



GUIDANCE IN USE OF **ACGME Milestone Data in Undergraduate Medical Education**

Prepared by the
American Association of Colleges of Osteopathic Medicine's National Academy
of Osteopathic Medical Educators Milestone Project Taskforce

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Guidance in Use of ACGME Milestone Data in Undergraduate Medical Education

Purpose: This guiding document provides information regarding the Accreditation Council for Graduate Medical Education (ACGME) Milestones Outcome Reporting Project and its use in undergraduate medical education (UME).

Background / Context

While milestones implementation is currently associated with graduate medical education (GME), milestones have become an emergent topic in UME. Facilitating the transition to residency amid ongoing COVID-19 challenges and national board examination changes has led to growing interest in using individual medical student readiness for residency measures to assess key developmental outcomes.

During the 2019-20 academic year, the American Association of Colleges of Osteopathic Medicine (AACOM) identified resident readiness as a key strategic goal. AACOM groups and affiliated medical schools began participating in projects to support the capture of resident readiness during the first year of GME, including the ACGME Milestones Outcome reporting project, the Entrustable Professional Activities (EPAs) for Entering Residency project, and the Association of American Medical Colleges Resident Readiness Program Directors Survey project. Taken together, these projects can provide useful information to support medical school planning and decision making.

ACGME Milestones Outcome Reporting Project

ACGME has initiated a project to distribute aggregate GME milestone data to osteopathic schools through a password protected portal. The portal was opened in December 2020. The first round of reports covered 5- and 10-year summary statistics for entering medical school graduates (e.g., completion, attrition, specialty and sub-specialty selections, geography, etc.), de-identified Year 1 milestone evaluations by specialty and final specialty selections. Descriptive statistics were reported through frequency distributions and box plots. Comparatives allow programs to review their graduates' data in relation to national data trends and variation in performance metrics by program specialty.

How Can the Milestones in GME Data Inform Changes in UME?

To better understand how the milestones data can inform changes in UME, it becomes important to better understand the role of milestones in GME. Milestones are discrete and significant developmental points in a training continuum or program of learning. Within a medical education context, this refers to the developmental performance levels expected of learners in each core competency domain with regard to individually demonstrated knowledge, skills and behaviors.

Milestones development at the GME level began as an outgrowth of the movement toward competency-based education, beginning with the ACGME Outcome Project formally launched in 2001. The specific history of the evolution of milestones over time can be found in Table 1. (1,2)

Table 1: Key Dates in Educational Milestones History

Dates	Structure
1999	The six Core Competencies endorsed by ACGME and American Board of Medical Specialties (ABMS)
2001	The Outcome Project formally launched
2009	ACGME approves structure of NAS, including inclusion of the Milestones
2013	First seven specialties implement NAS, including Milestones reporting
2014	Remaining accredited specialties and subspecialties implement NAS, including Milestones reporting
2015	All specialties and subspecialties begin to report Milestones data
2018	Work begins on Milestones revisions, called Milestones 2.0

The intent of GME milestones was to provide a specialty-specific framework across programs to document individual-level competency attainment prior to resident program completion. Milestones describe the learning trajectory within a sub-competency that takes a resident or fellow from a novice in the specialty or subspecialty to a proficient resident or fellow or resident/fellow expert (see ACGME example, Table 2 below). Milestones are different from many other assessments in that there is an opportunity for the learner to demonstrate aspirational attainment levels. Milestones are intended for longer-term and broader assessment of knowledge, skills or abilities and for use in tandem with other regular assessments of curricular outcomes and competency-based task performance.

Table 2. General Description of Milestone Levels Related to Stage of Education²

Competency: Subcompetency				
Level 1	Level 2	Level 3	Level 4	Level 5
Novice Resident/Fellow	Advanced Beginner Resident/Fellow	Competent Resident/Fellow	Proficient Resident/Fellow	Resident/Fellow Expert
Brand new to the specialty	Performs some tasks with limited autonomy	Performs common tasks with autonomy	Target for graduation (not a requirement)	Exceeds their peers
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

² ACGME - Edgar et al., 2020; p.9.

