Background

This workbook outlines the major steps to building your curriculum inventory (CI). There is more than one right way to build a CI. The workbook provides a suggested step-by-step process, but schools can also design their own approach. Once you assemble your CI team, this workbook can be an effective exercise to work through together. The workbook can be useful for:

- New schools,
- Schools new to CI, or
- Schools with an existing CI that wish to take a fresh look at their data, and data quality.

This workbook supports medical schools in creating their local, school-specific CI so that they can share their CI data with the AAMC. Consider the AAMC CI as an all-schools CI, bringing together curriculum data from MD and DO-granting medical schools in the United States and Canada. This allows the AAMC to study and share trends and develop benchmarking reporting on content, structure, delivery, and assessment. Schools can use their local CIs for a number of purposes, including to support accreditation efforts.

There are aspects to building your CI that are clear (e.g., Is this standard required, yes or no?), but many questions are gray (e.g., What is the best way to organize our learning objectives?). As questions arise, the virtual Curriculum Community may be a helpful place to post your questions so that you can hear from other schools that have been through similar issues. You can sign up for the virtual Curriculum Community by emailing “Subscribe to curriculum community” to ci@aamc.org.

In addition to this workbook, other resources that might be helpful to establish your CI include:

- CI website, especially the:
  - CI Portal User Guide
  - CI Technical User Guide
- AAMC CI communications for news and events: sign up by emailing “Subscribe” to ci@aamc.org.

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Preface

What data should I include in my CI upload to the AAMC?

When creating your CI, you may wonder how much of your curriculum you should model or to what degree. Some schools may have over 1,000 electives—should those all be in your CI? Some schools may have one student on an MD/PhD track—should that be included in your CI?

For internal purposes, you may want to document every possible path and course all your matriculated students could encounter. For AAMC CI purposes, we ask that at minimum you document your prototypical student for each year of the program and their required curricular experiences to complete your program. You are welcome to also submit special tracks, extracurricular experiences, and special pathways a portion of your students may encounter as well, but your initial CI effort should be focused on the required curricular content for the majority of your students, for each year of the curriculum. The more aspects of your curriculum and data you include, the more data can be used in reports. However, the priority is to document the prototypical student’s experience first accurately, and then completely.

How the prototypical student’s experience is constructed may vary depending on your technical platform. It can be constructed using a representative, actual student’s curricular calendar or be built from a hypothetical student’s curricular experiences to best represent your curriculum. If you are working with a vendor, we recommend talking with them about how CI data is populated in their system.

Learning objectives are a rich source of data in reports

Learning objectives in a CI file are located at several levels (e.g., domain, program, course, event). The more specific and descriptive your learning objectives are, the better the reports using your CI data can be. Descriptive, detailed learning objectives are also helpful for your students and faculty. Resources on writing effective learning objectives are available on the virtual Curriculum Community library collection on “learning objectives”.

CI data goals: accuracy and completeness

As with all aspects of the educational enterprise, the devil is in the details. For example, we have likely all been to a lecture that was disappointing. Perhaps too much content was planned, or the material was not presented in a way that engaged the audience, or the content did not meet the learning objectives. On the other hand, a lecture implemented well can be engaging, timely, relevant, and designed to meet its stated learning objectives. A CI is similar in that it can be very useful if the data is accurate, if the reports are well structured and meaningful, and if there are processes in place to make evidence-based curriculum change decisions.

The MedBiquitous specifications govern the structure and types of data that can be included in your
Cl. The Cl Technical User Guide explains the AAMC’s application of those specifications from an educator and technical perspective. There may be data that technically meets the standards but, under closer scrutiny, is not accurate or complete. In any large-scale data collection effort, some degree of data entry error is expected. After Cl data is collected, the AAMC performs a number of data quality checks before preparing a curriculum report. We ask schools to do their best to submit only accurate Cl data.

Once the goal of accuracy is attained (i.e., everything currently documented in our Cl is true), the secondary goal is completion (i.e., is anything required for the prototypical student for each year missing from our Cl?).

Making the case for curriculum documentation

Curriculum mapping is important for a number of reasons, and given its importance, it is not a practice unique to medical schools. Schools in the K-12 arena have been documenting curriculum for years to help track students’ learning and progress. We in the medical school arena can learn from fields outside health professions regarding curriculum mapping.

Curriculum documentation supports accreditation

Curriculum documentation can be referred to as a Cl, curriculum map, or curriculum database—the terminology may vary, but the purpose of the accreditation standard is to ensure that schools have a record of their curricula. Having a Cl is an accreditation requirement for medical school programs. The Liaison Committee on Medical Education (LCME) Data Collection Instrument (DCI) refers to this documentation as a curriculum database. The American Osteopathic Association (AOA) Commission on Osteopathic College Accreditation (COCA) refers to it as a curriculum map. Reports sourced from your Cl data may support aspects of the accreditation process.

Students need curriculum documentation

Even before accrediting bodies were requiring schools to show evidence of their Cl, schools were documenting their curricula for several critical reasons.

For students, curriculum documentation helps them to know:

- Where they are in the curriculum,
- Where they are going, and
- Where they have been.

It helps put their learning into context, so they understand the long-term goals (e.g., program expectations and graduation requirements) and how their current learning fits within those goals.

At the same time, the amount of medical and other knowledge for practice deemed necessary for medical students is growing exponentially. Students may not remember every detail of every
educational experience they have, and so, a searchable CI is helpful for knowledge retention, building a study plan, and preparing for comprehensive assessments.

**Faculty need curriculum documentation**

Faculty responsible for a given content area or discipline need a searchable CI to understand:

- Where all the “touches” on a given topic exist,
- What other topics are next to this content area,
- What gaps or unintentional duplications may exist, and
- How the learning objectives for a content area relate to each other and to the program expectations.

Teaching faculty who may be coming into the curriculum to teach a session or two need to understand what information students already have on a given topic and what they need to be prepared for in the future.

**The school needs curriculum documentation**

For the school, beyond meeting accreditation requirements, having a searchable CI is helpful for responding to stakeholder inquiries. Students, applicants, senior leaders in the organization, members of the public, or others may need an answer to the questions “How much X does our medical school cover, how do we teach and assess it, and where is it within our curriculum?”

Schools can:

- Clearly outline their expectations for students;
- Ensure content has a logical sequence and degree of difficulty;
- Align learning objectives, instructional approaches, and assessment methods; and
- Identify gaps and unintentional redundancies.

Reports that a CI produces are useful for supporting:

- Vertical and horizontal integration, where connections are made across topics and time;
- Program, course, and content area evaluation;
- Continuous quality improvement (CQI); and
- Evidence-based curriculum change.

A robust CI can serve as a curriculum’s telemetry, giving users an at-a-glance high-level view of the fulfillment of the program’s educational program objectives, as well as when and how they are achieving these benchmarks, and identifying areas where work needs to be focused. Just like an ECG waveform can provide real-time information about the electrical function of the heart, a well-done CI can provide an informative snapshot of curricular performance. Checking the pulse of the curriculum supports ongoing continuous quality improvement!
Please see past **Building Better Curriculum webinars** related to Curriculum Evaluation, including “Comprehensive Curriculum Evaluation” and “Program Evaluation and the Integration of Curriculum Information.”

**The AAMC uses CI data for its mission**

The AAMC annually collects this data to provide a service to medical schools, but also because the data is used to fulfill a component of the AAMC’s mission—to be an advocate for medical education programs. The AAMC relies on data to form its responses when communicating with government and media outlets, to inform medical education research in studying practices and trends, to advance medical education research, and to guide its initiatives.

**Participating schools contribute to and receive access to reports**

There are 50+ aggregate national **curriculum reports** available on the AAMC website, from both the AAMC CI and the LCME Annual Medical School Questionnaire Part II. In addition to these, schools who contribute to the AAMC CI data set receive special access to curriculum reports through the **CI Portal**, the site where schools annually share their CI data. For more information about reports and how to access them, please see the **CI Portal User Guide** section titled, “Curriculum Reports for Schools.”
Chapter 1: Getting started

Chapter 1 highlights

- Motivations and goals for your CI
- CI data to collect
- Internal operations to support your CI

A CI is essentially a database—it is the documentation of a school’s curriculum and can include many data fields. Once a medical school has created its local, school-specific CI, it shares its CI data with the AAMC.

The AAMC CI collects data typically found in a curriculum management system (CMS) or learning management system (LMS), such as courses, events, timing, learning objectives, and more. Not all CMSs or LMSs may be able to create and manage CI data—more information regarding technical platforms is given in Chapter 2.

Motivations and goals for your CI
There are many reasons a school builds and maintains a CI, as described in the Preface of this guidebook. A chief motivation for building a CI is often accreditation, although there are many other purposes a CI can serve, including:

- Program and course evaluation,
- Evidence-based curriculum change,
- Curriculum integration and alignment, and more.

It will be helpful for your school to identify why you are building a CI—is it only for accreditation? Will you use your CI to support your curriculum review process? Are there other goals you wish your CI to achieve?

Outlining the motivations and goals for your school’s CI will help guide the choices you make and the resources you will need as you work through building your CI. It will be helpful to communicate to your school’s faculty, staff, and stakeholders about what a CI entails, the kinds of efforts it will take to build and maintain over the next year, and why your school’s CI is important.

Read: Read the Preface of this Guidebook, which focuses on making the case for curriculum documentation.

Task 1: Identify your school’s goals for your CI and share the Preface of this Guidebook, “Making the Case for Curriculum Documentation,” with your school’s stakeholders.

CI data to collect
From an AAMC CI technical standards perspective, some AAMC CI data fields are required, and others are optional (see more about the CI technical components in the CI Technical User Guide). However,
documenting some optional data fields can be critical to a school’s CI goals—for example, supporting curriculum renewal, enabling continuous quality improvement, and making the curriculum visible to students and faculty.

It may be helpful to first note all the required elements of your CI based on the technical standards in the CI Technical User Guide. Then, prioritize the optional data fields, noting which ones are necessary to meet your school’s CI goals. For example, some optional data fields are necessary to populate your school’s Verification Report, which each school receives after successfully uploading its CI data to the AAMC. The Verification Report summarizes and synthesizes a school’s own submitted curriculum data into useful formats and tables. You can view a sample Verification Report in the CI Technical User Guide. As you read through the sample Verification Report, please note that each table in it outlines which data fields are necessary to populate that table.

Collecting CI data, ensuring it is accurate and complete, choosing the technical platform to house the CI . . . all these steps will be a large-scale project over time. The AAMC CI collects curriculum data from the previous academic year, so building a CI is the kind of project a school should start the year before it wishes to upload its CI data to the AAMC. For example, in August 2022, the AAMC CI collected schools’ data on curricula that occurred July 1, 2021, through June 30, 2022.

Visit & Explore: CI technical components in the CI Technical User Guide, and review the sample Verification Report

Task 2: Develop an outline of the elements of your CI based on the technical standards and which optional data fields, especially those visible in the Verification Report, you need to include in your data collection to meet your goals and populate your CI accurately and completely.

Internal operations to support your CI
From an operations standpoint, schools will need to marshal resources, people, and time for this project. One way to keep the project collectively on your school’s radar is to consider making your CI an institutional/school goal, perhaps integrating the CI into individuals’ performance goals this year.

There will likely be a team of people who contribute to your school’s CI. The first team member to identify is your curriculum dean. This person should be familiar with the curriculum overall, as one of their key responsibilities will be verifying your school’s Verification Report to complete the CI upload process with the AAMC. You can read more about the official AAMC CI roles in the CI Portal User Guide (beginning on p. 6 there). There may be more than one person at your school with curriculum oversight responsibilities, and even with dean-related titles. For the purposes of the AAMC CI, it is important to choose one person as the principle communicator and decision-maker to officially hold the curriculum dean role.

Next, it will be important to identify additional members of the CI team, as well as stakeholders who need to be informed about your CI’s progress. There may be faculty and staff at your school who already collect CI-related data, such as curriculum coordinators and course directors. We recommend communicating with all those involved so they are prepared to assist and provide data over the next
Once you identify your team, you may find that different or additional staffing roles are needed. While a curriculum coordinator may be able to hand off course content to a centralized database, there will need to be some degree of central oversight, which can help ensure that curriculum documentation practices across courses and people are consistent. The amount of staffing and time your CI requires in this initial year is likely more than the amount of staffing and time it will take in subsequent years. However, some degree of faculty and staff full-time employment will be necessary to maintain the CI over time.

Regarding staffing and roles, it may be helpful to review job descriptions of those with curriculum and curriculum mapping responsibilities at other schools. In the virtual Curriculum Community library, some helpful resources include “Medical School Organizational Charts – A Random Sample,” and sample school job descriptions in the “Curriculum Operations” library folder. Make sure to click on the + sign next to “Curriculum Operations” to see sub-folders of job descriptions organized by responsibilities, like “curriculum mapping,” or “clerkship administration.”

**Read:** The official AAMC CI roles in the CI Portal User Guide (beginning on page 6 there).

**Task 3:** Please send an email to ci@aamc.org with your school’s curriculum dean. This individual can then add additional faculty and staff as CI primary administrators and CI viewers.

**Task 4:** Make your CI an institutional/school goal and integrate that goal into all identified CI team members’ individual performance goals this year.

In addition to formal staffing roles to support the CI, you will need a technical platform that meets the AAMC CI standards. Schools can create an institutionally developed system or choose to work with a third-party vendor. We discuss technical platforms more in Chapter 2. A software program your school already has may offer CI services. It will be important to consider your technical platform (e.g., server hosting, subscription service, staffing to manage the software, etc.) in your budget.

**Chapter 1 key questions**

1. What are our motivations for having a CI? What do we want our completed CI to be able to do? Essentially, what are our goals for our CI?

<table>
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<tr>
<th>Motivating factor</th>
<th>Is this a goal for our school’s CI? Yes/No</th>
<th>If yes, please describe.</th>
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<td>Document our school’s curriculum in a formalized manner.</td>
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<td>Make curriculum visible to students.</td>
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<td>Make curriculum visible to faculty.</td>
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<td>Support program evaluation and continuous quality improvement.</td>
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<td>Support course-level reviews.</td>
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<td>Support accreditation efforts.</td>
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<td>Promote curriculum research.</td>
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<tr>
<td>Other</td>
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2. After reviewing the required AAMC CI data fields, what are the ones (including required and optional data fields) that we must collect in order to meet our CI goals, and populate our CI accurately and completely?

3. Who will be our school’s official curriculum dean for the AAMC CI?

4. Who at our school may hold or collect CI-related data currently? It will be helpful to keep a list.

5. Who at our school will need to be on our CI team? Who at our school needs to be informed about our CI’s progress?

6. Share the Preface of this Guidebook with our CI team, and consider sharing this project with other key faculty and stakeholders so they are aware it is underway.

7. What is our budget for staffing and technical support?
Chapter 2: Where will your CI data live and thrive?

Chapter 2 highlights

- CI’s technical platform
- Initial CI data quality planning
- MedBiquitous CI specifications compliance

CI’s technical platform
As mentioned in Chapter 1, you will need a technical platform for your CI data to live in, and that technical platform needs to produce a CI data file that is in full compliance with the MedBiquitous technical standards, more fully described in the CI Technical User Guide.

People can choose from a variety of types of homes to live in. Whether it is an apartment in a large city or a house in a sprawling suburb, the home a person picks will vary depending on their life’s goals—e.g., a short commute, a big backyard, etc. So too with your CI, there are multiple types of homes (i.e., technical platforms) you can choose. Each one may come with pluses and minuses.

To decide your CI home for the future, we suggest going back to the goals you identified in Chapter 1 and considering which CI technical platform will help you to meet them. Perhaps you need a CI that will be easily searchable by your students or one that is integrated with your students’ calendars.

**Task 1**: Review your school’s goals for curriculum mapping.

With each step in the CI-building process, it can be helpful to seek guidance (e.g., advice and lessons learned) from schools that have been successful in that area—this is especially true before choosing a technical platform. Remember that once you have your CI data in a technical platform, removing it and starting over can be challenging if you change your mind down the road. Because a curriculum can change rapidly and regularly, you will want a system that can adapt as your curriculum evolves.

**Task 2**: Contact other schools to collect lessons learned about their technical platforms.

A relatively simple system, like an Access database, may be sufficient to meet your school’s CI goals. Or you may want a system with more bells and whistles. Referring to the goals you identified in Chapter 1 can help narrow your options. If you are curious about pursuing an institutionally developed system, consider reaching out to the curriculum community to get feedback from schools that have developed their own systems.

Initial CI data quality planning
The goal of any data collection is to have usable data for searches and reports. You may want to think about the types of curriculum reports and searches you wish to have. You can view national aggregate reports on the Curriculum Reports webpage and your school’s CI Portal, which you can read more about accessing in the CI Portal User Guide.
As an example, say your school has recently completed a curriculum renewal effort where increased use of case-based learning (CBL) was a goal. Since CBL is one of the instructional method choices used in the AAMC CI (see complete list of instructional method choices in Appendix I), you may want to double-check that your curriculum before and after the curriculum renewal effort is consistently and accurately tagged with CBL according to the definition provided, so that you can then measure your school’s progress in increasing the amount of CBL in the curriculum.

A list of guidelines for your school’s CI efforts will help support data quality and facilitate useful curriculum reports. Examples of school guidelines could include:

- **Spelling out school-specific acronyms:** Universally known acronyms, such as ACLS, may be easily searchable and known, but school-specific acronyms can be difficult to identify for curriculum reports. For example, if we find ACE in the CI, does that refer to adverse childhood events or ACE inhibitors? At one school, ACE could refer to acute care for the elderly, but unless those words are spelled out, finding all the relevant elder-care curricula might be challenging.

- **Checking for spelling errors:** Many software programs have spell-check built in, but even in those cases, it would be helpful to confirm that the system is effectively identifying spelling errors. For example, the word *clinical* can be easily misspelled.

- **Establishing a consistent, standardized way to refer to your content in each topic:** For example, will your CI have the words *cancer, neoplasm, oncological,* and *tumor,* or will you provide your faculty and staff a list of terms to use consistently across your CI? You may use whichever and however many terms you like, but remember that you need to keep all the terms you use in mind when creating a data search query once your CI is built. The AAMC CI keyword list (can be a useful resource to ensure consistency across some terminology in your CI. More details regarding keywords are provided further along in this workbook.

**Task 3:** Begin drafting an institutional style guide for curriculum documentation, and consider including the AAMC CI keyword list (see Appendix II) as part of your plan.

**Chapter 2 key questions**

1. What technical platform will house our CI data?

2. What kinds of curriculum searches and reports do we want to be able to produce?

3. Now that we have some additional information and insight, do we need to make any refinements to the list of data we intended to collect, from our worksheet in Chapter 1, question 2?

4. What will our school guidelines be for consistent curriculum documentation?
Chapter 3: Program objectives drive the curriculum

Chapter 3 highlights

- Program objectives’ role in the curriculum
- Considerations in finalizing your program objectives

Program objectives are the expectations or outcomes students must meet by graduation. Schools can craft their own program objectives from scratch or use an existing model either as is or as inspiration. One such model is the Physician Competency Reference Set (PCRS) (see Appendix III). Schools can use the PCRS as inspiration or as is for their own program objectives but are not required to do so. Program objectives can be tailored to a school’s mission and vision, culture, and patient populations.

Program objectives’ role in the curriculum

Program objectives govern the curriculum. They drive the content, course- and event-level learning objectives, instructional and assessment approaches, and more. Because the program objectives drive the entire curriculum, it is important to make sure your program objectives:

- Are up to date;
- Accurately capture the required curricular content for graduating students;
- Align with your school’s mission and vision, culture, and patient population;
- Are written in descriptive, specific, outcomes-based language; and
- Have been reviewed and approved by your curriculum committee (or similar oversight body).

