most important ability assessed with this milestone, because 9 of 12 narrative anchors provided in the milestones document discussed grossing.

The work group felt that more than 1 milestone was necessary to provide trainees with more granular assessment of their progress in PC, particularly because Selective Pathology training is almost invariably focused on clinical care of individual patients. Assessment of this competency was therefore expanded to 5 milestones (Table 2). PC1 applies to all tracks and focuses on composing a clinical report. The entry-level fellow will be aware of the structure of a report. Progressive responsibility in this area entails the ability to generate a simple (level 2) or more complex (levels 3–4) report, incorporating the language of uncertainty and potentially incorporating ancillary data. At level 5, the fellow is expected to generate a report that acknowledges a discordant diagnosis, clinical discrepancy, or otherwise complex clinical scenario.

The panel decided to retain gross examination as part of the milestones for tracks A and B, and even to make its significance more explicit by making it a standalone milestone as PC2. The role of training in gross examination in surgical pathology has evolved with the increased role of pathologists’ assistants.5 Although gross examination has become a smaller part of pathology training, the panel felt that surgical pathologists must still demonstrate the skills needed for the appropriate examination of gross specimens. A similar position has been endorsed by the Association of Pathology Chairs,6 and deficiencies among new-in-practice pathologists have been described in the literature.7 In most practice settings, the surgical pathologist can reasonably expect to either carry out or direct the examination of some specimens, particularly complex resection specimens. Surgical pathology fellowship programs are advised to provide training in gross dissection and/or to evaluate their trainees’ skills in this area as it pertains to general surgical pathology or the fellowship’s identified focus area.

In the Selective Pathology Milestones 1.0, intraoperative consultation/frozen section was evaluated as part of MK.

| Table 2. Overview of Selective Pathology Milestones 1.0 and 2.0 for Patient Care (PC) |
|-----------------|-----------------|
| **Milestones 1.0** | **Milestones 2.0** |
| PC1A/B—patient care and procedural skills: surgical pathology grossing and histologic exam (track A/B) | PC1—reporting (all tracks) |
| PC1B—patient care and procedural skills (track C) | |
| PC2—gross examination (tracks A/B) | |
| PC3—intraoperative consultation, including frozen section (tracks A/B) | |
| PC4—microscopic examination and ancillary testing for diagnosis (tracks A/B) | |
| PC5—interpretation (track C) | |

| Table 3. Overview of Selective Pathology Milestones 1.0 and 2.0 for Medical Knowledge (MK) |
|-----------------|-----------------|
| **Milestones 1.0** | **Milestones 2.0** |
| MK1A—demonstrates knowledge of established and evolving biomedical, clinical, epidemiologic, and social-behavioral sciences, and applies it to patient care (all tracks) | MK1—clinical reasoning (all tracks) |
| MK2A,B—procedure: intraoperative consultation/frozen sections (track A/B) | MK2—knowledge of established and evolving biomedical, clinical, epidemiologic, and social-behavioral sciences (all tracks) |

| Table 4. Subcompetencies for the Harmonized Non–Patient Care, Non–Medical Knowledge Milestones |
|-----------------|-----------------|
| **Milestones 2.0** | **Competencies** |
| ICS | Patient-centered and family-centered communication (ICS1) |
| | Interprofessional and team communication (ICS2) |
| | Communication within health care systems (ICS3) |
| PBLI | Evidence-based and informed practice (PBLI1) |
| | Reflective practice and commitment to personal growth (PBLI2) |
| PROF | Professional behavior and ethical principles (PROF1) |
| | Accountability/conscientiousness (PROF2) |
| | Self-awareness and help-seeking (PROF3) |
| SBP | Patient safety and quality improvement (SBP1) |
| | System navigation for patient-centered care (SBP2) |
| | The physician’s role in health care systems (SBP3) |

Abbreviations: ICS, interpersonal and communication skills; PBLI, practice-based learning and improvement; PROF, professionalism; SBP, systems-based practice.
The work group felt that frozen section was better classified under the umbrella of PC, and it reassigned this topic as PC3. Narrative anchors for this milestone were felt to be too elementary and were therefore downshifted as part of the revision so that a higher level of skill would be required to meet the graduation target. For example, communicating appropriately with the surgeon after discussion with the attending pathologist was considered a level 4 achievement in Milestones 1.0. The panel felt that this level of skill would be expected in an entering fellow, not one at the point of graduation. Fellows are expected to develop the ability to interpret frozen sections independently in preparation for practice, so the revised PC3 level 4 calls upon fellows to demonstrate their ability to do so. It should be noted that although the word “independent” is used in this and other milestones, this word is used here in its plain-English sense, and fellow work should always be supervised by a mechanism acceptable under ACGME guidance, such as indirect supervision or oversight.