Use of ACGME Reports

Milestones Aggregate Report: This report provides aggregate box plots of year-end milestone performance for graduates of your school following completion of their first year of residency training. Milestone performance is specialty-specific and should be evaluated in that context. You may refer to specialty milestones on the ACGME website

(<https://www.acgme.org/What-We-Do/Accreditation/Milestones/Milestones-by-Specialty>). The annual Milestone National Report can also be used to provide national comparison data and help the school identify aggregate patterns within a specialty, while also identifying potential outliers of performance. These comparisons can be used as a high-level review of the school's assessment system.

Application: Each school should review their milestone aggregate box plots together with their De-Identified Year 1 Milestone Evaluations by Residency data. The milestone ratings by specialty and sub-competency can be useful in determining the milestone level of residents from your school at the end of Year 1 of residency. If your data show all residents at or below Level 1 for a specific sub-competency, it could be that the specific milestone is not expected of a first-year resident, or it could reflect a lack of preparation of trainees from your school. The national comparison box plots can provide important context in this instance. It is also important to note that the de-identified resident performance is reported on a scale of 1 to 9, while the box plots are charted in levels of 1 to 5, with mid-point transitions between each level. At times, 0 may be used for "not yet assessed," while at other times it may be used for "not achieving level 1". It is important to be aware of these differences across specialty milestones when making your comparisons.

Summary Statistics for Entering Medical School Graduates (5-year and 10-year look back):

This report summarizes completion rates of graduates who entered into an ACGME-accredited residency program five and 10 years earlier and compares the school's performance to all other colleges of osteopathic medicine (COMs) (see national rates). The report tracks graduates from the time of initial entrance into residency training, including preliminary and transitional programs, to the residency program they ultimately complete. Residents are grouped in one of four categories: 1)

Application: Retention and attrition trends over time within a school and in comparison to national data are important outcome measures of graduate success. Attrition rates due to transfers and withdrawals have important implications for career counseling and match advising in the school and should be evaluated based upon the specialty tables provided. Dismissals, on the other hand, are commonly related to professionalism concerns and should be carefully evaluated in conjunction with the Professionalism Report provided.

completed successfully, 2) completed preliminary training and transitional year, 3) still active or 4) attrition. Over the report period, residents will shift among the categories as they progress in their training. For example, a resident who completes a transitional program and then moves on to an advanced position but is still in training will be categorized as “Completed Preliminary Training” for the initial bar chart and as “Still Active” in the ultimately completed chart. However, a resident who withdraws from a program and then re-enters another and completes the program will be included under attrition (withdraw) from the initial program and then as completed successfully in the ultimately completed bar chart.

Professionalism Report: The aggregate professionalism report summarizes the percentage of graduates who are at or below Level 1 (novice or below) compared to national data. If you have more Level 1 graduates than the national norm, there may be room for improvement in the professionalism curricula/standards in UME. These numbers might also be useful in comparison to the number of students dismissed from a program.

Frequently Asked Questions

As schools of osteopathic medicine and COMs have begun to use these reports, several important questions have surfaced.

What if your school did not receive access to the portal in December 2020?

The ACGME sent a link and login information to deans or other appropriate representatives of each osteopathic medical school on December 2, 2020. The email sender would have been medschoolportal@acgme.org. If you did not receive an email or cannot locate it now, you can email medschoolportal@acgme.org to request assistance in getting access to the portal.

Is anything required upon login to get access to all reports?

Yes. Once logged in to the portal, the dean (or appropriate representative) will need to electronically “sign” the Access Agreement by selecting the appropriate checkbox and saving the selection. Once the ACGME Access Agreement is “signed,” the full Medical School Portal and a User’s Guide will show on the homepage. From the homepage, the user will be able to navigate to their institution’s reports.