For example, perhaps your school has a desire to deliver leadership curriculum content to students and has identified this goal in its mission and vision. Are leadership skills represented in some way in your program objectives? If not, it will be difficult to link course- and event-level learning objectives regarding leadership skill development to a program objective.

Gaps such as this will be easier to identify once you have a CI built. In the meantime, a review of the program objectives would be helpful to identify and address any potential gaps before you begin the in-depth work of building your CI.

Task 1: Review your school’s program objectives.

One way to identify curriculum gaps before your CI is built is to map each of your current program objectives to a PCRS competency statement. This linking of program objectives to the PCRS is required, ultimately, for your CI upload to the AAMC CI so that the AAMC can compare program objectives across schools, as schools may use diverse language and models when crafting their program objectives. A national report regarding school practices and the PCRS is available on the CI Portal. Although the linking of a school’s program objectives to the PCRS is required to upload to the AAMC CI, schools are not required to use the PCRS within their program objectives language, although they may choose to do so.
For example, perhaps while you are linking your program objectives each to a PCRS competency statement, you find that you have very many program objectives mapped to the PCRS domains for patient care (1.0) and knowledge for practice (2.0) but very few program objectives across the other PCRS domains (e.g., practice-based learning and improvement, interpersonal and communication skills, etc.). This may be intentional for your curriculum, but if not, identifying these gaps can inform your analysis of whether your current program objectives meet your school’s needs. Perhaps you note that your program objectives do not have any links to the PCRS domain for interprofessional collaboration (7.0), although interprofessional practice is identified in your school’s mission statement. In this hypothetical case, the discrepancy noted between your school’s mission and program objectives, as well as the gap you identified by linking program objectives to the PCRS, may prompt further discussion and, potentially, edits to your program objectives, mission statement, or both. If and how you choose to address the gaps you identify in your program objectives will be helpful to document and bring to your curriculum committee or similar oversight body, which in turn may support your accreditation efforts.

Task 2: Identify links between each of your program objectives and one or more PCRS competencies.

Considerations in finalizing your program objectives
When organizing your program objectives, you may nest your program objective statements in a given domain. Domains for your program objectives are not required for your CI upload; however, in 2022, there is a new optional field in the AAMC CI to collection program objective domains, further described in the CI Technical User Guide.

Domains can be helpful for both organizing and succinctly communicating the content of your curriculum to key stakeholders, such as students, applicants, university leadership, the general public, and more. There are a variety of models you can use if you would like to organize your program objectives by domains. For example, the PCRS competencies are organized according to eight domains—patient care, knowledge for practice, practice-based learning and improvement, interpersonal and communication skills, professionalism, systems-based practice, interprofessional collaboration, and personal and professional development—with individual competency statements within each domain category.

Task 3: Consider if you would like your program objectives organized by domain.

Because the program objectives are the cornerstone of your curriculum, spending time and effort to get them right will make your subsequent CI work easier. Edits to your program objectives should be made carefully and thoughtfully, as each edit will have a trickle-down effect on your curricular content, course- and event-level learning objectives, instructional and assessment approaches, etc.

There are a variety of ways to write learning objectives well. If you are editing your program objectives and looking for guidance, there is a curated collection of resources regarding effective learning objectives, as well as school sample program objectives, in the virtual Curriculum Community library collection on “learning objectives”.

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It will be helpful to have your curriculum committee or similar oversight body approve the current program objectives and to establish a periodic review of the program objectives and their related CI data once your CI is built.

**Task 4:** Bring your finalized program objectives to your curriculum oversight body.

Once your program objectives are established, you may consider assigning them meaningful ID codes. Program objective ID codes are *not* required for your CI upload but using meaningful ID codes for your program objectives can help you recognize and sort your curriculum content. For example, if you have three program objectives related to interpersonal and communication skills, meaningful ID codes could be COMM-1, COMM-2, and COMM-3. Numerical ID codes such as 98373747 would not be as meaningful since the number does not necessarily tell you what portion of the curriculum it relates to. How ID codes are built and managed will vary depending on the technical platform you use.

**Task 5:** Consider assigning meaningful ID codes to your program objectives.

When deciding how to document your program objectives, it may be helpful to review how they will be displayed in your Verification Report once you successfully upload your CI data to the AAMC. You can view a sample Verification Report in the CI Technical User Guide and skim through the tables that use program objective data (tables 1, 6, 7, and 9).

**Chapter 3 key questions**

1. What models, if any, did we consult or use as inspiration when drafting our program objectives, and how did we use them?

2. Are there any curriculum gaps in our program objectives that we need to address with edits? Were any gaps identified through our PCRS linking process? Do our program objectives accurately capture the required curriculum?

3. Are our program objectives aligned with our school’s mission, vision, culture, and patient population?

4. Are our program objectives written in descriptive, specific, and outcomes-based language?

5. Are our program objectives up to date and regularly reviewed and approved?

6. What is our final, edited, and approved program objectives list, and do we have up-to-date links to the PCRS competencies?

7. What is our system for assigning ID codes to our program objectives? What is our system for organizing our program objectives, perhaps by domain?
Chapter 4: Determining your CI organizational strategy

Chapter 4 highlights

- Curriculum visual schematics
- CI organizing principles to create a list of courses
- How data will display in the Verification Report

Curriculum visual schematics
Typically, schools have visual schematics to represent their curricula to students, applicants, and the public. A listing of school curriculum schematics is available on the virtual Curriculum Community library. In the community, you can navigate to “Library,” then “Curriculum structure and organization,” then “Visual schematics of curriculum.” Click on the + signs to see more folders and resources. You will see sub-folders for different types of medical schools. You can make sure your school is listed, make sure the link is up-to-date, and explore other schools’ visual schematics of curriculum. These resources may help you design a visual schematic to represent your curriculum if you do not already have one or if you need to revise your current one. If you need help adding or updating your school’s visual schematic of curriculum on the community, please reach out to ci@aamc.org.

The MedBiquitous CI standards, more fully illustrated in the CI Technical User Guide, allow for multiple ways to model your data, so outlining your visual schematic in detail will help drive how you organize your content according to the standards.

**Task 1:** Design your curriculum’s visual schematic, and confirm it is accurately listed on the AAMC virtual Curriculum Community library.

CI organizing principles to create a list of course/modules
There are a variety of approaches that schools use to organize their curricula—by year (e.g., year 1, year 2, etc.), by phase (e.g., phase 1, phase 2, etc.), with courses or blocks, by longitudinal threads, and more. Once you determine how you would like your CI organized (e.g., phase 1 = year 1, phase 2 = year 2, etc.), you can decide how many and which courses, modules, or threads to nest underneath each phase.

**Task 2:** Determine the number of phases you need to accurately represent your curriculum and how each should be labeled (e.g., phase 1 = year 1).

The goal is to minimally include all required curriculum content (i.e., required courses that all graduating students take). You may also document optional courses, special tracks, extracurricular...
activities, etc. In your CI, you can have required courses with both required and optional events in them, as well as optional courses with both required and optional events in them.

When determining which courses, modules, and threads to include in your CI, think about your typical student and try to replicate the experience that most of your students will have. The goal is to paint an accurate and complete picture of the typical, hypothetical student for each year of your curriculum.

In the MedBiquitous CI standards, sequence block is the term used to describe courses, clerkships, modules, and other organizational approaches to curriculum content. An example of how a sequence block is documented in a CI file is illustrated in the CI Technical User Guide.

Deciding which content to include in your CI may be a matter of input and output. Ideally, all of your school’s curriculum would be documented in the same manner, but that may not be feasible. For example, if your school offers over 1,000 electives, it may not be realistic to document each course to its fullest extent in your CI. Instead, perhaps you could prioritize the top 25 electives with highest enrollment among your students. Ultimately, the CI goals you drafted in Chapter 1 should drive the choices you make in terms of which elements of the curriculum to document.

**Task 3:** Determine how many and which courses, clerkships, modules, blocks, and threads need to be within each of your phases. These should accurately and completely represent the curriculum experience of a typical, hypothetical student.

**How data will display in the Verification Report**
The Verification Report is a report each school receives after successfully uploading its CI data to the AAMC. This report presents the school’s data in tables, with explanations of what data populates each table. We recommend viewing a sample Verification Report in the CI Technical User Guide to see how organized content will display.

For example, the last table in the Verification Report shows content course by course or module by module. Therefore, if you would like a given course, module, or piece of your curriculum to have a separate and distinct section in the Verification Report, perhaps to support curriculum evaluation or accreditation efforts, or so that a given curriculum leader can more easily review the content, it will be helpful to organize it separately in your CI.

**Task 4:** Review the sample Verification and Accreditation Support Reports.

A feature of the CI standards is the concept of nested course/modules. These allow you to represent a hierarchy in your CI. For example, perhaps your curriculum will have a course/module for “diagnostic and therapeutic procedures” and, under that, separate course/module (e.g., for “surgery,” “OBGYN,” etc.) The use of nested course/modules is not required in your CI, but they can be a beneficial tool for accurately representing the organizational structure of your curriculum.
In this example, the courses in OBGYN, radiology, and surgery are all “nested” in a course/module (i.e., sequence block in the MedBiquitous specifications) of diagnostic and therapeutic procedures, to show they are organized together in a deliberate manner. Each of the “nested” courses have their own dates, events, instructional approaches, and more.

The use of “nested” course/modules is also a popular approach for organizing groups of courses, like clinical clerkships. More information about documenting clinical clerkships using a “nested” approach is described in Chapter 5 of this Guidebook.

**Task 5**: Determine whether and how nested course/modules can help you to accurately represent the hierarchy of curriculum data organization in your CI.

Keep in mind that each course, module, theme, thread, etc. that you enter now on your list for the CI needs additional documentation. This documentation will include data such as event dates and times, instructional and assessment methods, learning objectives, and so on. You may find that there is curricular content (courses, modules, etc.) on your list whose details are not centrally located (e.g., the learning objectives are on the faculty’s PowerPoint slides, event dates/times are on a PDF syllabus, etc.). Thus, it may be helpful to plan some extra time for gathering this kind of data across sources.

**Task 6**: Begin to think ahead about where the follow-up information you need for each course/module in your CI may be. You will need to collect that information in a centralized location.

**Chapter 4 key questions**

1. Do we have a visual schematic for our curriculum? Is it up to date and reflective of what we want our CI’s structure to look like?

2. What is our organizational approach for our CI? How many phases will we have, and what will we call them?

3. Based on our CI goals identified in Chapter 1, what is our list of courses, modules, and threads that we want to include in our CI, and how will these be organized within our phases?

4. How will we use the “nested” course/module approach to accurately represent our curriculum?
Chapter 5: Course-level details for your CI

Chapter 5 highlights

- Initial course details
- Representing rotational clerkships
- Representing integrated clerkships
- Representing elective and selective courses
- Course-level learning objectives

Initial course details

Once you have your organizing principles and content outline determined from Chapter 4, you can build out the details. For each course, clerkship, module, block, or thread that you include in your CI, the field within the CI standards you will use is the course/module. It may be helpful to refer to the CI Glossary (see Appendix IV) for definitions of terms used below. For each course/module you document in your CI, the details you will need at this stage include:

- **Title:** Sample titles include “cardiovascular course,” “patient safety module,” “internal medicine clerkship,” etc.

- **Course/module type:** This includes:
  - Whether the course/module is required or optional:
    - Required course/modules are those a student must complete to graduate. “These [course/modules] are stipulated as necessary to be done for all students in order to meet the expectations of the program” (Merriam-Webster, 2019).
    - Optional course/modules are those that “allow students to self-elect for participation” (Rabow et al., 2016) in the class (Agarwal et al., 2015). Optional electives, for example, could include research projects or away rotations.
  - Whether the course/module is a clerkship or not:
    - If a clerkship, further determine whether the clerkship is rotational or integrated (more details on rotational clerkships are described below).

- **Start and end dates:** The AAMC CI collects curricula from the previous academic year, so to upload your CI data in August 2022, your course start and end dates will generally fall between July 1, 2021, and June 30, 2022.

Although your CI reporting dates will be July 1, 2021, through June 30, 2022, it is acceptable if some content within your CI (e.g., phases, courses) falls outside those bounds. For example, while the academic year begins July 1, 2021, you may have clerkship courses that start in May 2021, and you should include them in your CI.

- **Duration:** This is documented in days (e.g., 20 days).
When determining how many days to document, days upon which learning is expected to occur should be counted. For example, it is easy to decide to document weekdays when there is learning scheduled to occur, like lectures or patient experiences. But what about weekends? Holiday breaks? If there are days, such as weekends, when there is no scheduled learning, but learning is expected, those days should be counted when calculating the days per course/module.

An example might be giving students no scheduled learning the day before a big exam – there are no new lectures, but the students are expected to be studying, thus learning is expected to occur and that study day should be counted when calculating the days for that course/module.

**Task 1:** Determine the initial details for your courses, clerkships, modules, threads, and/or blocks.

**Representing rotational clerkships**
Rotational clerkships are ones that repeat throughout the year: Each student experiences the clerkship once, but the clerkship repeats multiple times so that a cohort of students can enroll. For rotational clerkships, the start and ends dates may span a long period of time, but the duration for a given student may be relatively short. For example, a psychiatry clerkship may run from July 1, 2021 (start date), through June 30, 2022 (end date), but for each student, the duration of the psychiatry clerkship is 4 weeks.

Your CI submission should represent one typical, hypothetical student’s experience in each year of your curriculum. So, there should only be one instance of each rotational clerkship in your CI, if this is true for what one student would experience.

How these curricular experiences populate in your CI can vary depending on your technical platform. If your technical platform pulls your CI data from all students’ calendars, you could have multiple instances of the same rotational clerkship in your CI, which would be inaccurate. It is important to correct this before sharing your CI data with the AAMC. If, for instance, your rotational clerkships are entered 12 times instead of once, CI reports will reflect 12 times more content in a given content area than actually exists. One way to address this problem is to create a typical rotational clerkship (e.g., typical psychiatric clerkship) and use only that typical clerkship in your CI submission, rather than pulling CI data from all students’ real calendars.

Below are two examples of rotational clerkship models using the nested course/module concept discussed in Chapter 4 of this Guidebook; the first example illustrates clerkships scheduled in no particular order, the second example illustrates clerkships scheduled in a particular order.
Rotational Clerkship Model – Example 1

Students take various clerkships in no particular order

In this clerkship model example, clerkships are run throughout the year (e.g., July 1 – June 30), however each student’s experience in each clerkship is a shorter period of time (e.g., 4 weeks in the neurology clerkship). In this example, there are a series of clerkships, but the order in which students take them varies and is not prescribed. This model illustrates the elements and attributes in the MedBiquitous specifications that should be applied.

- **Start date:** 2021-07-01
- **End date:** 2022-06-30
- **Duration:** 230 days (46 weeks)
- **Required:** Required

Minimum: 8
Maximum: 8
Order: Unordered
Is this a clerkship? No (because this is the container, not the actual clerkship course)

### Clerkships

- **Neurology Clerkship**
  - Start date: 2021-07-01
  - End date: 2022-06-30
  - Duration: 20 days (4 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation

- **Psychiatry Clerkship**
  - Start date: 2021-07-01
  - End date: 2022-06-30
  - Duration: 20 days (4 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation

- **Surgery & Peri-operative Services Clerkship**
  - Start date: 2021-09-01
  - End date: 2022-06-30
  - Duration: 40 days (8 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation

- **OBGYN Clerkship**
  - Start date: 2021-09-01
  - End date: 2022-06-30
  - Duration: 30 days (6 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation

- **Pediatrics Clerkship**
  - Start date: 2021-09-01
  - End date: 2022-06-30
  - Duration: 30 days (6 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation

- **Family Medicine Clerkship**
  - Start date: 2021-07-01
  - End date: 2022-06-30
  - Duration: 30 days (6 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation

- **Emergency Med Clerkship**
  - Start date: 2021-07-01
  - End date: 2022-06-30
  - Duration: 20 days (4 weeks)
  - Required: Required
  - Is this a clerkship? Yes
  - Clerkship type: Rotation
Rotational Clerkship Model – Example 2
Students take clerkships at various times and in a particular order

In this clerkship model example, clerkships are run throughout the year (e.g., July 1 – June 30), however each student’s experience in each clerkship is a shorter period of time (e.g., 4 weeks in the neurology clerkship). In this example, there are a series of clerkships, and while students take them at various times, there is a prescribed order. For example, whether a student takes the neurology clerkship in August or February, the psychiatry clerkship always comes next.

<table>
<thead>
<tr>
<th>Clerkship Type</th>
<th>Start Date</th>
<th>End Date</th>
<th>Duration</th>
<th>Required</th>
<th>Order</th>
<th>Is this a clerkship?</th>
<th>Clerkship Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurology Clerkship</td>
<td>2021-07-01</td>
<td>2022-06-30</td>
<td>20 days (4 weeks)</td>
<td>Required</td>
<td>1</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>Psychiatry Clerkship</td>
<td>2021-07-01</td>
<td>2022-06-30</td>
<td>20 days (4 weeks)</td>
<td>Required</td>
<td>2</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>Internal Medicine Clerkship</td>
<td>2021-09-01</td>
<td>2022-06-30</td>
<td>40 days (8 weeks)</td>
<td>Required</td>
<td>3</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>Surgery &amp; Peri-operative Services Clerkship</td>
<td>2021-09-01</td>
<td>2022-06-30</td>
<td>40 days (8 weeks)</td>
<td>Required</td>
<td>4</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>OBGYN Clerkship</td>
<td>2021-09-01</td>
<td>2022-06-30</td>
<td>30 days (6 weeks)</td>
<td>Required</td>
<td>5</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>Pediatrics Clerkship</td>
<td>2021-07-01</td>
<td>2022-06-30</td>
<td>30 days (6 weeks)</td>
<td>Required</td>
<td>6</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>Family Medicine Clerkship</td>
<td>2021-07-01</td>
<td>2022-06-30</td>
<td>30 days (6 weeks)</td>
<td>Required</td>
<td>7</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
<tr>
<td>Emergency Medicine Clerkship</td>
<td>2021-07-01</td>
<td>2022-06-30</td>
<td>20 days (4 weeks)</td>
<td>Required</td>
<td>8</td>
<td>Yes</td>
<td>Rotation</td>
</tr>
</tbody>
</table>
**Task 2:** Consider how to represent rotational clerkships in your CI. One solution is to represent the clerkship with a typical iteration.

**Representing integrated clerkships**
Integrated clerkships are ones where content “cuts across subject matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study” (Shoemaker, 1989). In a medical school context, integrated clerkships are ones that include content across disciplines. For example, an integrated clerkship experience for students might include following a panel of diverse patients from internal medicine, family medicine, and pediatrics over a period of time, with students acting as patient advocates and navigators. In this example, the integrated clerkship includes content from several clinical disciplines: internal medicine, family medicine, and pediatrics.

Please note that according to the MedBiquitous specifications, a clerkship must be either rotational or integrated; clerkships are not able to be documented as both rotational and integrated. Moreover, the concepts of rotational and integrated can be applied only to course/modules that are clerkships; they cannot be applied to non-clerkship course/modules.

**Task 3:** Consider if integrated clerkships need to be modeled in your CI.

**Representing elective and selective courses**
Definitions of elective and selective courses, for the purposes of the AAMC CI, are available in the Glossary (see Appendix IV). It may be that the definitions and examples of electives and selectives which follow do not line up perfectly with your school’s application of the word elective. Regardless of whether optional courses are referred to as electives or selectives, your school’s vernacular is not critical for the AAMC CI—what is important is that the electives, selectives, and optional courses at your school are modeled accurately. The samples which follow may help in using the aspects of the MedBiquitous CI specifications to best model your optional courses.