Selective Pathology Milestones 1.0 had no specific milestone for microscopic examination and instead grouped this topic together with gross examination. Most Selective Pathology programs (certainly on tracks A/B) focus on general or organ-specific histopathology, and the panel therefore felt it essential to elevate microscopic examination to a standalone milestone as PC4. The entry-level fellow will be able to identify normal and abnormal histology, skills that should have been acquired in residency. More advanced fellows will have the ability to generate and prioritize a differential diagnosis for complex cases, including when confounding factors such as limited tissue or artifacts are present.

For track C, the PC competency includes a dedicated milestone (PC5) focused on test interpretation. Given the variable nature of these fellowships, the panel was unable to explicitly specify the skills that would be needed to meet each competency. The entering fellow will be aware of the assays in the scope of the fellowship. Increasing levels of achievement are assigned for the ability to interpret increasingly esoteric testing. The level 5 trainee will have an expert level of skill in interpreting lab testing in the focused area of the fellowship.

Medical Knowledge

The Milestones 1.0 contained 2 items for MK (Table 3). The first of these subcompetencies focused on medical science as applied to patient care. Tracks A and B had an additional milestone relating to frozen section. As mentioned above, the latter was moved to patient care in Milestones 2.0. The panel felt it was important to separate clinical reasoning from strict MK because both of these subcompetencies are important in Selective Pathology and can be separately addressed. The 2 final subcompetencies established for MK are designed to be applicable to all 3 tracks. These changes reflect the current and constantly evolving requirements of practicing pathologists and the expectation that they will be able to reason as physicians while articulating knowledge of current biomedical science.

Summary of survey responses received during the public comment period for each of the subcompetencies in Milestones 2.0: (A through E) Patient Care, (F and G) Medical Knowledge, (H through L) Systems-Based Practice, (M and N) Practice-Based Learning and Improvement, (O through Q) Professionalism, and (R through T) Interpersonal and Communication Skills. All charts have the same layout, scale, and legend. For PC5, responses about the Supplemental Guide were not collected because there is no Supplemental Guide table for that subcompetency. Abbreviation; N/A, not applicable.
Non-PC, Non-MK Competencies

In reviewing milestones outside of the PC and MK competencies, the work group made use of the ACGME’s harmonized milestones. Feedback gathered on the Milestones 1.0 through focus groups, program director meetings, and at the second ACGME Milestones Summit in December 2016 had previously identified a high degree of variability across specialties, hindering efforts to simplify assessment tools and provide faculty development. In an effort to reduce this variability, the ACGME set out to identify common and overlapping themes among the ICS, PBLI, PROF, and SBP milestones of the transitional year and 26 core specialties. The analysis identified 22 themes among the ICS, PBLI, PROF, and SBP milestones, with 230 different ways to describe PROF, 176 for ICS, 171 for PBLI, and 122 for SBP.

To address this variability, the ACGME convened 4 groups of content experts, program directors, interprofessional team members, and other faculty to develop a set of “harmonized” milestones for ICS, PBLI, PROF, and SBP that would be applicable to all medical specialties and subspecialties. Each group developed 2 to 3 subcompetencies (Table 4), which were made available for public review and comment in 2017. Although each specialty will have its own milestones for PC and MK, ACGME envisions that the non-PC, non-MK milestones will be substantially equivalent across specialties. Harmonizing these milestones will promote a shared understanding across specialties and subspecialties, facilitate longitudinal assessment of trainees as they progress from residency to fellowship, and simplify the work of clinical competency committees. The Selective Pathology work group adopted these harmonized milestones while recognizing that some subcompetencies, such as patient and family–centered communication (ICS1), are sparingly relevant in Selective Pathology.

The Supplemental Guide

A new addition to the milestones project, being implemented across all specialties as part of Milestones 2.0, is the Milestones Supplemental Guide. The purpose of the Supplemental Guide is to aid programs and clinical competency committees in the implementation of the updated milestones by providing insight into the aim of each subcompetency. The guide is intended to be used as a supplement and does not define specific criteria for each level. Instead, it assists the program director(s) and clinical competency committees in creating a shared mental model of the milestones from which an individualized guide can be created with program-specific examples and assessment tools. Given the variable and specialized nature of track C programs, the work group did not feel it was possible to give examples or create a Supplemental Guide table for PC5, which applies only to that track.