More information can be found within the User’s Guide attached at the end of this guiding document.

Can additional institutional administrators or staff be granted access to the portal?

Currently, only one user can be granted access per institution. This is to ensure that a single person is held accountable for the data and how it is used.

How are students added to the dataset? Is it based on when the program becomes fully accredited by ACGME or are pre-accreditation numbers included (e.g., when they apply for ACGME accreditation)?

At the moment, all residents, preliminary and categorical, are included in the dataset. In the future, ACGME will be looking at separating out these positions.

Is there a code book or list of definitions for the categories reported within the document (especially, withdrew from program or transferred to another program)?

The resident status is reported based on information provided by the program.

Withdrew from program represents any resident who decides to leave the program.

Dismissed represents a resident who is let go from the program.

Transferred to another program represents a resident who transferred to another program or specialty.

A resident unsuccessfully completing the program represents those residents who have completed all required training but have unsuccessfully demonstrated their competence to practice independently.

How should the scale be interpreted? Are the 9-point scales converted to 5-point for reporting? If so, why are they converted?

The ACGME User's Guide (attached to this guiding document) can provide some guidance for interpreting the scales. Additionally, users should understand that the individual milestone data (de-identified) is reported on a 9-point scale, yet the boxplots are in a 5-point scale format. Therefore, it is clear that ACGME is taking the 9-point scale and converting it back to a 5-point scale (essentially, the same scale—just using midpoint numbers like 1, 1.5, 2, 2.5, etc., instead of whole numbers like 1-9. Users must also consider, as mentioned above, that the 0 can mean two different things (e.g., “not yet assessed” or “not achieving Level 1”).

How is “has not been assessed” handled in the reporting? Is it lumped in with other numbers? Is it not reported at all?

The 0 in the scale can mean “has not been assessed” or “has not reached Level 1.” The interpretation is specialty specific. Please see the individual milestone by specialty guides for more information (<https://www.acgme.org/What-We-Do/Accreditation/Milestones/Milestones-by-Specialty>).

Are the comparisons to other osteopathic schools only? If so, will a report/comparison to all ACGME residencies be available soon?

Yes. Current comparisons are to other osteopathic medical schools only. In the future (Fall or Winter 2021), ACGME hopes to provide additional comparisons to the broader medical school community (e.g., all allopathic medical schools).

When will we get individual assessments for our school's residents?

Phase II (Fall or Winter 2021) of the ACGME Milestones for UME project will include individualized reports.

Who do I contact if I need help or have issues related to the portal or the data?

If an institution runs into issues with the portal or the data, the ACGME Helpdesk at medschoolportal@acgme.org is a good place to start. It is monitored regularly and routes questions to the individual best able to respond to each issue.

References

1. ACGME. *ACGME website*. Chicago: ACGME. Accessed November 15, 2020 at: <https://www.acgme.org/What-We-Do/Accreditation/Milestones/Resources>.
2. Edgar L, McLean S, Hogan SO, Hamstra S, Holmboe ES. *The milestones guidebook*. Chicago: Accreditation Council for Graduate Medical Education (ACGME); 2020.

Users Guide for Medical School Portal

Overview

The intended audience for this Portal includes medical school faculty, administrators, and staff involved in assessing student learning. It provides information about the performance of medical school graduates during their residency training. The Portal includes outcomes of individual graduates and cohorts of graduates. By providing this information, the ACGME is acting on its obligation to share information, in responsible ways, in order to facilitate evidence-informed, learner-centric discussions about how to improve each phase in the continuum of medical education. This data can serve as a resource for program improvement in undergraduate medical education (UME). The contents of the portal and data descriptions may evolve over time, so users are urged to familiarize themselves with the most recent documentation.