Elective courses typically mean that students can choose to take them or not take them. One way to think about electives is to consider a course that is optional, where there is no academic penalty if a student chooses not to take it. As an example, perhaps a global health trip to Central America is offered during winter break of the first year of medical school. Students are offered the optional elective trip, but they could also choose to do something else with their winter break time (e.g., have a part-time job, study, go home to visit family) without academic penalty. The only consequence would be not acquiring any credit hours offered for that particular course. Elective courses, like the example described above, should be designated optional (rather than required) in your CI to model them accurately.

In selective courses, students typically have some flexibility in choice, but there are limitations and requirements on which and how many of these courses they can choose.

For example, perhaps students are required to complete one intensive care unit (ICU) rotation. The school offers ICU rotations in medicine, surgery, and pediatrics. Students therefore must choose from
these three ICU rotations. There is some degree of choice (e.g., Which ICU rotation is available when a student wants to take it and will best prepare the student for their future career?). There are also limitations on that choice—students can choose only one of only these three ICU options. Another common example is sub-internships. Perhaps all students at your school are required to complete a sub-internship, but there are multiple sub-internship options students can choose from (e.g., medicine, surgery, pediatrics, etc.).

How will you model these types of selective courses in your CI? Recall that the goal is both to model what a typical, hypothetical student would experience in the curriculum (e.g., must take one ICU rotation) and to model your curriculum completely and accurately (e.g., can choose from three ICU selective options). Here is how the selective ICU course described above could be modeled using the nested course/module concept introduced in Chapter 4.

**Task 4:** List all courses, modules, clerkships, etc. that are optional (e.g., electives, selectives), and determine how to model them accurately in your CI, considering the examples above.

**Course-level learning objectives**
Each of the courses/modules and clerkships in your list will have learning objectives, and there are many questions to consider before finalizing the course-level learning objectives for inclusion in your CI.

Are there documented learning objectives for each course/module? Are any missing? Do the learning objectives reflect the content of the course/module? Do they reflect relevant and up-to-date medical and other literature? Are the learning objectives written in descriptive, specific, outcomes-based...
language?

It is important to confirm that the learning objectives at the course level collectively meet your school’s goals, i.e., the program objectives. Remember that the program objectives, discussed in Chapter 3, drive the curriculum. For example, perhaps for your pre-clerkship courses, a collective goal is that all the course-level learning objectives add up to preparedness for the clerkship experience. Or perhaps course learning objectives collectively need to prepare learners for a licensing exam. Whatever your curriculum goals are, it is helpful to write them down and then consult your learning objectives to ensure they are collectively meeting your goals.

It may be useful to engage content experts both to review the content of the learning objectives and also to judge the relatedness of the learning objectives to each other and to your school’s program objectives and goals. For example, if one of your goals for the pre-clerkship learning objectives is to collectively prepare students for clerkships, perhaps clerkship directors should be consulted in reviewing the learning objectives.

**Task 5:** Gather draft learning objectives for each course, module, clerkship, etc. that you need to include in your CI.

Once you have drafted learning objectives for each course/module, there are additional questions to ask. Are these learning objectives the appropriate degree of difficulty, and do they build upon each other over time? Consider alignment of your learning objectives within courses and modules, across and between courses and modules, and across time. In the simplified, limited example below, the colored arrows represent how vertical and horizontal alignment and integration of content (in this case, learning objectives) could be considered. Some schools use their visual schematic of curriculum to very effectively illustrate where in the curriculum content is purposefully integrated; it may be helpful to review some sample curriculum schematics is available on the [virtual Curriculum Community library](#).

At this stage, you can check to make sure that learning objectives are not too easy or too challenging for where the students will be at a given phase of the curriculum. If the learning objectives relate to each other across courses and over time, there will be limited duplication of content presented to students and fewer gaps in content coverage.
For resources on writing learning objectives with effective language, please see the virtual Curriculum Community library collection on “learning objectives”. Whatever approach you choose, it will be helpful to write down and broadly share your school’s guidelines so that faculty take a consistent approach across courses when editing their learning objectives. Offering faculty development in writing effective learning objectives using your school’s guidelines is another way to support faculty through this process. You may also want to establish a centralized clearinghouse to review learning objectives to ensure quality. This will be especially important if you have multiple authors contributing to your learning objectives.

Again, program-level learning objectives drive the curriculum. Any learning objectives at the course/module level should be driven by your program objectives. However, there are likely some commonalities in the wording/content of learning objectives schools need, and there may be sources you can refer to for sample learning objectives. Some professional societies for clinical areas have recommended learning objectives. For example, the Association of Directors of Medical Student Education in Psychiatry has a Clinical Learning Objectives Guide for Psychiatry Education of Medical Students organized by unit (e.g., “clinical skills”), topic (e.g., “history-taking, examination, and medical interviewing”), and learning objective (e.g., “elicit and accurately document a complete psychiatric history, including the identifying data, chief complaint, etc.”). If the sources are up to date, evidence based, informed by content experts, and well written, it may be more efficient to use them as inspiration rather than starting from scratch. There are also learning objective models per topic area, when available, in national curriculum reports on the CI Portal. As you choose which resources or samples to use or consult, keep a written record for each course/module—this may be helpful for your curriculum committee (or similar oversight body) when conducting curriculum evaluation and course reviews.

**Task 6**: Finalize your course-level learning objectives after additional considerations.

Once edits to the learning objectives are finalized, it is time to link program objectives to course objectives. This applies to all courses, clerkships, and modules—to whatever you have included in your CI using the course/module concept as more fully described in the CI Technical User Guide.

It may be helpful to establish thresholds for what warrants a link between a course objective and a program objective—if a very broad approach is taken, such that every course objective is linked to many program objectives, it may be difficult to identify your curriculum content in reports. At least one link between each course-level learning objective and a program objective should be documented.

At this point, you should evaluate if any gaps are identified. Are there course-level learning objectives that do not relate to a program objective? Are there any program objectives with few or no course-level learning objectives to link to? It will be helpful to address these gaps now, before further CI content is developed, as a school’s program objectives and related learning objectives drive content. Keep in mind that number of learning objectives is not necessarily equal to amount of exposure; what matters at the end is not the amount of objectives but the overarching representation of their
content at the program level that fits with the school’s mission and vision.

**Task 7**: Create links between program-level and course-level learning objectives, and address any gaps identified.

If you have nested your program objectives in domains (e.g., patient care, knowledge for practice, etc.), it may be helpful to monitor all the course objectives linked up to each domain for breadth and depth. The goal is not necessarily to have an equivalent amount of content in each program objective domain but to make sure the spread of content is intentional.

This also is the time to choose whether you will assign ID codes to each course learning objective. Recall the use of meaningful ID codes described in Chapter 3 when discussing program objectives. The same principles can now be applied if you choose to design a meaningful system for course-level learning objective ID codes.

**Task 8**: Analyze how your course-level learning objectives link up to your program objective domains (if you have them) and consider assigning ID codes to each course-level learning objective.

**Chapter 5 key questions**

1. Do each of our courses, clerkships, modules, and threads have a title? Have we documented whether they are required or optional? Have we documented their start dates, end dates, and durations in days?

2. Have we created a typical course, or some other approach that will accurately and completely model our curriculum, for our rotational courses such as clerkships? Do we have any integrated clerkships to model in our CI? How can we leverage the “nested” course/module approach to document these clinical learning experiences?

3. Do we have a list of all our optional courses, modules, clerkships, etc., including optional electives? Do we have any for which the selective model (some choice in what students can choose, but limitations on those choices) applies, such as sub-internships? What modeling strategy will we use to completely and accurately represent the breadth of what our curriculum offers and the experience of a typical, hypothetical student?

4. For our course/module-level learning objectives:
   a. Are there documented learning objectives for each course/module?
   b. Do the learning objectives reflect the content of the course/module?
   c. Do the objectives reflect relevant and up-to-date medical and other literature?
   d. Are the learning objectives written in descriptive, specific, outcomes-based language?
   e. Have we consulted our content experts for their input on the learning objectives?
   f. Do these learning objectives add up to meeting our school’s program objectives?
   g. Are these learning objectives the right degree of difficulty?
h. Do these learning objectives build upon each other over time?
i. Are these learning objectives aligned across our courses/modules?
j. What are our school’s standards and guidelines for writing learning objectives, and how are we disseminating that information to our faculty?
k. How are we ensuring consistency in the quality of our learning objectives across courses/modules and across multiple authors?
l. Have we consulted any sample or model learning objectives, such as those from clinical professional societies?
m. Does each course/module learning objective have at least one link to a program objective? Have we identified any gaps based on these links that need to be addressed?
n. If our program objectives are nested in domains, does our coverage of content for breadth and depth play out as expected?
Chapter 6: Maintaining and using your CI from year to year

Chapter 6 highlights

- Internal uses of CI data and ongoing resources
- Internal procedures and oversight bodies
- Centralized and decentralized processes

Internal uses of CI data and ongoing resources
Recall the discussion of your school’s motivations and goals for having a CI, identified in Chapter 1. Once your CI is established, your school may have a variety of uses for your data that align with the motivations and goals you earlier identified. Possible uses of data include:

- **Program evaluation**: evaluating the amount of student time spent in each domain of content; evaluating the overall mix of instructional and assessment methods; identifying gaps or unintentional redundancies in the curriculum; evaluating the progression of learning objectives from events to courses and, ultimately, to the program objectives; etc.
- **Course evaluation**: evaluating the alignment of course objectives, instructional methods, and assessment methods; evaluating the number, duration, and content of teaching events; etc.
- **Accreditation support**: using CI data to populate accreditation forms, identifying curriculum weaknesses to address before a site visit, maintaining accreditation standards, etc.
- **Continuous quality improvement**: evaluating progress towards meeting a curricular goal, such as increasing the amount of CBL in the curriculum; identifying degree of integration of curricular threads throughout multiple courses; etc.
- **Curriculum renewal**: identifying areas where new curriculum content can be placed and less relevant curriculum content can be discontinued, etc.
- **Curriculum benchmarking**: comparing the percentage of your curriculum’s time spent in lecture to national norms, comparing the percentage of your curriculum’s time spent in simulation to national norms, etc.

Perhaps you plan to use CI data to complete accreditation forms or demonstrate accreditation compliance. When medical schools think about accreditation, the LCME for MD schools and the AOA COCA for DO schools are usually the first types that come to mind. However, there may be additional accrediting agencies for which you find CI data useful. For example, the Higher Learning Commission accredits universities in a select number of US states; it may be that your university’s accrediting needs can be supported by your medical school’s CI.

Perhaps your school wishes to establish a baseline for future curriculum renewal and change or your curriculum committee would like to choose an annual goal for its curriculum review.

Outlining how you plan to use your CI data for a variety of purposes will help determine which institutional stakeholders need to utilize it and, therefore, what kinds of procedures to maintain and update it are required.
Because a curriculum is adapting and changing all the time, having an accurate and complete CI at any given point is a tall (or perhaps impossible) order. It could be that yesterday, your CI was perfectly accurate, but today, one faculty member has to adapt learning objectives in their lecture to the students’ needs and, as a result, edits to your CI are necessary.

Edits to your CI will occur on a regular basis because of these natural and necessary changes to the curriculum. The CI is not an effort where you can build it and forget it—it will require attention and resources on an ongoing basis. As your CI matures from one year to the next, so too will the amount of data grow, such that eventually year-to-year comparisons of your curriculum will be possible. The thorough documentation you do now will facilitate analysis of curriculum change over time.

By identifying all the ways in which your school wishes to use CI data, as well as all the regular reviews and updates that will be needed for your CI data, you can plan the ongoing resources that will be necessary to maintain it. Those resources will include curriculum faculty and staff, IT infrastructure and staff, and software licensing (if applicable).

**Task 1:** Refer to your CI motivations and goals from Chapter 1 and identify all your school’s uses for CI data. One of these uses is annually sharing CI data with the AAMC.

**Internal procedures and oversight bodies**
The guidebook chapters you have reviewed thus far should have given you a sense of the kinds and amounts of data you will be managing. While perfection may not be attainable, it is possible to establish internal procedures and processes to maintain your CI.

The most direct method to ensure that the CI is regularly updated and utilized is to incorporate it into your curriculum procedures and overseeing bodies. For example, consider how and how often the following groups may need to review, update, and utilize data from the CI:

- Your medical education and/or dean’s office;
- Your curriculum leaders and administrative staff;
- Your curriculum oversight bodies, such as a curriculum committee;
- Your course directors and curriculum planners; and/or
- Your teaching faculty.

There may also be stakeholders who could benefit from some synthesized CI data reports but are not responsible for contributing to the CI, such as your students, applicants, or institutional leaders. It is up to you to determine how you wish stakeholder groups to have knowledge or awareness of portions of your CI.

**Task 2:** Identify which stakeholder groups and existing bodies and procedures need access to CI data and/or reports.

From outlining how you wish these groups to use CI data, you may find that additional or different oversight bodies or procedures are required. For example, perhaps your current course evaluation
process does not incorporate all the CI data fields you would like to review, and so, the course evaluation form needs to be edited. Perhaps your curriculum committee’s policies and procedures need to be updated to incorporate CI data into its decision-making processes. Are your curriculum committee’s existing membership, charge, and cadence of meetings sufficient to utilize CI data? There may be some aspects of the CI data that are more efficiently reviewed asynchronously via reports or visualizations and other aspects for which a committee meeting or longer retreat would be best.

It may be useful to consult scholarly literature around curriculum committee management, as well as reviewing school samples of curriculum committee governance, policy, and procedure documents. These resources are available in the virtual Curriculum Community library collection for “Curriculum committee policy, practice, and governance.”

**Task 3:** Identify any different or additional oversight bodies or procedures that need to be updated to include use of CI data and reports.

Over time, your CI data will comprise thousands to millions of data points, and it may not be efficient or necessary for an overseeing body to review every aspect of your CI. It will, however, be necessary for someone to review and ensure the accuracy of each component of your CI. Once you answer the questions above, you will have a sense of who needs which parts of your CI and when. Then, you can develop your CI maintenance procedures to ensure that your CI data is accessible and up to date for each of your stakeholder needs.

We recommend outlining each piece of CI data, who is responsible for updating it, and how often. It also may be helpful to outline your existing curriculum evaluation documents (e.g., course evaluation forms), procedures (e.g., curriculum committee reviews), and meetings to determine which ones need to be adjusted to include CI data.

**Task 4:** Identify a person/role responsible for updating each piece of CI data, and document how often the CI data needs to be updated.

**Centralized and decentralized processes**

In Chapters 1 and 5, we alluded to centralized and decentralized approaches to collecting and reviewing CI data. Now that you have worked through more aspects of how you will build and use your CI data, it is time to make decisions about the degree to which your school will have a centralized and/or decentralized process.

In a decentralized approach, curriculum data comes from a variety of sources and people. The decentralized approach is a more distributed model. Its chief advantage is that those with the most knowledge of and familiarity with a given aspect of the curriculum have a hand in its documentation. For example, the course directors and curriculum coordinators responsible for an area of the curriculum may be asked to provide all the CI data points relative to their areas of responsibility. The chief disadvantage of the decentralized approach is that there may not be consistency across the curriculum when different authors provide data. For example, different faculty members may write
learning objectives with varying degrees of detail. If the curriculum data lives in a variety of places, such as presentation slides, syllabi, student schedules, and more, which version is the master copy? How can you ensure consistency across documents when CI data is changed?

In a centralized approach, the collection (and to some degree, the writing) of curriculum data is in the hands of a few individuals, typically staff in the medical education or dean’s office. The chief advantages of the centralized approach are control and consistency. The medical education office knows where the master set of data is, and any changes to the CI are tightly controlled and overseen to ensure quality. For example, before a course objective can be changed, someone will need to determine whether the previous program objective relationships still fit, whether the previous event objective relationships still fit, whether the instructional and assessment methods still fit, and more. The chief disadvantage of the centralized approach is that it does not bring content experts and others who would benefit the CI data into the development and oversight process.

There is more than one right way to oversee your CI data, and different schools have opted for both centralized and decentralized approaches. To some degree, the approach you choose will depend on your school’s organizational structure and staffing model. It may even be the case that a careful mix of the two approaches to overseeing your curriculum data can promote the advantages of both while mitigating their disadvantages.

**Task 5:** Determine what type of oversight model (whether centralized, decentralized, or a hybrid of both) you will employ to maintain your CI data.

**Chapter 6 key questions**

1. Recall the list of motivations and goals we identified for our CI in Chapter 1. Identify all our school’s uses for CI data.

<table>
<thead>
<tr>
<th>Uses for CI</th>
<th>How we will use CI data for this purpose at our school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program evaluation</td>
<td></td>
</tr>
<tr>
<td>Course evaluation</td>
<td></td>
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<tr>
<td>Accreditation support</td>
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<tr>
<td>Continuous quality improvement</td>
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<tr>
<td>Curriculum renewal</td>
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<tr>
<td>Curriculum benchmarking</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>
List all our current curriculum oversight bodies, including their meeting cadence, and our curriculum governance documents (e.g., course evaluation forms). Gathering this information here will help inform the following questions in this chapter.

<table>
<thead>
<tr>
<th>3. Stakeholder group</th>
<th>How is this group going to use our CI data? What kinds of CI data? How often?</th>
<th>What internal procedures or oversight bodies can we incorporate?</th>
<th>What is this group’s role in updating the CI data regularly?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Curriculum committee</td>
<td>Example: Our curriculum committee evaluates program objectives once per year. This includes program objective language, coverage of program objectives by domain, distribution of program objectives coverage across phases and courses, links of program objectives to PCRS, etc.</td>
<td>Example: We will edit our curriculum committee policies and procedures to specify that review of program objectives in our CI data is part of the committee’s charge. Administrative staff will be responsible for gathering and sharing the data prior to the meeting.</td>
<td>Example: Changes to the program objectives can only be made with the curriculum committee’s approval. The curriculum dean maintains the program objectives in our CI.</td>
</tr>
</tbody>
</table>

Curriculum leaders

Administrative staff

Curriculum oversight bodies

Course directors and curriculum planners

Teaching faculty

Students

Applicants

Internal stakeholders

Other
4. Now that you have completed the table above, are there any additional curriculum procedures or documents that need to be added or edited to include CI data collection and/or review?

5. Going back to the list of CI data points our school will collect, which we identified in Chapter 1, ensure that each data point has a point person responsible for maintaining it. An example of how this could look is provided here:

<table>
<thead>
<tr>
<th>CI data point</th>
<th>Faculty or staff person responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course objectives</td>
<td>Course director is responsible for edits; curriculum coordinator is responsible for communicating updates to curriculum dean. Course objectives are finalized minimally 3 months prior to start of course. Course objectives, including updates, are reviewed in the monthly curriculum subcommittee meetings.</td>
</tr>
<tr>
<td>Event instructional methods</td>
<td>Medical education office’s instructional designer is responsible for working with course director and teaching faculty; curriculum coordinator is responsible for communicating updates to curriculum manager. Event instructional methods are finalized minimally 1 month prior to start of course. Event instructional methods are reviewed in the weekly dean’s office operational meetings.</td>
</tr>
<tr>
<td>Event keywords</td>
<td>Course director is responsible for tagging keywords to events within their course using the AAMC CI Keywords list; curriculum coordinator is responsible for communicating updates to curriculum manager. Event keywords are finalized minimally 1 week prior to start of course. Keyword reports are reviewed in the monthly curriculum committee meetings.</td>
</tr>
</tbody>
</table>

6. What ongoing resources, including faculty and staff, protected time, IT infrastructure, IT staff, software licensing, and more, are needed to maintain the CI, given how we wish to update the use of the data?

7. Will we have a centralized, decentralized, or hybrid approach to managing our CI data? Please describe in detail.
Chapter 7: Documenting time

Chapter 7 highlights

- Documenting scheduled and unscheduled content
- Study time and other pre-/post-activity work
- Clinical learning
- Other unscheduled curriculum content
- Beginning details for events

In this chapter, we will be highlighting some instructional methods that touch on documenting scheduled and unscheduled curriculum content. A complete list of instructional methods is available in Appendix I. We will explore instructional methods further in later chapters. Please also recall the discussion of time, in terms of duration (e.g., days) for course/modules described in Chapter 2 of this Guidebook.