Public Comments

Public comments were solicited by distributing a survey to 256 program directors and coordinators, who were encouraged to redistribute it to other stakeholders. Only 9 responses were received, but these responses were generally positive, with one area of concern being difficulty in assessing the milestones for SBP. We are not aware of benchmarks for what constitutes an acceptable response rate to a public comment period. The results of the public comment period were considered to provide validity evidence for the Milestones 2.0.

Dissemination and Implementation

Following the public comment period and minor final revisions, ACGME released the Selective Pathology Milestones 2.0 (https://acgme.org/Portals/0/PDFs/milestones/SelectivePathologyMilestones2.0.pdf?ver=2020-11-13-110020-893, accessed February 21, 2021) and Supplemental Guide (https://acgme.org/Portals/0/PDFs/milestones/SelectivePathologySupplementalGuide.pdf?ver=2021-01-27-164015-967, accessed February 21, 2021) to the general public on February 19, 2021, for implementation in July 2021. Selective Pathology program directors, coordinators, applicants, and fellows are invited to review these documents in anticipation of the first reporting period, to take place in winter of the 2021–2022 academic year.

In preparation for implementation, each program must review the updated milestones and evaluate its current assessment methods. At the end of the Supplemental Guide is a map that identifies the similarities and differences between the original and updated milestones. This map may help programs identify areas in which their current assessment tools may be used with the new subcompetencies. An editable version of the Supplemental Guide is available from the ACGME, allowing each program to tailor the expected observations and/or assessment tools to the training environment.

CONCLUSIONS

Major changes in Milestones 2.0 include increased granularity in the Patient Care competency, including continued emphasis on both gross and microscopic examination, intraoperative consultation, use of ancillary testing, and the ability of the fellow to report cases in the face of diagnostic difficulties and discrepancies. The milestones for Selective Pathology now are part of the program for harmonization of non-PC, non-MK competencies across all specialties. The Milestones 2.0 document is accompanied by a Supplemental Guide containing examples to illustrate the intent of each milestone. Users should remember that the narrative anchors in the milestones are representative and are not meant to be interpreted as stringent and literal requirements.

True to their foundational metaphor, the milestones are intended as a roadmap to training in Selective Pathology, but all trainees are likely to take a slightly different road to reach their destination. The work group hopes that these milestones will help to benchmark fellow expectations in surgical pathology in order to ensure continued excellence in training and practice in our field.

The authors thank Laura Edgar, EdD; Sydney McLean, MHA; and Kate Hatlak, MSEd, for their support during the milestones revision process and drafting of this paper.

References

1. Iezzoni JC, Ewton A, Chévez-Barrón P, Moore S, Thorsen LM, Naritoku WY. Selective pathology fellowships: diverse, innovative, and valuable subspecialty training. Arch Pathol Lab Med. 2014;138(4):518–525.
2. Naritoku WY, Alexander CB. Pathology milestones. J Grad Med Educ. 2014;6(1 suppl 1):180–181.
3. Naritoku WY, Alexander CB, Bennett BD, et al. The pathology milestones and the next accreditation system. Arch Pathol Lab Med. 2014;138(3):307–315.
4. Accreditation Commission for Graduate Medical Education. The Selective Pathology Milestone Project: Selective Pathology Milestones 1.0. Published online July 2015. https://acgme.org/Portals/0/PDFs/Milestones/SelectivePathologyMilestones2.0.pdf?ver=2020-11-13-110020-893, accessed February 21, 2021) and Supplemental Guide (https://acgme.org/Portals/0/PDFs/milestones/SelectivePathologySupplementalGuide.pdf?ver=2021-01-27-164015-967, accessed February 21, 2021) to the general public on February 19, 2021, for implementation in July 2021. Selective Pathology program directors, coordinators, applicants, and fellows are invited to review these documents in anticipation of the first reporting period, to take place in winter of the 2021–2022 academic year.
5. Wright JR. The history of pathologists’ assistants: a tale of 2 educational mavericks. *Arch Pathol Lab Med*. 2019;143(6):753–762.

6. Kragel PJ, Hoffman RD, Kaul KL. Position paper from the Association of Pathology Chairs: surgical pathology residency training. *Acad Pathol*. 2019;6:2374289518824054. doi:10.1177/2374289518824054

7. Horowitz RE. Expectations and essentials for the community practice of pathology. *Hum Pathol*. 2006;37(8):969–973.

8. Edgar L, Roberts S, Holmboe E. Milestones 2.0: a step forward. *J Grad Med Educ*. 2018;10(3):367–369.

9. Edgar L, Roberts S, Yaghmour NA, et al. Competency crosswalk: a multispecialty review of the Accreditation Council for Graduate Medical Education milestones across four competency domains. *Acad Med*. 2018;93(7):1035–1041.