The portal provides data about the graduates' specialty choice, completion rates, and outcomes on Milestones evaluations (Milestones) as well as retention and attrition, choice of medical specialty. The Milestones report first-year outcomes of residents, which may provide insights to medical schools wanting to assess how well prepared their graduates were to take the next step in their medical training. Medical schools are encouraged to engage their faculty, assessment committees, and administrators in a collaborative effort to interpret the information found in the Portal in light of other data available to them. They may consider the various explanations for the outcomes presented.

The Portal is organized into three principal sections:

- Access agreement
- Reports and downloads – graduate data and milestones
- Resources

A description of each section follows.

Access agreement

To protect the privacy and reputational interests of individual trainees, the portal is password-protected. Users are expected to treat the contents as they would any other sensitive student record. Prior to accessing the Portal, users will read and accept the terms of an access agreement. In summary, users will agree that:

- The ACGME is sharing this information for the sole purpose of informing the educational improvement efforts of individual medical schools
- Users will share the contents of the portal only with individuals at their own institutions who are directly responsible for UME learning assessment;
- None of the data in the portal may be disseminated without prior, written consent of the ACGME
- Users will exercise the same standards of care and control of portal data as they would with their own student records
- Users will promptly report any breach of data security and cooperate with ACGME in curative action
- The ACGME makes reasonable effort to ensure the accuracy of the contents of the portal, but make no guarantees that it is entirely free of error. Users will not hold the ACGME liable for damages resulting from the use of the portal.
- A failure to adhere to these terms may result in the ACGME revoking access to the Portal.

Reports and downloads – graduate data and Milestones

The portal contains six major reports. They are in tabular and graphical format. Each is described in this section.

Summary statistics for entering medical school graduates – 10 year look back

This report summarizes completion rates of medical school graduates who entered an ACGME accredited residency program 10 years prior. This provides measures for the following categories: successfully completed residency training, completed preliminary training or transitional year, still active, or left the program prior to successful completion (attrition). Included also is limited data by specialty of entry after medical school for categorical residents and geography of residents (in-state vs out-of-state).

Summary statistics for entering medical school graduates – 5 year look back

This report summarizes completion rates of medical school graduates who entered an ACGME accredited residency program 5 years ago. This provides measures for the following categories: successfully completed residency training, completed preliminary training or transitional year, still active, or left the program prior to successful completion (attrition). Included also is limited data by specialty of entry after medical school for categorical residents and geography of residents (in-state vs out-of-state).