Documenting scheduled and unscheduled content
The AAMC CI’s content is primarily sourced from data typically found in a CMS or LMS, which often includes student calendaring and scheduling features. The details from the calendar feed into the CI, bringing details about learning events such as the amount of time spent, the instructional methods, the learning objectives, and more. CI data can also come from a system that does not include student calendaring features, but in either case, a large amount of CI data is tied to events, whether for learning, assessment, or both. For events that have a date and time, including them in the CI is straightforward—scheduled lectures, workshops, simulations, etc. have a date, start time, and end time.

However, there may be curriculum content that is not so neatly scheduled. We want to acknowledge that documenting unscheduled content in your CI is challenging. It will be important for your school to decide on a consistent approach to capture not only the scheduled but also the unscheduled curriculum content. Below are a few scenarios to consider.

**Task 1**: Identify which portions of your curriculum are unscheduled and not visible on a student calendar and thus may need a special approach to be included in your CI.

Study time and other pre-/post-activity work
One common example of protected study time is that occurring prior to high-stakes assessments, including concentrated time to prepare for licensing exams. Time like this may be more straightforward to include in your CI if it has set dates and durations.

Another example is the studying during off-hours that students are often responsible for. This may be studying assigned to the students as part of the curriculum. For example, some instructional methods necessitate that students study on their own to prepare for an upcoming teaching event or assignment. Perhaps the students are participating in a problem-based learning activity and need to do some research to prepare for a patient case discussion. Or perhaps the school is implementing a
flipped classroom model in its instruction and has assigned some prework as independent learning before the classroom session.

Are these types of activities required or optional? Are they scheduled on the student calendar? If so, how do you consistently determine how much time to assign? Is it based on the average amount of time students needs to complete the independent learning assignment or some other threshold? If these types of activities are not calendared, why not? If the answer to this question is “Because there is no room on the calendar,” it may prompt your school to consider whether the amount of required content planned for the students, including scheduled and unscheduled curriculum activities, is feasible.

The advantages to calendaring curriculum activities like those described above is that (1) they will be easier to pull into your CI, thus giving you a more complete picture of your curriculum, and (2) the amount of students’ required curriculum activities will be visible and thus easier to manage.

**Task 2:** Determine your school’s approach to documenting study time in your CI.

**Clinical learning**
Some clinical learning activities are scheduled and may be more straightforward to bring into your CI. For example, perhaps students are scheduled for regular preceptorship opportunities.

However, many clinical learning experiences are unscheduled. For example, in an obstetrics and gynecology (OBGYN) clerkship, there may be a series of learning objectives and clinical cases that students complete during a 6-week rotation. Students within the cohort might have different schedules and different learning experiences on any given day. Ultimately, though, each student will meet the clerkship requirements by the end of the rotation.

There is more than one right way to represent this curriculum in your CI; school examples in the Building Better Curriculum webinar series may be useful to see various approaches schools take in documenting time. One approach is to group clinical learning time according to how many total hours students have spent in clinical time during a given week (e.g., 60 hours), so that the clinical time in the clerkship overall approximates the average student experience.

Solving this issue is an opportunity to bring content experts (in this example, clerkship directors) into the curriculum mapping process so that they can advise on the appropriate amounts of time spent in unscheduled clinical learning. Whatever approach you follow, it is important to choose a system you can implement consistently across clinical content and courses so that clinical learning is represented accurately in your CI.

**Task 3:** Determine your school’s approach to documenting clinical unscheduled time in your CI.

**Other unscheduled curriculum content**
Beyond pre- and post-activity study and clinical learning, there may be other scenarios for unscheduled curriculum activity. For example, perhaps students are assigned a term paper that they
work on throughout a months-long course. How will this be represented in your CI? Perhaps you will enter this kind of assignment in your CI with the assignment due date or the date it was assigned, as well as the approximate number of hours required to complete it. Or you could estimate a certain number of hours per week that students will spend on the paper. What other kinds of unscheduled curriculum activities need to be included in your CI? One of the choices in the CI Standardized Vocabulary list of instructional methods (see Appendix I) is Independent Study, which can be useful for documenting protected study time. It will be helpful to have a consistent approach for documenting unscheduled activities across your curriculum and courses.

**Task 4:** Identify any remaining areas of your curriculum that are unscheduled and determine your school’s approach to documenting these in your CI.

**Beginning details for events**

Now that you have an understanding of the many kinds of unscheduled activities that you need to consider ahead of time, you can make a list of the events and unscheduled activities to include in your CI. You can refer to the list of courses, modules, and threads/themes you created in Chapter 4. For each of these, your list of events and unscheduled curriculum activities will need to include:

- Title,
- Date,
- Start and end times,
- Duration (hours, minutes), and
- The course, module, thread, or theme to which the event should be linked. (In the MedBiquitous CI standards, these organizational buckets are referred to as sequence blocks.)

**Task 5:** Document the title, date, start and end times, duration, and course/module link for each event you are including in your CI.

The goal of the CI, as discussed in Chapter 5, is to represent the curriculum for a typical, hypothetical student. It may be that a single event is listed in your CI more than once if it is experienced more than once by a given student. For example, perhaps there is an event concerning family discussions in the pediatric ICU that students attend once while on the pediatrics clerkship and a second time, intentionally, while on the OBGYN clerkship. Perhaps the students’ learning objectives are tailored to shift focus between child and parent, depending on which clerkship they are currently attending. In this hypothetical scenario, the same event title could be in your CI twice because an individual hypothetical student experiences that event more than once, each time with a distinct purpose.

**Task 6:** Confirm that any events listed more than once in your CI are unique and meant to be experienced more than once by the typical, hypothetical student. Remove any accidental duplicates.

Further details regarding events are discussed in later chapters of this workbook. So, finalizing the list of both scheduled and unscheduled learning to include in your CI now will set you up for success in the upcoming work.
Chapter 7 key questions

1. What unscheduled learning occurs in our curriculum, such as clinical or independent study time? What approach will our school use to document our unscheduled curriculum content? How will we ensure our approach is applied consistently across courses and content?

2. List the scheduled and unscheduled events and curriculum content to include in our CI for each course/module we identified in Chapter 4, along with:
   - Title,
   - Date,
   - Start and end times,
   - Duration (hours, minutes), and
   - The course, module, thread, or theme to which the event should be linked.

3. Are there any accidental duplicate events in our CI list? Are all events listed more than once in our CI truly experienced more than once by a typical, hypothetical student?
Chapter 8: Event learning objectives

Chapter 8 highlights

- Event-level data populates CI reports
- Oversight, quality, and consistency of learning objectives

Events and the details they include are the most numerous aspects of your CI. If you were to arrange your CI data into a shape, it would generally look like a pyramid, with program-level data at the uppermost level, courses and modules (the organizing approach) in the middle, and events making up the bottom and largest level. In Chapter 7, you listed the events and unscheduled curriculum content to include in your CI, including the following information for an event:

- Title,
- Date,
- Start and end times,
- Duration (hours, minutes), and
- The course, module, thread, or theme to which the event should be linked.

Event-level data populates CI reports
The events in your CI are where most of the details that will populate curriculum reports can be found, so specificity and detail in your event-level learning objectives will be critical. For example, if someone were to ask where your disabilities-related content lives, it is unlikely you would have it all tucked neatly into one, and only one, course. More likely, there would be content related to disabilities in various locations across the curriculum (e.g., physical disabilities, developmental disabilities, misconceptions about disabilities, conversations with patients about disabilities, diagnosis of disabilities, community and support organizations for patients with disabilities, physical exam skills applied to patients with disabilities, etc.). To do a comprehensive search of all disabilities-related curriculum content, most of the detail needed to create such a report would be found at the event level, perhaps most especially in the learning objectives. The more thorough and accurate your event-level learning objectives are written, the more accurate data reports will be. A good resource for effective language in learning objectives is the virtual Curriculum Community library collection on “learning objectives”.

Oversight, quality, and consistency of learning objectives
Before you embark on collecting and writing event-level learning objectives, now is a good time to refer back to your school’s consistent documentation practices identified in Chapter 2 to help address acronyms, misspellings, and other data quality issues. It may be useful to consult the CI Keywords List (see Appendix II) when selecting terms, as each term in the keyword list has accompanying synonyms, included, and related terms documented as well. You can also refer to the learning objective approaches you used for your program objectives in Chapter 3 and your course-level learning objectives in Chapter 5. It also may be a good time to consider the school-specific reports (e.g., Verification Report, Accreditation Support Report) you will get once you upload your CI data to the AAMC and to determine where and how your event-level learning objectives will appear; samples
of these reports are available in the CI Technical User Guide.

**Task 1:** Refer to your school’s consistent documentation practices that you identified in Chapter 2, the learning objective writing approach for your program-level learning objectives from Chapter 3, and the course- or module-level learning objectives from Chapter 5. Confirm that your documentation from those chapters is still accurate. Look at the sample Verification and Accreditation Support Reports to examine where your event-level learning objectives will appear.

Recall the details in Chapter 5 about course-level learning objectives. The same writing principles will apply at the event level as you gather (or write) learning objectives for each event in your CI. While collecting learning objectives for each event, you can ask:

- Are these event-level learning objectives written in descriptive, specific, outcomes-based language?
- Do these event-level learning objectives accurately and adequately capture the content?
- Do these event-level learning objectives reflect relevant and up-to-date literature?
- Have your content experts in the relevant fields reviewed these event-level learning objectives? Who needs to be included in your event-level learning objectives’ writing and editing process?
- Can each of these event-level learning objectives be linked up to a course/module-level learning objective for the course/module in which this event occurs? (This will help identify gaps. Be sure to set thresholds as discussed in Chapter 5, so that faculty take a consistent approach and learning objectives are not over-tagged to each other, thus bloating your curriculum reports.)
- Are these event-level learning objectives meeting your school’s goals (e.g., preparing students for licensing exams, etc.)?
- Are these event-level learning objectives the right degree of difficulty, do they build upon previous curriculum content as well as prepare students for future curriculum content in this area, and do any of them duplicate content students have already received? (These are all questions about your learning objective alignment.)
- Now that you have event-level learning objectives documented, does the duration of time assigned to this event (in Chapter 7) still make sense? For example, if, on the calendar, students are attending a 1-hour lecture but there are 80 event-level learning objectives listed for this lecture, something needs to be adjusted. There are no hard and fast rules for how many learning objectives are too many, so discussion among your curriculum leaders can help identify some school-specific guidelines. Perhaps, for a 1-hour lecture, your school may decide that given the amount of detail you expect in your event-level learning objectives, no fewer than five but no more than 15 is reasonable.

**Task 2:** Gather existing event-level learning objectives for each event within your CI, and vet them against the questions listed above.

Whatever approach you choose in your event-level learning objectives, it will be helpful to write out your school’s guidelines and offer professional development so that faculty take a consistent approach across courses when editing their learning objectives. For example, when students are learning to perform a physical exam, will you have a learning objective on every single maneuver, or will the maneuvers be listed in your assessment rubric while the learning objectives are written more broadly (e.g., the abdominal exam)? The approach you take in one area (e.g., X content goes in the
learning objectives, Y content goes in the assessment rubrics) could be applied across courses. You also may want a centralized process to review quality and consistency of learning objectives. This will be especially important if you have multiple authors contributing to them.

**Task 3:** Determine your school’s approach regarding level of detail and formatting for event-level learning objectives as well as how to vet drafted learning objectives for quality.

If you find any gaps or need to make edits to your learning objectives, be sure to complete that step now, before moving on to Chapter 9, as there you will be using your event-level learning objectives to document instructional and assessment methods and resources. This is also the time to choose whether you will assign ID codes to each event-level learning objective; recall the details in Chapters 3 and 5 regarding creating a meaningful ID code system for learning objectives.

**Task 4:** Write and/or edit event-level learning objectives to ensure quality, accuracy, and completeness and to address any curricular gaps identified. Complete links between event-level learning objectives and course-level learning objectives and assign ID codes as desired.

**Chapter 8 key questions**

1. Gather our list of events and unscheduled curriculum activities to include in our CI from Chapter 7. Do we need to make any edits to this list before we proceed?

2. Gather our consistent documentation practices that we identified in Chapter 2. Do we need to make any edits to these before we proceed?

3. Review the sample school-specific reports in the CI Technical User Guide. Knowing how our event-level learning objectives will be visible in reports, is there anything we want to adjust about our current event-level learning objective documentation practices before we proceed?

4. Recall the course/module-level learning objective principles we identified in Chapter 5. Are there any further principles or resources we need to identify before we proceed? What will be our centralized process for ensuring quality and consistency across faculty and courses? Can we offer resources and/or professional development about writing learning objectives to our faculty?

5. For each event, the following questions can help in writing or vetting our event-level learning objectives:
   - Are these event-level learning objectives written in descriptive, specific, outcomes-based language?
   - Do these event-level learning objectives accurately and adequately capture the content?
   - Do these event-level learning objectives reflect relevant and up-to-date literature?
   - Have our content experts in the relevant fields reviewed these event-level learning objectives? Who needs to be included in our event-level learning objectives’ writing and editing process?
• Can each of these event-level learning objectives be linked up to a course/module-level learning objective for the course/module in which this event occurs?
• Are these event-level learning objectives meeting our school’s goals (e.g., preparing students for licensing exams, etc.)?
• Are these event-level learning objectives the right degree of difficulty, do they build upon previous curriculum content as well as prepare students for future curriculum content in this area, and do any of them duplicate content students have already received?
• Now that we have event-level learning objectives documented, does the duration of time we assigned to this event (in Chapter 7) still make sense?

6. Have we addressed all the identified gaps, and are there any further event-level learning objective edits needed before we proceed?

7. Will we assign ID codes to each event-level learning objective, and if so, what will our system be?

8. What will our process to update our event-level learning objectives from year to year be? Make sure we have identified this area of our CI in our Chapter 6 maintenance plans.
Chapter 9: Instructional methods, assessment methods, and resources

Chapter 9 highlights

- Alignment among learning objective, instructional method, assessment method, and resource
- Standardized vocabulary
- Technical rules
- School-specific guidelines

Alignment among learning objective, instructional method, assessment method, and resource

Now that you have your list of events and unscheduled content from Chapter 7 and have written and/or collected event-level learning objectives for each in Chapter 8, it is time to assign instructional methods, assessment methods, and resources to each event as applicable.

The learning objective language, especially the verb choice, will drive the selection of instructional and assessment methods, which in turn will drive the choice of resources. As an example, if your event-level learning objective begins with the verb *discuss*, your teaching and assessment approach will likely need to include some opportunity for communication, whether through verbal discussion or writing. If your event-level learning objective begins with the verb *demonstrate*, your teaching and assessment approach will likely need to include some opportunity for performance. The learning objective, instructional method, and assessment method should work in harmony together. Once you have identified the instructional and assessment methods you would like, you can select which resources you will need to support them.

**Task 1:** Review how the language of a learning objective, especially the verb choice, directs the selection of instructional and assessment methods and, in turn, resources.

Standardized vocabulary

A list of all possible choices for instructional methods, assessment methods, and resources is available in the CI Standardized Vocabulary document in Appendix I. This common set of instructional methods, assessment methods, and resource types enables aggregate curricular reporting; thus, use of this document is required to upload your CI data to the AAMC.

There are some instructional and assessment methods that fit together more directly. For example, instructional method IM012: Laboratory is a natural fit with assessment method AM019: Exam–Institutionally Developed, Laboratory, Practical, although this is not the only assessment method you could pair with a laboratory teaching experience. If you choose IM012: Laboratory for your instructional method and AM019: Exam–Institutionally Developed, Laboratory, Practical for your assessment method, perhaps the resource to pick to support these would be RE004: Cadaver.

Within the CI Standardized Vocabulary document, each term (e.g., *concept mapping*) comes with an ID code (e.g., IM004) that must be used along with it in your CI submission. Each term also comes with a definition, references, synonyms, and clarification of related terms that are not included in the definition. For a successful data upload, your CI submission can include only the terms found within
this document regarding instructional methods, assessment methods, and resources.

**Task 2:** Review the CI Standardized Vocabulary list for instructional methods, assessment methods, and resources.

**Technical rules**
From a technical perspective, the rules about how you can tag the instructional methods, assessment methods, and resources are available in the CI Technical User Guide. There are also questions and answers related to instructional methods, assessment methods, and resources in the Frequently Asked Questions. Below are some highlights about what is allowable with instructional and assessment methods and resources. How these technical rules are implemented can vary per technical platform.

- You can have more than one instructional method, and more than one instance of the same instructional method, per event.
- If more than one instructional method is assigned to an event, one of them must be marked as primary. How you choose the primary instructional method will impact your school-specific reports, such as the Verification Report.
- You can have more than one assessment method, and more than one instance of the same assessment method, per event.
- Each assessment method must be tagged as either formative or summative.
- You can document both instructional and assessment methods within a single event or document them separately. How you document your assessments will impact your school-specific reports, such as the Verification Report.
- You can have more than one resource, and more than one instance of the same resource, per event.

From a curriculum design perspective, recent trends in medical education have included the increasing integration of curriculum topics (e.g., clinical and basic science content) and the use of active learning approaches. As these trends continue, you may find that multiple instructional approaches occur within a single event.

**Task 3:** Review the technical requirements for use of instructional and assessment methods and resources, as well as sample Verification and Accreditation Support Reports, to see where this data will populate in your own school reports. These are available in the CI Technical User Guide.

**School-specific guidelines**
Establishing your school’s guidelines will be helpful in assigning instructional and assessment methods and resources so that tagging across courses can be consistent. It will be especially important if there are multiple faculty and staff providing these tags. For example, perhaps your curriculum has a series of 2-hour events across several courses that use a team-based learning (TBL) model (IM026), but the content of the TBL focuses on patient cases. Does this situation qualify also as case-based instruction/learning (CBL, IM001), such that all of these 2-hour events should be tagged with both IM026 and IM001? Possibly so, but it will be important to have a centralized process to
make these kinds of decisions and communicate them to your faculty and staff so that tagging practices are consistent. This centralized process could include professional development for your faculty and staff. Your technical platform may allow you to allot the amount of time spent per instructional method—this is not required in your CI submission, but it can be useful for internal curriculum management purposes.

Another example where school-specific guidelines and approach to documentation are important relates to instruction and assessment that, for any given student, occur on different days. Recall our consideration of unscheduled events from Chapter 7. With licensing exams, for instance, each student ideally takes the exam once, and so, the typical, hypothetical student represented in your CI should have the licensing exam (e.g., AM006: Exam–Licensure, Clinical Performance or AM007: Exam–Licensure, Written/Computer-based) listed once in your CI. However, in reality, each student takes the licensing exam on a different day. How will you represent this event and assessment method in your CI? The first day the licensing exam is offered? The last day students can take it? Establishing your school’s approach to documenting these assessments will help ensure consistency across your curriculum.

**Task 4:** Determine your school-specific guidelines for assigning instructional methods, assessment methods, and resources to each event, and tag the events in your CI accordingly.

**Chapter 9 key questions**

1. Do we have our list of events and unscheduled content, along with learning objectives, from our work during Chapter 8? Have we reviewed the CI Standardized Vocabulary (see Appendix I) with all the possible choices for instructional method, assessment method, and resources?

2. What instructional and assessment methods will best align with the learning objectives for each event? What resources are needed per event to support our instructional and assessment methods?

3. What are our school-specific guidelines for dealing with cases where multiple methods (e.g., TBL and CBL) may apply or where students may experience a given event and method (e.g., licensing exam) on different days?

4. Have we followed all the technical rules in the [CI Technical User Guide](#) (e.g., choosing one instructional method as primary per event, tagging each assessment method as formative or summative, etc.)?

5. What resources or professional development will we provide to our faculty and staff to ensure consistent assignment of instructional and assessment methods and resources across content?

How will we ensure the accuracy of our instructional and assessment methods and resources from year to year? (Be sure this element of our CI was included in our maintenance plans from Chapter 6.)
Chapter 10: Keywords

Chapter 10 highlights

- Reasons and goals for tagging keywords
- Your school’s implementation plan
- Standardized keyword list

Using keywords to tag content within your CI can help you search your curriculum through queries and produce reports so that you can more easily use your CI data. Your technical platform may have additional methods by which you can tag and search your CI, but the use of keywords is one approach that is both within the CI standards and shared back with your school in your Verification Report. Use of the AAMC CI Keywords are recommended although not required – a school could choose to use the AAMC CI Keywords and supplement with their own keywords as needed. These are available in Appendix II.

Reasons and goals for tagging keywords

There are multiple ways you can utilize the results from a search using keywords—for instance, your curriculum committee may wish to analyze the amount and location of content in the curriculum for various content areas. Thinking about the purpose of your keywords and how you want to use their search results can drive your choices of keywords and how you apply them. Perhaps you wish to generate reports for your curriculum committee, prepare for an accreditation site visit, inform students where content relevant to a licensing exam is in your curriculum, etc.

Some schools use a very detailed approach, such that there are thousands of terms in their customized keyword list, or rely on a standardized list, e.g., the Medical Subject Headings of the United States National Library of Medicine. Other schools take a very high-level approach, with fewer terms in their keyword list. Still other schools may do both, having a very high-level but also very detailed hierarchical keyword list. The approach you choose should align with your goals for how you plan to use your keyword list results.

It is important to prioritize what you and your faculty and staff will have time to maintain. Every element you tag in your CI in detail creates a field that must be regularly monitored and updated. It may be that a keyword list of thousands of terms is your first choice, but a shorter keyword list is more feasible given your school’s resources and ability to maintain your CI data from year to year.

Task 1: Determine your school’s goals for use of keyword-tagged CI data and consider what resources your school has to maintain that data from year to year.

Your school’s implementation plan

Who is going to do your keyword tagging? With some aspects of your CI, you may be able to delegate the data collection to your staff. For example, curriculum coordinators may be the most knowledgeable about student classroom time. With keywords, however, a certain amount of content expertise is required, which may mean involving different faculty members per content area. At the
same time, you will want to have a consistent approach so that your reports are reliable; recall Chapter 6’s discussion of a centralized versus decentralized process for collecting and vetting your CI data.

For instance, what counts as interpersonal and communication skills and therefore warrants a keyword tag in this area—is it if there is discussion during class, if the word communication is in the event title, if the learning objectives focus on the development of communication skills explicitly, etc.? If the faculty are very generous with what counts as interpersonal and communication skills content and thus over-tag with keywords, the resulting search queries and reports may be difficult to use.

Task 2: Determine who at your school will do the keyword tagging, how thresholds will be set to prevent over- or under-tagging, and how you will ensure consistency in approach across potentially multiple keyword taggers.

Standardized keyword list
The recommended approach is to use the AAMC CI Keywords. This high-level keyword list is relatively short (i.e., fewer than 100 terms) and provides instructions regarding how to set a threshold for what content warrants a keyword tag. The approach taken to creating the keyword list, as well as what it is and is not intended for, is further detailed in the keywords instructions.

It may be helpful to review the AAMC CI Keywords instructions together with your faculty to ensure consistency. Just as you would gather your faculty to confirm understanding before implementing an assessment rating scale, they can similarly be brought together to ensure common understanding of the keyword implementation.

The AAMC CI Keywords is informed by the literature and considers several data sources. However, its use is optional; you can use additional or alternate terms as you desire. Your technical platform may allow you to tag keywords at various levels (program, course, event) of the curriculum, but for AAMC CI purposes, please tag at the event level.

Task 3: Review the AAMC CI Keywords and instructions.

If you choose to create your own keyword list or have each faculty member choose any keywords they would like, there may be some issues to resolve:

- What degree of detail do you want to drill down to for your keywords? Is a high-level list sufficient?
- What data sources will you use for your keywords?
- How will you define each of your keywords?
- At what level will you tag your keywords (e.g., event, course)?
- What thresholds will you set so that keywords are tagged consistently across content?
- How will you control for terms with the same meaning (e.g., hypertension vs. high blood pressure)?
• How will you control for capitalization, plurals, and spelling (e.g., Knee, knees, kneees)?
• How will you maintain your keyword list from year to year?

**Task 4:** Determine your keyword list (the recommended approach is to use the AAMC CI Keywords), and tag each event within your CI.

**Chapter 10 key questions**

1. What are our school’s goals for the use of our CI data once we have tagged events with keywords? What kinds of reports do we want to be able to create and for what purpose?

2. Who will do our keyword tagging? How will we include our content experts but also have a centralized process to ensure the accuracy of our keyword tags?

3. Do we need to supplement the AAMC CI Keywords? If so, how will we choose those terms and execute them?

4. What kind of faculty and staff development can we provide to ensure our keyword tagging is consistent across content areas?

5. How will we maintain our keyword accuracy from year to year? Be sure this element of our CI data is included in our maintenance plans identified in Chapter 6.
Chapter 11: Test your CI upload

Chapter 11 highlights

- The CI Portal and CI Portal User Guide
- Begin testing with one piece of the curriculum
- Technical specifications and business rules

The CI Portal and CI Portal User Guide

The CI Portal is the site where schools:
- Annually upload their previous year’s CI data to the AAMC (Portal open between August 1 – October 21),
- View reports, and
- Test upload data for accuracy and completeness (Portal open for testing throughout the year, although there may be periodic closures for enhancements).

This testing can be thought of as a sandbox or playground where schools (and their vendors) can test-upload data to try different approaches. More information regarding functionality of the CI Portal is available in the CI Portal User Guide.

**Task 1**: Read the CI Portal User Guide.

If they have not already done so, it is important for your key faculty and staff involved with the CI, as well as those who wish to view reports, to gain access to the CI Portal. Instructions for how to access the site, plus differences between the various faculty roles available, are located in the CI Portal User Guide. It is important to have faculty and staff access completed by June 1 annually, as this is the date that the first automatic emails from the CI Portal begin.

**Task 2**: Ensure the correct faculty and staff have access to the CI Portal.

Begin testing with one piece of the curriculum

Once you have access to the CI Portal, it is recommended to test-upload one piece of your curriculum (e.g., one course) to see which (if any) standards or business rules are not met. The test-upload approach is recommended because if there is something not quite right about the way a curriculum has been documented, it is preferable to identify that with one course, before the rest of the courses are also documented. If you wait to test your data until the CI Portal opens on August 1, sufficient time may not be left to correct any errors before the CI Portal closes on October 21.

As long as the one piece of your curriculum you test-upload meets the standards and business rules, it can be uploaded to the CI Portal and generate your school’s Verification and Accreditation Support Reports. You can then review those reports to ensure the data has populated the tables as expected and represents your curriculum accurately and completely.

The earliest you can test a piece of your curriculum in the CI Portal would be once you have content from Chapters 1-9 of this workbook ready for a portion of your curriculum. If you were to try to test-
upload only your program objectives from Chapter 3, for example, you would encounter standard and business rule errors because your CI data file would be missing required content from courses and events.

**Task 3:** Test-upload your curriculum (perhaps beginning with one piece of curriculum) in the CI Portal.

**Technical specifications and business rules**
Recall in Chapter 1 that you explored the CI technical components. The MedBiquitous specifications govern the structure and content of CI data. The AAMC CI Business Rules add caveats to the specifications, such as limitations on word counts. The AAMC’s application of the MedBiquitous standards for CI purposes, as well as the AAMC CI Business Rules, can be found in the CI Technical User Guide.

Keep in mind that if you are using a CI participating vendor, rather than an institutionally developed system, your vendor also has access to the CI Portal to assist you. More information about vendor use of the CI Portal is located in the CI Portal User Guide.

If the file you test-upload in the CI Portal does not meet the MedBiquitous specifications or has problems in how it is formed, the CI Portal will not allow you to progress to the next phase (e.g., testing your data file against the AAMC CI Business Rules). Once the MedBiquitous specifications are met, the CI Portal will vet your CI data file (in XML) against the business rules. If any business rules are not met, an error report with an exportable Excel file will be generated describing the errors that have occurred. You can then edit your CI data file in your technical platform and try uploading a new CI XML data file. Once you resolve the technical specification and business rule errors, you can add more of your curriculum to your test file so that eventually the entire curriculum is included in your test upload.

Only when both the standards and the business rules have been met is a Verification Report generated. It is normal to encounter technical specification and business rule errors that need to be resolved in the upload process. Even schools that have been uploading to the AAMC CI for years encounter errors because specifications and business rules evolve, technical platforms are enhanced, curriculum content and documentation practices change, etc.

**Task 4:** Review the technical specifications and business rules and resolve any errors. Upload a new CI XML data file until all the standards and business rules are met and the Verification Report populates accurately and completely to represent your curriculum.

**Chapter 11 key questions**

1. Do all our key faculty and staff concerned with the CI have access to the CI Portal as needed? Have we all read the CI Portal User Guide, and do we all understand the purpose and functions?

2. Have we identified a piece of our curriculum we want to test that has content documented from Chapters 1-9 of this workbook at a minimum?
3. Have we communicated with our IT staff and/or vendor to explain our goals and timeline for testing CI data in CI Portal prior to the upload beginning on August 1?

4. Have we reviewed the technical specifications and business rules in the CI Technical User Guide?

5. Have we resolved any errors in our data file? Have we added additional curriculum content to test so that we have a CI data file that meets the technical specifications and business rules and accurately and completely represents our curriculum?

6. Are our Verification and Accreditation Support Reports populating as expected? Are there any blanks or missing data we need to address?
Chapter 12: Explore the AAMC CI Portal and reports

Chapter 12 highlights

- CI Portal features
- Curriculum reports
- Reflect on your CI-building process and outcomes

CI Portal features
In Chapter 11, you read the CI Portal User Guide and ensured that faculty and staff who need access to your CI data and reports have accounts for the CI Portal. The majority of helpful text regarding the CI Portal can be found in the CI Portal User Guide. While the CI Portal does not open for data uploads until August 1, users are able to consult it throughout the year to access reports.

- **Upload:** Not all users have the same abilities and views in the CI Portal. Some users (e.g., vendors) have view-only access for a given school, while other roles (e.g., curriculum deans) have edit access. Your view of the upload tab will vary depending on your role.

  The upload tab is where a school can upload a CI data file and view the Verification and Accreditation Support Reports it generates. Within the upload tab, there is also an activity history, which documents each action, date, and user for all key actions occurring in the CI Portal (e.g., file uploaded, errors generated, etc.).

  Remember that only the curriculum dean can officially verify your school’s Verification Report, which officially submits your data to the AAMC.

- **Reports:** Schools can view a number of curriculum reports, including:
  - Past Verification Reports (up to the last 10 years),
  - Past Accreditation Support Reports (up to the last 10 years),
  - National curriculum reports (e.g., geriatrics, pain management, etc.), and
  - The Curriculum Inventory (CI) Data Tool, an Excel-based annual report designed to make national curriculum data accessible to curriculum deans in a self-serve manner. More information about the Curriculum Inventory Data Tool can be found in our FAQs.

Please note the terms of usage for the CI Portal and its reports detailed in the CI Portal User Guide.

**Task 1:** Explore the CI Portal features, including the help section, upload and activity history, and available reports.

Curriculum reports
In addition to the school-specific (e.g., Verification and Accreditation Support Reports) and aggregate national reports available in the CI Portal, there are also a number of publicly available reports on the Curriculum Reports website. These reports come from two sources: the AAMC CI and the Liaison Committee on Medical Education (LCME) Annual Medical School Questionnaire, Part II.
Many of the curriculum reports on the website have interactive features (e.g., drop-down menus), and all are printable and downloadable with raw data. Each curriculum report also has additional scholarship links to Academic Medicine, MedEdPORTAL, and PubMed, which provide prefiltered search results relevant to the content of the curriculum report you are viewing. The prefiltered search queries were created by AAMC professional library staff.

Schools can use all these reports from the CI Portal and curriculum reports website to benchmark their own curricula, make evidence-based and informed decisions about curriculum change, and stimulate discussion among curriculum leaders.

**Task 2:** Review your plans developed in Chapter 6 to use CI data for various purposes, and incorporate curriculum reports from the CI Portal and the curriculum reports website into those plans.

**Reflect on your CI-building process and outcomes**
Congratulations on making it through all the key stages of building your CI! It is no small feat, and you and your team should take a bow.

Reflect a bit individually and as a team about how the process of building your CI has gone. Here are some sample questions to aid your reflection:

- What went well, and what did not?
- What went as expected, and what was unexpected?
- What do you wish you had known ahead of time?
- What about your CI are you most proud of?
- What did the CI process teach you about your curriculum?
- What, if anything, was originally part of your plans but was not able to be executed?
- What will you do differently next year in terms of process?
- What are the outcomes and lessons learned from this process?
- What would you tell a school new to CI?

**Task 3:** Reflect individually and as a team about the CI-building process and outcomes.

**Chapter 12 key questions**

1. Have we reviewed all the key features of the CI Portal, including the help section, upload and activity history, and reports?

2. How can we revise the plans we made to use CI data (from Chapter 6) to include our school-specific and national reports on the CI Portal, as well as publicly available curriculum reports from the website, in our evaluation, continuous quality improvement, benchmarking, and curriculum renewal processes?

3. What has our team learned from building our CI?
Iterative process

As we have mentioned throughout this guidebook, there is more than one right way to build a CI. The process outlined in this workbook helps illuminate the major steps of the CI-building process, although there are other approaches that can also be successful.

You may find, as you and your team progress through the chapters, that new information becomes available and prompts a return to earlier chapters to revise your work. It is a normal and natural part of the process to need to revise plans and content for your CI to ensure its accuracy and completeness in an iterative fashion.

Additional assistance

We hope you have found this step-by-step guide helpful. If you have questions or suggestions about the Guidebook to Building a CI or need assistance, please reach out to ci@aamc.org.

Acknowledgments

We wish to acknowledge the following CI Committee members for their review and feedback:

- Julie Youm, PhD: Assistant Dean, Education Compliance and Quality, and Adjunct Assistant Professor, Emergency Medicine, University of California, Irvine, School of Medicine.
- Cinda J. Stone, MEd: Director, Pre-Clerkship and Curricular Management, University of Arizona College of Medicine - Phoenix.
- Santiago Toro Posada, MBBS: Director of Curriculum Accreditation and Management, Washington State University Elson S. Floyd College of Medicine.
Appendix I

Curriculum Inventory Standardized Instructional and Assessment Methods and Resource Types

Suggested citation:

### Instructional Methods

<table>
<thead>
<tr>
<th>IM001</th>
<th>Case-Based Instruction/Learning</th>
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<tbody>
<tr>
<td>IM002</td>
<td>Clinical Experience - Ambulatory</td>
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<tr>
<td>IM003</td>
<td>Clinical Experience - Inpatient</td>
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<td>IM004</td>
<td>Concept Mapping</td>
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<td>IM005</td>
<td>Conference</td>
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<td>IM008</td>
<td>Discussion, Small Group (&lt;12)</td>
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<td>IM010</td>
<td>Independent Learning</td>
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<td>IM013</td>
<td>Lecture</td>
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<td>Mentorship</td>
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<td>Patient Presentation - Faculty</td>
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<td>Patient Presentation - Learner</td>
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<td>Peer Teaching</td>
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<td>Problem-Based Learning (PBL)</td>
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<td>Research</td>
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<td>Role Play/Dramatization</td>
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### Assessment Methods

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<td>Exam – Institutionally Developed, Laboratory, Practical</td>
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<td>Exam – Institutionally Developed, Written/Computer-based</td>
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<td>Research or Project Assessment</td>
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<td>AM017</td>
<td>Self-Assessment</td>
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<td>AM018</td>
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### Resource Types

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<td>Audio</td>
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<td>Cadaver</td>
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<td>RE007</td>
<td>Distance Learning - Synchronous</td>
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<td>Key Feature</td>
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<td>Mobile Application</td>
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<td>Patient – Receiving Clinical Care</td>
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<td>Patient – Teaching</td>
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<td>Plastinated Specimens</td>
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<td>Scenario</td>
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<td>Searchable Electronic Database</td>
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<td>Standardized/Simulated Patient (SP)</td>
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<td>Task Trainer</td>
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<tr>
<td>RE023</td>
<td>Ultrasound</td>
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<tr>
<td>RE024</td>
<td>Virtual Patient</td>
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<tr>
<td>RE025</td>
<td>Virtual/Computerized Laboratory</td>
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<tr>
<td>RE026</td>
<td>Wet Laboratory</td>
</tr>
<tr>
<td>Instructional Method</td>
<td>Definition / More information</td>
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</tr>
<tr>
<td><strong>Case-Based Instruction/Learning</strong></td>
<td>Use of patient cases (actual or theoretical) to stimulate discussion, questioning, problem solving, and reasoning on issues pertaining to the basic sciences and clinical disciplines (Anderson, 2010)</td>
</tr>
<tr>
<td><em>Synonymous with/Includes:</em> Case Study</td>
<td><em>Does not include:</em> Conference; Discussion, Small Group (&lt;12); Patient Presentation - Faculty; Patient Presentation - Learner; Problem-Based Learning (PBL); Simulation; Team-Based Learning (TBL)</td>
</tr>
<tr>
<td><strong>Note(s):</strong></td>
<td>Distinguished from Simulation in that, in CBL, learner is not necessarily practicing the role of care provider, yet in Simulation, learner is practicing some aspect(s) of provider role.</td>
</tr>
<tr>
<td><strong>Clinical Experience - Ambulatory</strong></td>
<td>Practical experience(s) in patient care and health-related services carried out in an ambulatory/outpatient setting where actual patients are studied and treatment and/or counseling is given (ERIC, 1968 &amp; 1981; CI Standardized Vocabulary Subcommittee)</td>
</tr>
<tr>
<td><em>Synonymous with/Includes:</em> Clinical Reasoning; Communication Skills; Community-Based; Outpatient; Patient Care; Patient Care Activity; Problem Solving</td>
<td><em>Does not include:</em> Discussion, Large Group (&gt;12); Lecture</td>
</tr>
<tr>
<td><strong>Clinical Experience - Inpatient</strong></td>
<td>Practical experience(s) in patient care and health-related services carried out in an inpatient setting where actual patients are studied and treatment and/or counseling is given (ERIC, 1968 &amp; 1981; CI Standardized Vocabulary Subcommittee)</td>
</tr>
<tr>
<td><em>Synonymous with/Includes:</em> Clinical Reasoning; Communication Skills; Patient Care; Patient Care Activity; Problem Solving</td>
<td><em>Does not include:</em> Lecture</td>
</tr>
<tr>
<td><strong>Concept Mapping</strong></td>
<td>Technique [that] allows learners to organize and represent knowledge in an explicit interconnected network. Linkages between concepts are explored to make apparent connections that are not usually seen. (Weiss &amp; Levinson, 2000, citing Novak &amp; Gowin, 1984)</td>
</tr>
<tr>
<td><strong>Conference</strong></td>
<td>Departmentally-driven and/or content-specific presentations by clinical faculty/professionals, residents, and/or learners before a large group of other professionals and/or learners (e.g., Mortality and Morbidity, or &quot;M &amp; M,&quot; Conference--Biddle &amp; Oaster, 1990--and Interdisciplinary Conference--Feldman, 1999; also see Cooke, Irby, &amp; O'Brien, 2010b)</td>
</tr>
<tr>
<td><em>Synonymous with/Includes:</em> Grand Rounds; Mortality/Morbidity (M &amp; M) Conference; X-Ray; Tumor Board</td>
<td><em>Does not include:</em> Discussion, Large Group (&gt;12); Lecture</td>
</tr>
<tr>
<td><strong>Demonstration</strong></td>
<td>A description, performance, or explanation of a process, illustrated by examples, observable action, specimens, etc.</td>
</tr>
<tr>
<td><em>Synonymous with/Includes:</em> Autopsy</td>
<td><em>Does not include:</em> Laboratory</td>
</tr>
<tr>
<td><strong>Discussion, Large Group (&gt;12)</strong></td>
<td>An exchange (oral or written) of opinions, observations, or ideas among a Large Group [more than 12 participants], usually to analyze, clarify, or reach conclusions about issues, questions, or problems (ERIC, 1980)</td>
</tr>
<tr>
<td><em>Does not include:</em> Conference</td>
<td><em>Does not include:</em> Case-Based Learning/Instruction; Conference; Problem-Based Learning (PBL); Team-Based Learning (TBL); Tutorial; Workshop</td>
</tr>
<tr>
<td><strong>Discussion, Small Group (&lt;12)</strong></td>
<td>An exchange (oral or written) of opinions, observations, or ideas among a Small Group [12 or fewer participants], usually to analyze, clarify, or reach conclusions about issues, questions, or problems (ERIC, 1980)</td>
</tr>
<tr>
<td><em>Does not include:</em> Case-Based Learning/Instruction; Conference; Problem-Based Learning (PBL); Team-Based Learning (TBL); Tutorial; Workshop</td>
<td><em>Does not include:</em> Conference</td>
</tr>
<tr>
<td><strong>Games</strong></td>
<td>Individual or group games that have cognitive, social, behavioral, and/or emotional, etc., dimensions which are related to educational objectives (ERIC, 1966a)</td>
</tr>
<tr>
<td><strong>Independent Learning</strong></td>
<td>Instructor-/or mentor-guided learning activities to be performed by the learner outside of formal educational settings (classroom, lab, clinic) (Bowen &amp; Smith, 2010); Dedicated time on learner schedules to prepare for specific learning activities, e.g., case discussions, TBL, PBL, clinical activities, research project(s)</td>
</tr>
<tr>
<td><em>Synonymous with/Includes:</em> Self-Directed Learning</td>
<td><em>Does not include:</em> Independent Study; Homework</td>
</tr>
</tbody>
</table>
**Journal Club**