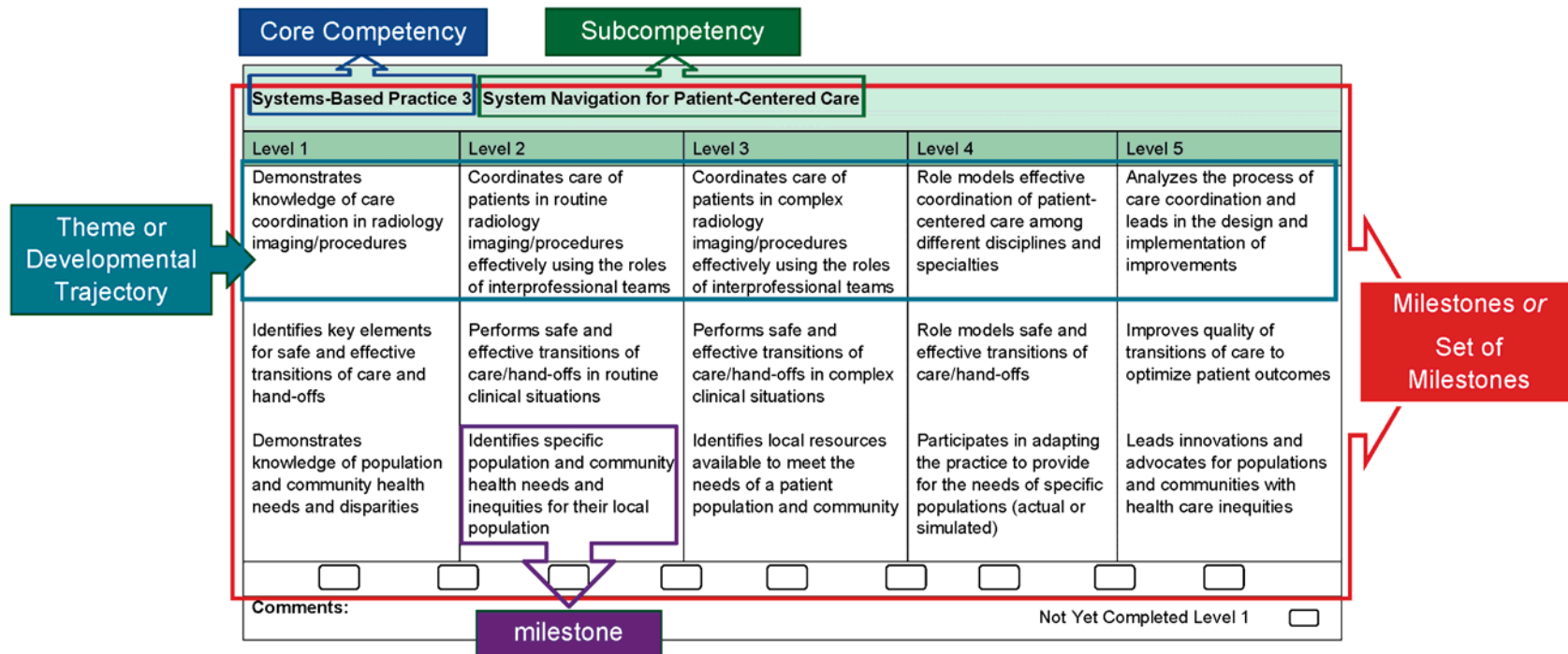
Milestones reports

In brief, Milestones allow for continuous evaluation of skills development for resident and fellow physicians throughout their graduate education. The Milestones allow training programs to assess learners using a narrative description of essential subcompetencies along a developmental continuum of novice to expert. The Milestones are comprised of the six core competencies: patient care and procedural skills, medical knowledge, system-based practice, interpersonal skills and communication, practice-based learning and improvement, and professionalism. In collaboration with each specialty, the ACGME developed subcompetencies that exemplify each of the core competencies in a way that is germane to each specialty.

Later in this guide, we provide basic information about how to interpret the Milestones data. For more detailed understanding of the Milestones, please visit the Milestones Resources tab in the Portal (or visit <https://www.acgme.org/What-We-Do/Accreditation/Milestones/Resources>). There, readers will find current editions of the ACGME's Milestones Guidebook and the Clinical Competency Committee (CCC) Guidebook. The Milestones Guidebook describes the origins, rationale, and development of the Milestones; while the CCC Guidebook offers practical tips on how CCCs might apply the Milestones in practice. These resources will help portal users review the Milestones in greater context.

The Milestones reports in the Portal include 1-year outcomes, an aggregate report, and a summary for the Professionalism milestone.

Image 1, Explaining the Milestones



Definitions	
Milestones or Set of Milestones	Describes performance levels residents and fellows are expected to demonstrate for skills, knowledge, and behaviors in the six Core Competency domains
Core Competency	One of the six domains of educational and clinical knowledge, skills, and attitudes that physicians must develop for independent and autonomous practice of a specialty or subspecialty
Subcompetency	A specific content area that incorporates skills, knowledge, and/or behaviors under one of the Core Competencies
Theme or Development Trajectory	Skill, knowledge, or behavior that progresses from novice to advanced beginner to competent to proficient to expert
milestone	Significant point in development along a developmental trajectory

De-Identified Year 1 Milestone Evaluations by Resident and Specialty

This report includes the raw de-identified evaluation data for individuals in the most recent graduating class by specialty (i.e. for the 2018 medical school graduating class, the 2018-2019 year-end milestone evaluations at the end of their first year in residency). The subcompetency descriptors appear in the left-hand column and the Milestone “level” ranges between 1 and 5. The Milestones are based on a stage model of development, where level 1 represents a novice in the specialty, level 2 advanced beginner, level 3 competent, level 4 proficient, and level 5 an early expert. The recommended goal during training is level 4, proficiency.