A forum in which participants discuss recent research papers from field literature in order to develop critical reading skills (comprehension, analysis, and critique) (Cooke, Irby, & O’Brien, 2010a; Mann & O’Neill, 2010; Woods & Winkel, 1982)

*Synonymous with/Includes:* Critical Reading

*Notes:* “[A] forum for the education of residents in the techniques of critical reading, that is, the ability to understand the format of an article, analyze the process by which the study was done, recognize the limitations of the work, and critique the results and interpretation” (Woods & Winkel, 1982); “[A] forum for discussion of recent papers in [a] specialty [and] mechanism for residents [and/or learners] to learn how to assess the quality and import of clinical research papers” (Cooke, Irby, & O’Brien, 2010a)

**Laboratory**

Hands-on or simulated exercises in which learners collect or use data to test and/or verify hypotheses or to address questions about principles and/or phenomena.

*Synonymous with/Includes:* Autopsy; Anatomy Lab; Gross Lab; Histology Lab; Wet Lab

*Does not include:* Demonstration

**Lecture**

An instruction or verbal discourse by a speaker before a large group of learners (Institute for International Medical Education, 2002)

*Synonymous with/Includes:* Didactic; Recording of a lecture

*Does not include:* Conference; Discussion, Large Group (>12)

**Mentorship**

The provision of guidance, direction and support by senior professionals to learners or more junior professionals (U.S. National Library of Medicine, 1987)

*Synonymous with/Includes:* Advising; Career Development; Coaching; Professional Development

*Does not include:* Preceptorship

**Patient Presentation-Faculty**

A presentation by faculty to faculty, residents, and/or other learners of patient findings, history and physical, differential diagnosis, treatment plan, etc. (Wiener, 1974; CI Standardized Vocabulary Subcommittee)

**Patient Presentation-Learner**

A presentation by a learner or learners to faculty, resident(s), and/or other learners of patient findings, history and physical, differential diagnosis, treatment plan, etc. (Wiener, 1974)

**Patient Presentation-Patient**

A presentation by a patient to faculty, residents, and other learners that tells or recounts the patient’s experience (CI Standardized Vocabulary Subcommittee)

**Peer Teaching**

Learner-to-learner instruction for the mutual learning experience of both "teacher" and "learner"; may be "peer-to-peer" (same training level) or "near-peer" (higher-level learner teaching lower-level learner) (Soriano et al., 2010)

*Synonymous with/Includes:* Near-Peer Instruction; Peer Instruction; Peer Teaching; Peer Tutoring; PeerAssisted Learning

**Preceptorship**

Practical experience in medical and health-related services wherein the professionally-trained learner works under the supervision of an established professional in the particular field (U. S. National Library of Medicine, 1974)

*Synonymous with/Includes:* Externship

*Does not include:* Mentorship; Service Learning Activity

**Problem-Based Learning(PBL)**

The use of carefully selected and designed patient cases that demand from the learner acquisition of critical knowledge, problem solving proficiency, self-directed learning strategies, and team participation skills as those needed in professional practice (Eshach & Bitterman, 2003; see also Major & Palmer, 2001; Cooke, Irby, & O’Brien, 2010b; Barrows & Tamblyn, 1980)

*Does not include:* Case-Based Instruction/Learning; Discussion, Small Group (<12); Team-Based Learning (TBL)

**Reflection**

Examination by the learner of his/her personal experiences of a learning event, including the cognitive, emotional, and affective aspects; the use of these past experiences in combination with objective information to inform present clinical decision-making and problem-solving (Mann, Gordon, & MacLeod, 2009; Mann & O’Neill, 2010); reflecting on patients’ experiences using narrative and/or storytelling (Advances in Health Sciences Education, 18(4), 727-743. [http://link.springer.com/article/10.1007/s10459-012-9411-y](http://link.springer.com/article/10.1007/s10459-012-9411-y))

*Synonymous with/Includes:* Journaling, Narrative, Story-telling
### Research

**Short-term or sustained participation in research.** *Research* is defined as a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. Activities which meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program which is considered research for other purposes. For example, some demonstration and service programs may include research activities. (U.S. Department of Health & Human Services 45 CFR 46 [http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html](http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html))

### Role Play/ Dramatization

**The adopting or performing the role or activities of another individual**

*Synonymous with/Includes:* Practicing Skills (with peers)

*Does not include:* Simulation (as with Simulated/Standardized Patient) – See Resource Types

### Self-Directed Learning

Learners taking the initiative for their own learning: diagnosing needs, formulating goals, identifying resources, implementing appropriate activities, and evaluating outcomes (Garrison, 1997; Spencer & Jordan, 1999)

*Does not include:* Independent Learning; Independent Study, PBL, TBL

### Service Learning Activity

A structured learning experience that combines community service with preparation and reflection. LCME Glossary of Terms for LCME Accreditation Standards and Elements 2015-2016, October 2015)

*Synonymous with/Includes:* Community Service

### Simulation

A method used to replace or amplify real patient encounters with scenarios designed to replicate real health care situations, using lifelike mannequins, physical models, standardized patients, or computers (Passiment, Sacks, & Huang, 2011)

*Does not include:* Role Play/Dramatization

### Team-Based Learning (TBL)

A form of collaborative learning that follows a specific sequence of individual work, group work and immediate feedback; engages learners in learning activities within a small group that works independently in classes with high learner-faculty ratios (Anderson, 2010; Team-Based Learning Collaborative, n.d.; Thompson, Schneider, Haidet, Perkowski, & Richards, 2007)

*Does not include:* Case-Based Instruction/Learning; Discussion, Small Group (≤12); Problem-Based Learning (PBL)

### Team- Building

Workshops, sessions, and/or activities contributing to the development of teamwork skills, often as a foundation for group work in learning (PBL, TBL, etc.) and practice (interprofessional/-disciplinary,etc.) (Morrison, Goldfarb, & Lanken, 2010)

### Tutorial

Instruction provided to a learner or small group of learners by direct interaction with an instructor (ERIC, 1966c)

### Ward Rounds

An instructional session conducted in an actual clinical setting, using real patients or patient cases to demonstrate procedures or clinical skills, illustrate clinical reasoning and problem-solving, or stimulate discussion and analytical thinking among a group of learners (Bowen & Smith, 2010; Wiener, 1974)

*Synonymous with/Includes:* Attending Rounds; Bedside Rounds; Bedside Teaching; Teaching Rounds; Student group visit as part of "Doctoring" or "Physical Diagnosis" course

*Does not include:* Clinical Experience - Ambulatory; Clinical Experience - Inpatient; Patient Presentation - Faculty; Patient Presentation – Learner

### Workshop

A brief intensive educational program for a relatively small group of people that focuses especially on techniques and skills related to a specific topic (U. S. National Library of Medicine, 2011)

*Synonymous with/Includes:* Seminar

Note: The concepts of Flipped Classroom, Clinical Correlation, Clinical Case Modules, Case Inventories, and similar terms that describe a particular use of multiple instructional methods or specific types of clinical documentation are not included in this list. It is the opinion of the MedBiquitous Curriculum Inventory Working Group Standardized Vocabulary Subcommittee that these terms are reflected by or are combinations of existing Instructional Methods or Resources.
<table>
<thead>
<tr>
<th>Assessment Method (may be formative or summative)</th>
<th>Definition / More information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical Documentation Review</strong></td>
<td>The review and assessment of clinical notes and logs kept by learners as part of practical training in the clinical setting (Bowen &amp; Smith, 2010; Irby, 1995)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> Case Log; Chart Review; Clinical Encounter Log; Patient Workup</td>
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<tr>
<td><strong>Does not include:</strong> Portfolio-Based Assessment</td>
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<tr>
<td><strong>Clinical Performance Rating/Checklist</strong></td>
<td>A non-narrative assessment tool (checklist, Likert-type scale, other instrument) used to note completion of clinical performance tasks (MacRae, Vu, Graham, Word-Sims, Collier, &amp; Robbs, 1995; Turnbull, Gray, &amp; MacFadyen, 1998) also see “Direct Observations or Performance Audits,” Institute for International Medical Education, 2002)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> Rating Scale; Likert Scale; Reflection Feedback; Video Performance Rating; Rubric</td>
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<tr>
<td><strong>Does not include:</strong> Multisource Assessment; Peer Assessment; Self-Assessment</td>
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</tr>
<tr>
<td><strong>Exam - Institutionally Developed, Clinical Performance</strong></td>
<td>Practical performance-based examination developed internally to assess problem solving, clinical reasoning, decision making, and/or communication skills (Includes observation of learner or small group by instructor)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> OSCE; Virtual Patient; Practical Exam; Internal (practical) Exam; Image Analysis; Script Concordance; Simulation Exam; MiniCEX; CEX; SCEE (Simulated Clinical Encounter Examination)</td>
<td></td>
</tr>
<tr>
<td><strong>Exam - Institutionally Developed, Laboratory Practical (Lab)</strong></td>
<td>Examination activities that use hands-on or simulated exercises in which students collect or use data to test and/or verify hypotheses or to address questions about principles and/or phenomena.</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> Laboratory Practicum; Anatomy Practical</td>
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</tr>
<tr>
<td><strong>Exam - Institutionally Developed, Written/Computer-based</strong></td>
<td>Examination utilizing various written question-and-answer formats (multiple-choice, short answer, essay, etc.) which may assess learners' factual knowledge retention; application of knowledge, concepts, and principles; problem-solving acumen; and clinical reasoning (Cooke, Irby, &amp; O’Brien, 2010b).</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> Written Exam; Internal (written) Exam; MCQ; Multiple Choice; Quiz; Script Concordance</td>
<td></td>
</tr>
<tr>
<td><strong>Exam - Institutionally Developed, Oral</strong></td>
<td>Verbal examination developed internally to assess problem solving, clinical reasoning, decision-making, and/or communication skills.</td>
</tr>
<tr>
<td><strong>Exam - Licensure, Clinical Performance</strong></td>
<td>Practical, performance-based examination developed by a professional licensing body to assess clinical skills such as problem solving, clinical reasoning, decision making, and communication, for licensure to practice in a given jurisdiction (e.g., USMLE for the United States); typically paired with a written/computer-based component (MCC, 2011a &amp; 2011c; NBOME, 2010b; USMLE, n.d.); may also be used by schools to assess learners' achievement of certain curricular objectives</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> USMLE Step 2-CS, COMLEX Level 2-PE; MCC Part II; CEFM</td>
<td></td>
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<tr>
<td><strong>Exam - Licensure, Written/Computer-based</strong></td>
<td>Standardized written examination administered to assess learners' factual knowledge retention; application of knowledge, concepts, and principles; problem-solving acumen; and clinical reasoning, for licensure to practice in a given jurisdiction (e.g., USMLE for the United States); typically paired with a clinical performance component (MCC, 2011a &amp; 2011b; NBOME, 2010b; USMLE, n.d.); may also be used by schools or learners themselves to assess achievement of certain curricular objectives</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> USMLE Step 1; USMLE Step 2-CK; COMLEX Level 1; COMLEX Level 2-CE; COMLEX Level 3; MCC Part I; CEFM</td>
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</tr>
<tr>
<td><strong>Exam - Nationally Normed/Standardized, Subject</strong></td>
<td>Standardized written examination administered to assess learners’ achievement of nationally established educational expectations for various levels of training and/or specialized subject area(s) (e.g., NBME Subject or “Shelf” Exam) (NBME, 2011; NBOME, 2010a)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong> NBME; NBME Subject Exam; NBME Shelf; COMAT Subject Exam; COMSAE; COMVEX</td>
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</tr>
<tr>
<td><strong>Multisource Assessment</strong></td>
<td>A formal assessment of performance by supervisors, peers, patients, and coworkers (Bowen &amp; Smith, 2010; Institute for International Medical Education, 2002) <em>(Also see Peer Assessment)</em></td>
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<tr>
<td><strong>Synonymous with/Includes</strong>:</td>
<td>Multi-Rater Assessment; 360-Degree Assessment</td>
</tr>
<tr>
<td><strong>Narrative Assessment</strong></td>
<td>An instructor’s or observer’s written subjective assessment of a learner’s work or performance (Mennin, McConnell, &amp; Anderson, 1997); <em>May Include</em>: Comments within larger assessment; Observation of learner or small group by instructor</td>
</tr>
<tr>
<td><strong>Does not include</strong>:</td>
<td>Clinical Documentation Review; Clinical Performance Rating/Checklist; Peer Assessment; Self-Assessment</td>
</tr>
<tr>
<td><strong>Oral Patient Presentation</strong></td>
<td>The presentation of clinical case (patient) findings, history and physical, differential diagnosis, treatment plan, etc., by a learner to an instructor or small group, and subsequent discussion with the instructor and/or small group for the purposes of learner demonstrating skills in clinical reasoning, problem-solving, etc. (Wiener, 1974)</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td>Sharing or taking part in an activity (ERIC, 1966b)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes</strong>:</td>
<td>Attendance</td>
</tr>
<tr>
<td><strong>Peer Assessment</strong></td>
<td>The concurrent or retrospective review by learners of the quality and efficiency of practices or services ordered or performed by fellow learners.</td>
</tr>
<tr>
<td><strong>Does not include</strong>:</td>
<td>Multisource Assessment; Narrative Assessment</td>
</tr>
<tr>
<td><strong>Portfolio-Based Assessment</strong></td>
<td>Review of a learner’s achievement of agreed-upon academic objectives or completion of a negotiated set of learning activities, based on a learner portfolio (Institute for International Medical Education, 2002) <em>(“a systematic collection of a student’s work samples, records of observation, test results, etc., over a period of time”—ERIC, 1994)</em></td>
</tr>
<tr>
<td><strong>Research or Project Assessment</strong></td>
<td>Assessment of activities and outcomes (e.g., posters, presentations, reports, etc.) of a project in which the learner participated or conducted research (Dyrbye, Davidson, &amp; Cook, 2008)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes</strong>:</td>
<td>Multi-Media Production</td>
</tr>
<tr>
<td><strong>Self-Assessment</strong></td>
<td>The process of evaluating one’s own deficiencies, achievements, behavior or professional performance and competencies (Institute for International Medical Education, 2002); Assessment completed by the learner to reflect and critically assess his/her own performance against a set of established criteria (Gordon, 1991) <em>(NOTE: Does not refer to NBME Self-Assessment)</em></td>
</tr>
<tr>
<td><strong>Synonymous with/Includes</strong>:</td>
<td>Observation of self on video</td>
</tr>
<tr>
<td><strong>Does not include</strong>:</td>
<td>NBME Self-Assessment (National Board of Medical Examiners (NBME) Self-Assessment Services, n.d.)</td>
</tr>
<tr>
<td><strong>Stimulated Recall</strong></td>
<td>The use of various stimuli (e.g., written records, audio tapes, video tapes) to re-activate the experience of a learner during a learning activity or clinical encounter in order to reflect on task performance, reasoning, decision-making, interpersonal skills, personal thoughts and feelings, etc. (Barrows, 2000)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes</strong>:</td>
<td>Chart-stimulated recall (CSR)</td>
</tr>
<tr>
<td>Resource</td>
<td>Definition / More information</td>
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<tr>
<td>Animation</td>
<td>A series of visual representations imparting an impression of motion when shown in succession. Includes visual output from a simulation. (<a href="http://purl.org/dc/dcmitype/MovingImage">http://purl.org/dc/dcmitype/MovingImage</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Does not include:</strong> Film/Video</td>
</tr>
<tr>
<td>Audience Response System</td>
<td>An electronic communication system that allows groups of people to vote on a topic or answer a question. Each person has a remote control (“clicker”) with which selections can be made; Typically, the results are instantly made available to the participants via a graph displayed on the projector. (<a href="http://purl.org/dc/dcmitype/MovingImage">Group on Information Resources, 2011; Stoddard &amp; Piquette, 2010</a>)</td>
</tr>
<tr>
<td>Audio</td>
<td>Devices or applications used to acquire or transfer knowledge, attitudes, or skills through study, instruction, or experience using auditory delivery (see “Electronic Learning,” <a href="http://purl.org/dc/dcmitype/MovingImage">ERIC, 2008b</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Synonymous with/Includes:</strong> Podcasts</td>
</tr>
<tr>
<td></td>
<td><strong>Does not include:</strong> Recordings of lectures, <a href="http://purl.org/dc/dcmitype/MovingImage">Mobile Application</a></td>
</tr>
<tr>
<td>Cadaver</td>
<td>A human body preserved post-mortem and “...to study anatomy, identify disease sites, determine causes of death, and provide tissue to repair a defect in a living human being” (<a href="http://purl.org/dc/dcmitype/MovingImage">MedicineNet.com, 2004</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Synonymous with/Includes:</strong> Corpse; Dissection; Prosection; Prosection Specimen; Skeleton</td>
</tr>
<tr>
<td>Clinical Case</td>
<td>Clinical information provided for teaching and assessment. May provide a complete patient description (with findings) or represent a brief description of a presenting situation or finding. (<a href="http://purl.org/dc/dcmitype/MovingImage">CStandardized Vocabulary Subcommittee</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Does not include:</strong> <a href="http://purl.org/dc/dcmitype/MovingImage">Standardized Patient</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Virtual Patient</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Clinical Case Module</a></td>
</tr>
<tr>
<td>Distance Learning - Asynchronous</td>
<td>Education facilitated through communications media (often electronic), with little or no classroom or other face-to-face contact between learners and teachers, and which “does not occur in real time or involve simultaneous interaction on the part of participants. It is intermittent and generally characterized by a significant time delay or interval between sending and receiving or responding to messages” (<a href="http://purl.org/dc/dcmitype/MovingImage">ERIC, 1983; 2008a</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Synonymous with/Includes:</strong> Computer-Assisted Learning (CAL); Computer-Assisted Instruction (CAI)</td>
</tr>
<tr>
<td>Distance Learning - Synchronous</td>
<td>Education facilitated through communications media (often electronic), with little or no classroom or other face-to-face contact between learners and teachers, “in real time, characterized by concurrent exchanges between participants. Interaction is simultaneous without a meaningful timedelay between sending a message and receiving or responding to it. Occurs in electronic (e.g., interactive videoconferencing) and non-electronic environments (e.g., telephone conversations)” (<a href="http://purl.org/dc/dcmitype/MovingImage">ERIC, 1983; 2008c</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Synonymous with/Includes:</strong> Computer-Assisted Learning (CAL); Computer-Assisted Instruction (CAI)</td>
</tr>
<tr>
<td>Educational Technology</td>
<td>Mobile or desktop technology (hardware or software) used for instruction/learning through audiovisual (A/V), multimedia, web-based, or online modalities (<a href="http://purl.org/dc/dcmitype/MovingImage">Group on Information Resources, 2011</a>); Sometimes includes dedicated space (see <a href="http://purl.org/dc/dcmitype/MovingImage">Virtual/Computerized Lab</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Synonymous with/Includes:</strong> Computer; Desktop Computer; Laptop; iPad; Netbook; Smartphone; E-reader; Web Portals; Collaboration Tools (Wikis, Blogs); Simulation Tools (see also, <a href="http://purl.org/dc/dcmitype/MovingImage">Mannequin</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Searchable Electronic Database</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Standardized/Simulated Patient</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Task Trainer</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Virtual Patient</a>, <a href="http://purl.org/dc/dcmitype/MovingImage">Virtual/Computerized Lab</a>); Audio/video Casting; e-Portfolios (see also, <a href="http://purl.org/dc/dcmitype/MovingImage">Portfolio-Based Assessment</a>)</td>
</tr>
<tr>
<td>Electronic Health/Medical Record (EHR/EMR)</td>
<td>An individual patient’s medical record in digital format...usually accessed on a computer, often over a network...[M]ay be made up of <strong>electronic medical records</strong> (EMRs) from many locations and/or sources. An Electronic Medical Record (EMR) <strong>may be an inpatient or outpatient medical record in digital format</strong> that may or may not be linked to or part of a larger EHR (<a href="http://purl.org/dc/dcmitype/MovingImage">Group on Information Resources, 2011</a>)</td>
</tr>
<tr>
<td>Film/Video</td>
<td>A camera-based recording of visual and audible components. Audio might not be included. (<a href="http://purl.org/dc/dcmitype/MovingImage">http://purl.org/dc/dcmitype/MovingImage</a>)</td>
</tr>
<tr>
<td></td>
<td><strong>Does not include:</strong> Recordings of lectures or other Instructional/Educational activities—Use appropriate method from Instructional Methods list and Resource, e.g., Distance Learning or Educational Technology, <a href="http://purl.org/dc/dcmitype/MovingImage">Mobile Application</a></td>
</tr>
</tbody>
</table>
**Key Feature**

An element specific to a clinical case or problem that demands the use of particular clinical skills in order to achieve the problem's successful resolution; Typically presented as written exam questions, as in the Canadian Qualifying Examination in Medicine (Page & Bordage, 1995; Page, Bordage, & Allen, 1995)

*Synonymous with/Includes:* Patient Management Problems (PMPs); Clinical Decision Making (CDM) exam

**Note(s):** “1) a critical or essential step(s) in the resolution of a problem, 2) a step(s) in which examinees ...are most likely to make errors in the resolution of the problem, or 3) a difficult or challenging aspect in the identification and management of the problem in practice” (MCC, 2010, p. 6)

**Mannequin**

A life-size model of the human body that mimics various anatomical functions to teach skills and procedures in health education; may be low-fidelity (having limited or no electronic inputs) or high-fidelity (connected to a computer that allows the robot to respond dynamically to user input) (Groupon Information Resources, 2011; Passiment, Sacks, & Huang, 2011)

**Medical Images**

Medical images of anatomic structures through the use of electromagnetic radiation or sound waves. Medical imaging techniques include radiographs, fluoroscopy, CT scans, PET scans, MRIs, and ultrasonograms. (adapted from http://medical-dictionary.thefreedictionary.com/radiology by Curriculum Inventory Standardized Vocabulary SubCommittee)

Includes: Radiologic Imaging; See also sonogram.

**Mobile Application**

A mobile application, most commonly referred to as an app, is a type of application software designed to run on a mobile device, such as a smartphone or tablet computer. Apps are generally small, individual software units with specific function. (Adapted from www.techopedia.com by Curriculum Inventory Standardized Vocabulary SubCommittee)

*Synonyms:* app, Web app, online app, or smartphone app

*Does not include:* Audio, Film/Video

**Patient-teaching**

An actual clinical patient with whom students interact to learn about a specific clinical condition, symptom, or finding, the patient’s experience with illness, or interaction with the healthcare system. (CI Standardized Vocabulary Subcommittee)

*Does not include:* Simulated Patient, Standardized Patient, or Patient-receiving clinical care

**Patient – receiving clinical care**

An actual clinical patient with whom the student is involved for clinical documentation, care, and/or treatment. (CI Standardized Vocabulary Subcommittee)

*Does not include:* Simulated Patient, Standardized Patient, or Patient-teaching

**Plastinated Specimens**

Organic material preserved by replacing water and fat in tissue with silicone, resulting in “anatomical specimens [that] are safer to use, more pleasant to use, and are much more durable and have a much longer shelf life” (University of Michigan Plastination Lab, n.d.); See also: Wet Lab

**Note(s):** “Preserved tissue is first dissected and then dehydrated with acetone. It is immersed in a silicone bath under vacuum until the replacement of acetone is completed. After plastination, the resulting tissue is safe to handle (i.e., toxic fixatives are eliminated), the tissue has no odor and it is extremely durable. Thus, the anatomical specimens are safer to use, more pleasant to use, and are much more durable and have a much longer shelf life” (University of Michigan Plastination Lab, n.d.)

**Scenario**

A written outline of a postulated sequence or development of events in a real or simulated clinical setting for use in instructional and assessment simulations. (CI Standardized Vocabulary Subcommittee)

**Searchable Electronic Database**

A collection of information organized in such a way that a computer program can quickly select desired pieces of data.

*Synonymous with/Includes:* PubMed

**Standardized/Simulated Patient (SP)**

Individual trained to portray a patient with a specific condition in a realistic, standardized and repeatable way (where portrayal/presentation varies based only on learner performance) (ASPE, 2011)

*Synonymous with/Includes:* Gynecological Teaching Associates (GTA); Male Urogenital Teaching Associates (MUTA)

*Note(s):* “SPs can be used for teaching and assessment of learners including but not limited to history/consultation, physical examination and other clinical skills in simulated clinical environments. SPs can also be used to give feedback and evaluate student performance.” (ASPE, 2011)
<table>
<thead>
<tr>
<th>Task Trainer</th>
<th>A physical model that simulates a subset of physiologic function to include normal and abnormal anatomy (Passiment, Sacks, &amp; Huang, 2011); Such models which provide just the key elements of the task or skill being learned (CISL, 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Synonymous with/Includes:</strong></td>
<td>Plastic IV Arm, Airway Management Head, Urinary catheter trainer, Pelvic examination trainer; Virtual reality endoscopic devices</td>
</tr>
<tr>
<td><strong>Note(s):</strong></td>
<td>“Part-task Trainers in plastic or other forms cannot fully replicate performing the task on real patients, but they do allow learners to acquire the basic steps of the procedures and some of the basic skills needed to then be taught the fine art of doing the procedures under supervision on actual human beings” (CISL, 2011)</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>Ultrasound is used by faculty and students for therapeutic purposes and/or to create Images using high-frequency sound waves to identify and examine organs and structures such as the heart; bloodvessels; kidneys; liver; and, during pregnancy, fetus(es) (adapted from <a href="http://www.nlm.nih.gov/research/umls/">http://www.nlm.nih.gov/research/umls/</a>).</td>
</tr>
<tr>
<td><strong>Does not include:</strong></td>
<td>Educational Technology; Virtual/Computerized Lab</td>
</tr>
<tr>
<td>Virtual Patient</td>
<td>An interactive computer simulation of real-life clinical scenarios for the purpose of medical training, education, or assessment (Smothers, Azan, &amp; Ellaway, 2010)</td>
</tr>
<tr>
<td><strong>Does not include:</strong></td>
<td>Educational Technology; Virtual/Computerized Lab</td>
</tr>
<tr>
<td>Virtual Reality</td>
<td>A virtual environment which allows the participant to experience a sense of presence in an immersive, computer-generated, three-dimensional, interactive environment [adapted from MeSH for “virtual reality exposure therapy”]</td>
</tr>
<tr>
<td>Virtual/Computerized Laboratory</td>
<td>A practical learning environment in which technology- and computer-based simulations allow learners to engage in computer-assisted instruction while being able to ask and answer questions and also engage in discussion of content (Cooke, Irby, &amp; O’Brien, 2010a); also, to learn through experience by performing medical tasks, especially high-risk ones, in a safe environment (Uniformed Services University, 2011)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong></td>
<td>Computer Assisted Instruction; Biochemistry; Microbiology; Molecular biology; Cell biology; Tissue culture laboratory; Pathology; Organic Chemistry; Physical Chemistry</td>
</tr>
<tr>
<td><strong>Does not include:</strong></td>
<td>Educational Technology</td>
</tr>
<tr>
<td>Wet Laboratory</td>
<td>Facilities outfitted with specialized equipment* and bench space or adjustable, flexible desktop space for working with solutions or biological materials (“C.1 Wet Laboratories,” 2006; Stanford University School of Medicine, 2007; WBDG Staff, 2010) *Often includes sinks, chemical fume hoods, biosafety cabinets, and piped services such as deionized or RO water, lab cold and hot water, lab waste/vents, carbon dioxide, vacuum, compressed air, eyewash, safety showers, natural gas, telephone, LAN, and power (“C.1 Wet Laboratories,” 2006)</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong></td>
<td>Biochemistry; Cell Biology; Histology Slides; Microbiology; Molecular Biology; Tissue Culture Laboratory; Organic Chemistry; Pathology; Physical Chemistry; Preserved Specimens (not Cadavers, Prosected Specimens, or Plastinated Specimens)</td>
</tr>
<tr>
<td><strong>Note(s):</strong></td>
<td>Frequently used for instruction and/or research in Biochemistry; Molecular biology; Cell biology; Tissue culture laboratory; Pathology; Organic Chemistry; Physical Chemistry (“C.1 Wet Laboratories,” 2006)</td>
</tr>
<tr>
<td><strong>Note(s):</strong></td>
<td>“[T]raditional molecular and cell biology...must be facilitated by high-quality wet lab space with bench and standard, small scale, support space (including desks that are computer-friendly because even for molecular biology experimentation you need a computer). As long as people work with model organisms, cell culture, and molecular biology, this arrangement forms the basis of biomedical insights that are obtained by experimentation” (Stanford University School of Medicine, 2007 p. 58).</td>
</tr>
<tr>
<td>Written or Visual Media (or Digital Equivalent)</td>
<td>Reference materials produced or selected by faculty to augment course teaching and learning</td>
</tr>
<tr>
<td><strong>Synonymous with/Includes:</strong></td>
<td>Handouts; Fiction or non-fiction Books; Poetry; Professional Journal Articles; Textbooks; Syllabi</td>
</tr>
</tbody>
</table>
Appendix II

AAMC Keywords List
Appendix III
Physician Competency Reference Set (PCRS)
Appendix IV  
Curriculum Inventory (CI) Glossary

This glossary lists and defines terms commonly used for the AAMC CI program. This CI Glossary is intended for use by schools for curriculum occurring between July 1, 2021 - June 30, 2022, for upload to the AAMC in August 2022.

Concepts Related to CI Content

Academic level and academic year

Academic level: An academic level is a period of time in the curriculum in which a cohort of students progresses as a group through the curriculum and have similar learning experiences. It can be thought of as a phase or year within the group, such as the first year of the curriculum, the second year of the curriculum, etc. In a CI XML data file, academic levels house sequence blocks (i.e., courses). For example, in academic level 1, the courses include the Foundations of Medicine, the Cardiovascular System, the Doctor-Patient Relationship, etc. Please see the Academic Level Length Distribution curriculum report for information about how much time schools generally assign to academic levels; the most common approach is to use academic levels to represent 7-12 month increments. Generally, schools with 4-year programs use 4 academic levels to represent their curricular years or phases.

Current academic year: For AAMC CI purposes, the academic year begins July 1 and ends June 30. For example, if today were July 1, 2021, the current academic year would be 2022 (beginning July 1, 2021, ending June 30, 2022).

Previous academic year: For AAMC CI purposes, the academic year begins July 1 and ends June 30. During a given AAMC CI data upload season (August 1 – October 21), schools upload the previous academic year’s curriculum. For example, beginning August 1, 2022, schools will upload curriculum data which occurred between July 1, 2021 through June 30, 2022.

Events

Events: An event is an instructional and/or assessment session (e.g., lecture, laboratory, exam) within a sequence block (i.e., course). A given event can be tagged with both instructional methods and assessment methods, tagged with only instructional methods, or tagged with only assessment methods. All events can be tagged with resources. Events tagged with assessment methods, and not tagged with instructional methods, are called assessment events. Please see the standardized vocabulary for instructional methods, assessment methods, and resources (Appendix I) for a complete list of possible instructional method, assessment method, and resource choices. Fields within events include title, duration in hours/minutes, learning objectives (i.e., expectations/competency objects), instructional and/or assessment methods, resources, and keywords.
**Assessment event:** An assessment event is an event in a school’s CI XML data file which is tagged with assessment methods, and not tagged with instructional methods. In an assessment event, some measurement or evaluation of student knowledge, skill, and/or attitudes is conducted. How an event is tagged with assessment methods (i.e., an assessment event) may have implications for data displayed in a school’s Verification Report. A sample Verification Report is available in the CI Technical User Guide.

**Formative assessment:** In a school’s CI XML data file, each assessment method used must be tagged as either formative or summative. The definition of formative assessment has been evolving in the education literature and may be applied with some variations across schools. For the purposes of the AAMC CI, **formative assessments** can be thought of as those which provide feedback to educators and students (Boston, 2002) in a timely manner, and are intended to modify students’ thinking or behavior to improve future learning and performance (derived from “formative feedback,” (LCME DCI Element 9.7). Formative assessment is more than data-gathering (Shepard, 2006); the information provided to students is linked to performance standards and coupled with strategies for improvement (Sadler, 1989). Formative assessment is performed in the spirit of ‘assessment for learning’ rather than ‘assessment of learning’” (Konopasek et al, 2016).

**Summative assessment:** In a school’s CI XML data file, each assessment method used must be tagged as either formative or summative. The definition of summative assessment has been evolving in the education literature and may be applied with some variations across schools. For the purposes of the AAMC CI, **summative assessments** can be thought of as those which typically occur at the end of an experience, such as an event, sequence block, or program in the curriculum. Summative assessments [typically] translate into a score or grade, allowing educators to compare students (Konopasek et al, 2016). These scores inform educator’s decision-making regarding students’ grades, academic progress, or graduation (LCME, 2019).

**Primary instructional method:** An event may be tagged with one or more instructional methods. An instructional method is the teaching approach used within a given learning event. Within an event, there must be one instructional method tagged as the “primary instructional method.” This is a feature of the MedBiquitous CI specifications. For example, if an event is tagged with the instructional methods IM006: Demonstration, and IM012: Laboratory, either the “demonstration” or “laboratory” instructional method must be indicated as the primary one. A list of instructional method choices is available in the standardized vocabulary for instructional methods, assessment methods, and resources (Appendix I).

**Resources:** All events in the CI may be tagged with resources, whether those events are tagged with instructional methods, assessment methods, or both. Resources can be thought of as the tools, supplies, and technology used within an event. For example, perhaps in an event with the instructional method “laboratory” (IM012), and the assessment method “laboratory practical” (IM019), the resource used is a “cadaver” (RE004). A list of resource choices is available in the standardized vocabulary for instructional methods, assessment methods, and resources (Appendix I).

**Standardized vocabulary for instructional methods, assessment methods, and resources:**
This resource, available in this Guide in Appendix I, of possible instructional methods, assessment methods, and resources provides schools a list of terms, definitions, synonyms, and references for the various methods and resources documented in a school’s CI. Schools are not required to use all the method and resource choices on the list; rather, schools should use whichever and how many methods and resources choices are needed to represent their curriculum accurately and completely. Use of the standardized vocabulary is required in order to participate in the AAMC CI. These terms are based on "existing terminologies for instructional methods and assessment methods from CurrMIT, LCME, ACGME, and others."

**Expectations, competency objects, and learning objectives**

In the MedBiquitous CI specifications, described in the [CI Technical User Guide](#), the terms “expectations”, “competencies,” and “competency objects” are sometimes used to refer to similar concepts. For the purposes of the AAMC CI, and to assist in alignment with the LCME, it is helpful to think of these concepts as referring to “learning objectives.”

**Learning objective**: A learning objective is a statement of the specific, observable, and measurable expected outcomes (i.e., what the medical students will be able to do). Learning objectives can exist at each level of the medical school program, such as the program-level (i.e., behaviors medical students will exhibit upon graduation), at the course-level (i.e., behaviors medical students will exhibit upon the completion of a course), and at the event-level (i.e., behaviors medical students will exhibit upon the completion of an event). Recall that in the MedBiquitous CI specifications, courses, clerkships, and modules are represented in the concept “sequence blocks.” The learning objectives in this hierarchy within the curriculum map have relationships, such that each event-level learning objective serves a course-level learning objective, and each course-level learning objective serves a program-level learning objective. This creates a hierarchical web of learning objective relationships.

**Program-level learning objective**: program-level learning objectives, or program objectives, according to the LCME, are “statements of the knowledge, skills, behaviors, and attitudes that medical students are expected to exhibit as evidence of their achievement by completion of the program” (LCME DCI, p.58). For the purposes of the AAMC CI, program objectives are related to [PCRS](#) competency statements, and have relationships to course/module-level learning objectives, which in turn have relationships with event-level learning objectives.

**Sequence-block-level learning objective**: These are learning outcomes that are met by the end of a given course, module, block, clerkship, etc. Based on the MedBiquitous CI Specifications, the concept of “sequence block” is analogous to a course, module, clerkship, block, etc.

**Event-level learning objective**: Event (aka session-level) learning objectives are met by the completion of an educational event (e.g., “By the end of this lecture, students will be able to...”).

**Physician Competency Reference Set (PCRS)**: The PCRS, available in Appendix III of this Guidebook, is a competency framework provided by AAMC to which schools must relate their program-level learning objective or competencies in order to upload CI data to the AAMC. This
allows AAMC to make comparisons of program objectives across schools. The PCRS can be thought of as a model or sample of program-level learning objectives. Schools are not required to use the PCRS beyond relating them to their own program objectives, but some schools choose to use the PCRS either verbatim or as inspiration when writing their learning objectives.

Course/Modules (e.g., sequence blocks, courses, modules, clerkships, etc.)
The terms and definitions in this section are curriculum concepts which may direct what and how school’s CI data is formatted in their CI XML data file.