Milestone Aggregate Report

This report includes aggregate box plots for the year-end milestone evaluations at the end of their first year in residency for each specialty with a resident from the medical school for the most recent graduating class

We encourage medical schools to compare the distribution of their graduates against the national data. This will help the medical school identify aggregate patterns of graduates within a specialty, while identifying potential outliers in performance in the first year of residency. This data can be used as a high-level review of the school’s assessment system.

Professionalism

This report includes distributions for the post year 1, year-end aggregate professionalism evaluations for each specialty with a resident from the medical school of interest for the most recent graduating class. In addition, the report summarizes the percent of graduates nationally and from the individual medical school who are at or below level 1 (novice or below).

Understanding the Milestones

The Milestones describe a learning trajectory for various abilities within a subcompetency. The Milestones are organized by the six core competencies. Each subcompetency is a thematic clustering of individual milestones. Each specialty has a range of between 10 to 41 sub-competencies (average is approximately 22 subcompetencies per specialty), with training periods that range from single-year fellowships to residency programs lasting seven years. The subcompetencies are descriptors of observable behaviors, skills, and knowledge. At approximately six-month intervals, CCCs assess residents and fellows along a continuum of novice to early expert and assign a level of development for each subcompetency. The creation of these developmental markers involved members of the ACGME’s Review Committees, representatives from the American Board of Medical Specialties (ABMS) member certification boards, American Osteopathic (AOA) certification boards, program directors, faculty, representatives from specialty societies, residents and fellows, and non-physician members.

The semi-annual Milestone ratings, among other data, are submitted to the ACGME as part of the programs’ terms of accreditation. Milestones reporting is part of the ACGME’s responsibility to professional self-regulation and the expectations for preparing physicians who will be able to provide safe and effective care when they enter unsupervised practice. While the Milestones data allow for tracking of educational achievement at the individual level, the primary role of the ACGME continues to be accreditation of institutions and residency and fellowship programs. Milestones are used as “lower-stakes” formative feedback to enable CCCs and the learners to clarify and customize the learning experiences, including creating remediation plans when warranted. The Milestones are not intended for

use in “high-stakes” assessments such as deciding whether a physician is prepared for licensure or specialty certification.

Overarching themes

The Milestones have been held up to scrutiny and are the subject of over 350 scholarly publications. Some things that are known about them are:

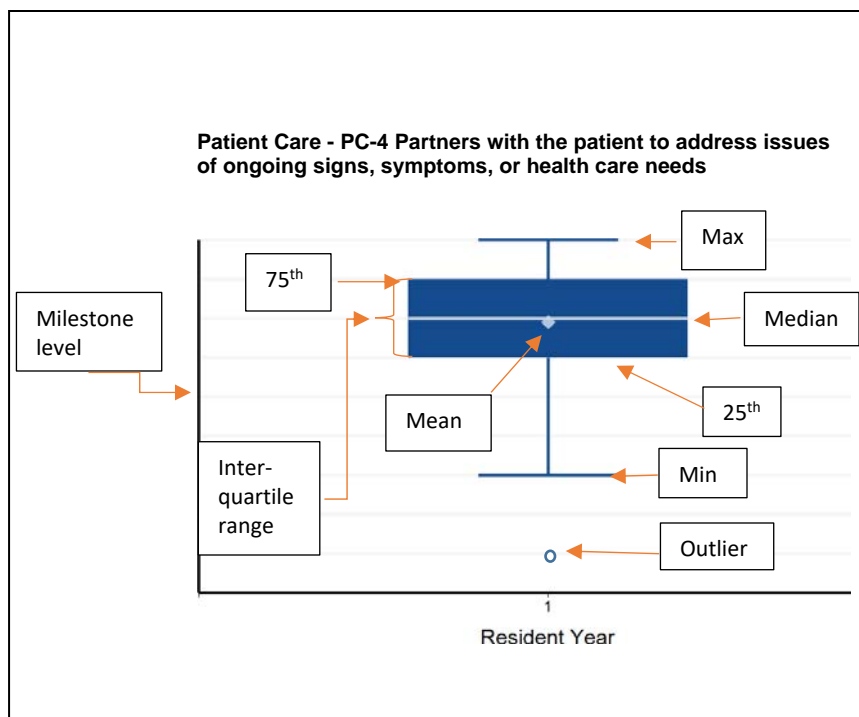
- 1) Some learners do not reach Level 4 in at least one competency by the time of graduation.
- 2) Each specialty shows variation in attainment of the Milestones, which needs to be investigated further.
- 3) Research suggests there are:
 - meaningful differences in actual performance;
 - differences in the complexity of the Milestones Competency language as written for a particular specialty;
 - differences in clinical exposure of some residents in some programs;
 - variations in scoring by CCCs;
 - differences in the quality of assessment rating forms; and,
 - differences in the types of assessment methods

Understanding box plots.

Box plots show the average Milestone ratings, as well as the variance, in general attainment across years in the residency program. Box plots provide a display that makes complex data, such as Milestones, visually impactful to a reader. The components of the box plots used for the Milestones are shown in the adjacent image. In this example, the data represent the year end evaluation of the Patient Care subcompetency for partnering with patients to address signs, symptoms and health care needs.

The y axis represents the Milestone level, with the higher number representing greater proficiency. The x axis represents the time in the program. Most Milestone sets include five levels of development with transition zones

between each level (designated as half increments, such as Level 2.5). The dark rectangle represents the interquartile range (IQR), with all residents scoring between the 25th percentile rank and the 75th percentile rank. Here, most residents score between a 3.0 and 4.0 rating at the end of year one on this sub-competency, with the range being between 2.0 and 4.5. Within the rectangle, a diamond represents



the mean score, and a horizontal line indicates the median Milestone level for each resident year. This suggests an “average” Milestone rating of about 3.5. The mean rating should be interpreted with caution given the Milestones are ordinal, not interval data.

With regards to Milestone levels, the levels can be sorted from least to greatest, and then graphed as shown in this box plot. In the example above, the highest 50 percent of the group were at or above Milestone Level 3.5; they are represented by everything above the **median** line. Half of the Year 1 residents fall between Level 1.5 and Level 3.5 (IQR). Those in the top 25 percent of Milestone judgments in the Year 1 group are shown by the top “whisker” (here labeled as **Max**) and the **outlier** open circles. When there are outliers, they will be represented by small circles. Outliers are judged to be substantially higher or much lower than normal. The number of people represented by the circles will vary by the sample size.

For further reading

This guide is intended to help readers for the Portal navigate the contents. Readers interested in more detailed understanding of the ACGME’s Milestones, we recommend the following resources.

[The Milestones Guidebook](#) describes the development and use of Milestones

[The Clinical Competency Committee Guidebook](#) for the ACGME’s guidance to CCCs on how to use the milestones

[Milestones Guidebook for Residents and Fellows](#) describes the origins and utility of the milestones, with the residents’ experience in mind.

[Milestones 2.0: a step forward](#): for background on Milestones development, limitations of the milestones and plans for revisions.

[Milestones FAQs](#): for brief understanding of the origins, purpose, development and intended uses of the Milestones.

[The 2019 Milestones National Report](#) for current national outcomes in Milestones attainment.

[Milestone’s Bibliography](#) for references to the scholarly literature related to the Milestones.