Course/modules and Sequence blocks: In the MedBiquitous Curriculum Inventory (CI) specifications, courses, clerkships, modules, blocks, units, and other organizing approaches to curriculum are represented with a data field called “sequence blocks.” It is an umbrella term to capture all types of organizational approaches to curriculum content. Within each sequence block there are events. Data within sequence blocks include title, start and end dates, duration in days, whether the sequence block is required or optional, expectations/competency objects, whether the sequence block is a clerkship or not, whether clerkship sequence blocks are rotational, and description. For the purposes of the AAMC CI, a course/module can be thought of as “a set of classes or a plan of study on a particular subject, usually leading to an exam or qualification” (Cambridge University Press, n.d., Definition A1, 2022).

Required sequence blocks are those that a student must complete to graduate. “These [sequence blocks] are stipulated as necessary to be done for all students in order to meet the expectations of the program” (Merriam-Webster, 2019). This is documented within the “required or optional” field for sequence blocks.

Optional sequence blocks are those that “allow students to self-elect for participation” (Rabow et al, 2016) in the class (Agarwal et al, 2015). Optional electives, for example, could include research projects or ‘away rotations.’ This is documented within the “required or optional” field for sequence blocks.

Clerkship model: In a CI XML data file, sequence blocks can be tagged as a “clerkship model.” If a sequence block fits the definition of clerkship for the AAMC CI, it would not receive the clerkship model tag. Definition of clerkship for the AAMC CI: A clinical clerkship which is tagged with a “clerkship model” in an CI XML data file is one that is predominantly made up of clinical, direct real-patient experiences in “which students receive clinical training and experience in teaching hospitals or affiliated health centers” (“Clinical clerkship,” 1983). Clinical clerkships are typically not connected to a specific supervising individual, but rather a location or specialty. The student has the “opportunity to acquire clinical knowledge and practice skills” (Golden et al, 2018). Examples may include sequence blocks such as emergency medicine clerkship, internal medicine clerkship, diagnostic procedures clerkship, etc.

If a sequence block is tagged as a “clerkship model”, it can be designated as “rotation” or “integrated.”

Rotational clerkships: A rotational clerkship is one that is offered as a sequence block throughout the year so that a cohort of students can enroll, but each individual student experiences the clerkship once. An example might be a psychiatry clerkship which runs from
July 1 through June 30 throughout the year so an entire cohort of students can enroll, but for any individual student, the psychiatry clerkship experience is 4 weeks long.

Integrated clerkships: If a sequence block is tagged as a “clerkship model”, it can be designated as “rotation” or “integrated.” These sequence blocks include content that “cuts across subject matter lines, bringing together various aspects of the curriculum into meaningful association to focus upon broad areas of study” (Shoemaker, 1989). In a medical school context, it includes the “trans-disciplinary delivery of information between the foundational sciences and the applied sciences” (Brauer & Ferguson, 2015; Quintero et al, 2016).

Concepts Related to CI Operations

Data and reports

Accreditation Support Report: Schools receive an Accreditation Support Report through their CI Portal, on the Upload tab, annually once they successfully upload a CI XML data file. This report contains school’s own data formatted in tables which align with the Liaison Committee on Medical Education (LCME) Data Collection Instrument (DCI). The data tables within the report may be used by schools to support curriculum evaluation, continuous quality improvement, evidence-informed curriculum decisions and renewal, and accreditation efforts. A sample of the Accreditation Support Report is available in the CI Technical User Guide.

CI data: CI data refers to schools’ curriculum inventories submitted to the AAMC. CI data are formatted in an XML data file for upload to the AAMC. CI data may contain thousands of data points. Information about the format and type of CI data that AAMC collects can be found through the MedBiquitous specifications.

CI Data tool: The CI Data Tool is produced annually by the AAMC starting August 2021 and intended as both a resource and research tool for schools with the goal of making the AAMC CI dataset more accessible to participating schools. As each school chooses whether to share and what to share of their curriculum data with other schools, each school’s view of the CI Data Tool is unique.

National aggregate curriculum reports: National reports which aggregate de-identified school data are available on the curriculum reports website, and in participating CI schools’ CI Portal. Curriculum reports on the website come from two data sources: the AAMC Curriculum Inventory (CI), and the Liaison Committee on Medical Education Annual Medical School Questionnaire Part II. National curriculum reports may be useful for benchmarking, curriculum renewal, and program evaluation purposes. More information about school access to curriculum reports can be found in the CI Portal User Guide.

School-specific CI reports: Schools receive two CI reports upon successful participation in the AAMC CI program. In the CI Portal, once a CI XML data file has been successfully uploaded, the Verification and
Accreditation Support Reports are generated. These reports format school’s own data into data tables. These reports may be useful to support curriculum evaluation, continuous quality improvement, evidence-informed curriculum decisions and renewal, and accreditation efforts. Samples of these reports are available in the CI Technical User Guide.

**Verification Report:** A Verification Report is a school-specific CI report. Schools receive a Verification Report upon successfully uploading a CI XML data file to the CI Portal. A Verification Report will not be generated if there are any MedBiquitous specifications or AAMC CI Business Rules errors within the data file. For more information about the specifications, business rules, and errors please see the CI Technical User Guide. Each school’s curriculum dean must verify their Verification Report in order to officially participate in the AAMC CI and submit data to AAMC.

The Verification Report contains data tables which present a school’s own data. The data tables within the report are used by a curriculum dean to verify the accuracy and completeness of a school’s CI data before verifying it and thereby officially submitting it to the AAMC. Because a school’s multi-year medical school program contains a great deal of content, the Verification Report can be very lengthy. It is best to reserve a block of time to review the report carefully. It is important to remember that the Verification Report, while lengthy, presents a portion but not necessary all of the CI data a school submits to AAMC.

Because a school’s curriculum program can be vast, it may not be realistic that a single individual (in this case, the curriculum dean) will have every event and learning objective memorized. Individual course and clerkship directors may be best able to judge whether all their curriculum is represented accurately and completely. Therefore, the curriculum dean may choose to share their Verification Report with other curriculum leaders in the institution (e.g., course directors) to confirm the individual curriculum component’s accuracy and completeness before giving the official sign off.

The data tables within the report may be used by schools to support curriculum evaluation, continuous quality improvement, evidence-informed curriculum decisions and renewal, and accreditation efforts. A sample of the Verification Report is available in the CI Technical User Guide.

**General terms**

**AAMC advocacy:** Part of the AAMC’s mission is to advocate for and support medical education programs. For example, the AAMC may use CI data to inform its responses to media or legislative inquiries. The AAMC also uses CI data to inform initiatives, conduct medical education research, and disseminate findings.

**Curriculum inventory (CI):** Schools maintain a local, school-specific curriculum inventory (CI), which is a repository of health professions curricula showing curriculum structure, content, and relationships among data points (e.g., program-level learning objective relationships to course-level learning objectives). Medical schools then share their local curriculum inventories with the AAMC, such that data can be analyzed and reported in aggregate. Please see more at www.aamc.org/cir
Dean: The medical school dean is a position at the school which is responsible for the entire medical school enterprise. Medical school deans are encouraged to have their staff upload their CI data to AAMC. Communications from the AAMC CI to medical school deans include the benefits to participation, reminders about deadlines, and a list of ramifications if a school is not able to upload their CI data by the deadline.

### Participation status

**Incomplete participating school:** If a school begins the AAMC CI data upload process, perhaps by uploading a data file, or beginning their Verification Report process, but does not complete the final step of verifying their Verification Report by the deadline (October 21), the school’s status remains incomplete. The school would not have access to AAMC CI participating school benefits.

**Non-participating school:** Participation in the AAMC CI program is evaluated on a yearly basis, as schools upload their CI data to the AAMC annually. If a school is non-participating for a given year, they are unable to access participation benefits for that year. Participation in the AAMC CI program is voluntary. Schools who need to decline participation for a given year should contact ci@aamc.org. This does not preclude schools’ ability to participate in the AAMC CI program in the future.

**Participating school:** A participating medical school in the AAMC CI program is one who has successfully uploaded and verified their CI data to AAMC in the most recent data collection period (August 1 - October 21 annually). Participation in the AAMC CI grants a school access to school-specific and national aggregate reports in addition to other publicly available curriculum reports.

**Participating vendor:** Vendors may sign a participation agreement with the AAMC so that they can access the CI Portal for their clients and assist in their CI data uploads to AAMC. Schools can choose to engage one of these participating vendors or use their own institutionally developed system to participate in the AAMC CI. Schools can also engage with a vendor who does not have a participation agreement with the AAMC; in those circumstances, the onus is on the school to manage data errors, uploads, and updates to the specifications and business rules. Schools are encouraged to contact other schools and collect lessons learned about their technical platforms before deciding on a specific curriculum management solution.

### Roles for schools in the CI Portal

The roles listed below for schools are available in the CI Portal.

**Curriculum dean:** The curriculum dean is responsible for the curriculum. This is the only role that can verify a school’s Verification Report to officially share CI data with AAMC. It is therefore helpful for this person to have familiarity with a school’s curriculum overall so that this person can judge the accuracy and completeness of a school’s CI data across courses and content. Learn more about the features that different CI users have access to and how to manage users and roles in the CI Portal User Guide.

**CI primary administrator:** The CI primary administrator, or CI primary admin, is a faculty/staff member
who is the primary point of contact for the AAMC CI. This is typically a person familiar with the ‘nitty gritty’ of the CI. Because schools can designate more than one CI primary admin, schools may choose to have both a curriculum director/manager and an IT staff member with CI responsibilities to each hold this role. Learn more about the features that different CI users have access to and how to manage users and roles in the CI Portal User Guide.

CI viewer: CI viewers are those faculty and staff at a school who need to be kept informed of CI data and reports but do not have editing responsibilities. This view-only role gives the user the ability to see their school’s CI data file, activity history, and school-specific and national reports. Schools can assign multiple faculty and staff to have a CI viewer role. As an example, schools might choose to give senior curriculum leaders, such as course directors, view only access through the CI viewer role so that course directors can see their school’s Verification and Accreditation Support Reports, and access national aggregate reports on various topics. Learn more about the features that different CI users have access to and how to manage users and roles in the CI Portal User Guide.

Roles for vendors in the CI Portal
The roles listed below for schools are available in the CI Portal. Please read more about the features that different CI users have access to and how to manage users and roles in the CI Portal User Guide.

CI vendor – admin: The CI vendor admin is the most senior role available for a vendor – this role has the maximum abilities for a vendor, with the ability to view clients’ progress in the CI upload and verification process and the ability to grant CI Portal access to other staff on the vendor’s team. This person should be the primary point of contact for AAMC CI and be familiar with all aspects of the program and their clients. AAMC CI participating vendors have view-only access (no editing abilities) to clients’ CI data files and school-specific reports. This access is only enabled when a school designates the vendor as their data sender in the Manage Sender tab of the CI Portal. If a school does not designate the vendor as their data sender, the vendor will not be able to view any information regarding their client.

CI vendor user: This role is designated by the CI vendor-admin. Vendors may choose to have several staff designated as CI vendor users so that individual staff can be assigned to select school clients. For example, a vendor may choose to designate one of their staff as the CI vendor user responsible for school clients in the Northeast, another staff member as the CI vendor user responsible for school clients in the Southeast, etc. This person should be someone able to provide customer support to their assigned school clients in uploading their CI data to AAMC. AAMC CI participating vendors have view-only access (no editing abilities) to clients’ CI data files and school-specific reports. This access is only enabled when a school designates the vendor as their data sender in the Manage Sender tab of the CI Portal. If a school does not designate the vendor as their data sender, the vendor will not be able to view any information regarding their client.

Stages of the CI data upload and verification process
CI season: Medical schools upload their curriculum data to the AAMC annually between August 1-October 21 for the previous academic year. For example, during August-October 2022, schools upload
curriculum data which occurred July 1, 2021–June 30, 2022. The CI Portal tracks schools’ progress in the upload and verification process. The stages of the process can be read in more detail in the CI Portal User Guide.

**No response status:** The CI Portal will display a ‘No Response’ status until data are uploaded for a given school.

**Ineligible status:** Because the AAMC CI collects data from the previous academic year, new medical schools which did not have a cohort of students in the previous year are not eligible to upload data to the CI Portal. However, new medical schools may request access to the CI Portal and may test their CI data in the CI Portal outside the upload period (approximately October 22 – July 31) so that they can build their CI and prepare for upload once they have a cohort of students.

**Data uploaded status:** Once a CI data file has been successfully uploaded, schools can download their CI Verification Report, access the CI XML data file that has been uploaded, or upload a new CI XML data file if necessary.

**Under review status:** In the CI Portal, a button available to curriculum deans and CI primary admins will say “Review Verification Report” once a CI XML data file is successfully uploaded. Once in the under-review status, the curriculum dean can verify the Verification Report. If the report contains inaccuracies or is incomplete, either the curriculum dean or CI primary admin can reject the Verification Report. In the school’s Activity History panel, this activity will be labeled “Review in Progress.”

**Verified status:** This is the final stage of the AAMC CI upload process and occurs once the school’s curriculum dean verifies/accepts the Verification Report. This is the step that officially shares a school’s CI data with AAMC.

**Technical aspects of the AAMC CI**
Technical documents related to the AAMC CI program are located in the CI Technical User Guide. AAMC CI program utilizes MedBiquitous CI standards and specifications; for more information about MedBiquitous and questions about their related documents, please visit the MedBiquitous website.

**AAMC CI Business Rules:** Following the compliance with the MedBiquitous Curriculum Inventory (CI) and Competency Framework specifications, the AAMC CI Business Rules, available in the CI Technical User Guide, are additional qualifications and constraints that a CI XML data file must meet before it can be submitted to the AAMC. For example, a CI submission must contain curricular data for the previous academic year (e.g., in August 2022, the AAMC will be collecting curricular data which occurred between July 1, 2021 – June 30, 2022). If the CI XML data file contained curricular data for any year other than the previous academic year, it would cause a business rule error and not successfully upload to the AAMC. Business rules abbreviations include:

- CF = Competency Framework
- CI = Curriculum Inventory
**CS = Curriculum Inventory Structure**  
**URI = Universal Resource Identifier**

**CI Portal**: The [CI Portal](#) is the site where schools annually upload their CI data and verify their Verification Report between August 1 and October 21. The CI Portal sends automatic email notifications related to the CI data upload and verification process. It is also where participating schools can view their school-specific and national aggregate curriculum reports throughout the year. Prior to November 2021, the CI provided access to a testing environment for schools and vendors to upload data. This environment was called CI Staging and it required a separate AAMC user account. The AAMC sunset this service in November 2021. Instead, the CI Portal is now available for schools and vendors to use for testing uploads.

**CI Portal lock**: The CI Portal is available throughout the year for schools to access their curriculum reports, view their CI submission from the previous year, edit their users and manage their data sender, and more. However, the period of time when the CI Portal is open for data uploads is limited to August 1-October 21 annually. After October 21, the CI Portal is locked in that additional data uploads or edits will not be accepted until the following year, beginning August 1 however the the CI Portal is available for testing uploads after October 21 for the following upload year.

**Data standards**: From [MedBiquitous](#): “Data standards are the rules by which data are described and recorded. In order to share, exchange, and understand data, we must standardize the format as well as the meaning. The four common elements of a data standard are: 1) the data dictionary, 2) the data model that demonstrates how the data elements are related, 3) the data format used for storing or transmitting the data, and 4) any relevant protocols related to security or how the data should be transported.”

**Competency data standards**: From [MedBiquitous](#): “data standards and supporting guidelines for education competencies that enable sharing of information, resources and activities that can be associated with a competency framework.” These standards form the backbone of AAMC business rules relating to competencies.

**Data lock**: In the [CI Portal](#), once a school has successfully uploaded a CI XML data file and enters “under review” status for reviewing their Verification Report, the school’s curriculum dean can accept the Verification Report, or the school’s curriculum dean or CI primary admin can reject the Verification Report. Schools may choose to reject the Verification Report and upload a new CI data file if errors are found, if the tables within the Verification Report do not populate as expected, or if the report is found to not accurately and completely represent a school’s curriculum. The school’s [CI Portal](#) will be locked for additional data uploads until the Verification Report is either accepted or rejected. This safety mechanism is put in place so that a user at a school does not accidentally overwrite a Verification Report that another user at their school was in the midst of reviewing. The data lock is removed once the Verification Report is either accepted or rejected.

**Data sender**: In the [CI Portal](#), in the Manage Sender tab, schools can designate who will create their CI XML data file and how it will be sent to the AAMC. Schools can choose to engage a CI participating
vendor or use an institutionally developed system to create their CI XML data file and share it with the AAMC. Vendors do not have access to any school information unless or until a school designates that vendor as their data sender in the CI Portal. More information about how schools can manage their data sender is available in the CI Portal User Guide.

Data quality flag: A CI XML data file must meet the MedBiquitous Curriculum Inventory (CI) specifications, the MedBiquitous Competency Framework specifications, and the AAMC CI Business Rules to be uploaded to the AAMC. These are available in the CI Technical User Guide. After CI data has been uploaded and the school’s curriculum dean has verified the Verification Report, AAMC performs a number of quality checks on the school’s data. If any data quality concerns are identified, a “flag” is triggered. These flags check for quality markers that technically meet the specifications and business rules but may be a signal of questionable data accuracy and completeness. Thus, through these post-CI data collection quality flags, it may be that not all CI data submitted to the AAMC is ultimately used when analyzing data and creating curriculum reports.

Error: An error will result if a CI XML data file uploaded to the AAMC does not meet the MedBiquitous Curriculum Inventory (CI) specifications, the MedBiquitous Competency Framework specifications, and/or the AAMC CI Business Rules. If an error exists in the CI XML data file related to the MedBiquitous specifications, the CI Portal will not allow the file to process or be evaluated against the AAMC CI Business Rules. Once a CI XML data file meets the MedBiquitous specifications, the file is checked against the AAMC CI Business Rules. If one or more errors related to the AAMC CI Business Rules occurs, an automatically generated notification is sent. This notification directs the reader to access the Activity History on the CI Portal and download the Error Report, which provides more details about the specific business rule violations. If an error is generated, it means the CI data has not been successfully submitted to the AAMC. The error must be addressed, and the entire file re-submitted. A school’s reports cannot be generated until all the MedBiquitous specifications and AAMC CI Business Rules are met.

Gateway: This term is related to the availability of a Web service, which a CI participating vendor may use so that a school client can submit their CI data directly from the vendor software to the AAMC, rather than through the CI Portal. A closed gateway means that the Web service is disabled and will not accept communication from senders. An open gateway means the Web service is enabled and will accept communication from senders. More information about the use of a Web service is available in the CI Portal User Guide, as well as in the CI Technical User Guide.

MedBiquitous standards: From MedBiquitous: “Standards are a key element of the infrastructure that is essential to track clinical education and training, measure its efficacy, integrate education and improvement resources with systems at the point of care, deploy online courses in different environments, and link education and performance data to core competencies and curricula.” MedBiquitous develops data standards and technical guidelines in support of health professions education and credentialing. As it relates to the curriculum inventory, each submission is validated against the MedBiquitous Curriculum Inventory standard automatically as part of the submission process.
**Verification process:** A CI XML data file can be uploaded directly to the CI Portal or via a Web service. Once a CI XML data file is uploaded which meets all the MedBiquitous Curriculum Inventory (CI) specifications, the MedBiquitous Competency Framework specifications, and the AAMC CI Business Rules, a school’s Verification Report is generated in the CI Portal. A school’s submission process is not complete until the curriculum dean verifies the Verification Report in the CI Portal.

**Web service:** CI participating vendors and schools who create their own CI data files with an institutionally developed system have the option to use a Web service to share CI data with AAMC. This allows for CI data uploads outside of the CI Portal. CI participating vendors may create this feature so that their school clients can submit their CI data directly from the vendor software to the AAMC. Whether CI data is uploaded directly to the CI Portal or through a Web service, schools still need to login into the CI Portal to review and verify the Verification Report. More information about the use of a Web service is available in the CI Portal User Guide, as well as in the CI Technical User Guide.
References


