



Public Health Laboratory Competencies Project



APHL/CDC Laboratory Competencies Project Overview

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Public Health Laboratory Competencies Project



Introduction to the Project

The Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories (APHL) have developed the Laboratory Efficiencies Initiative (LEI) to help Public Health Laboratories (PHL) achieve long-term sustainability by adopting high-efficiency management practices.

Current State of the PHL Workforce

PHL workforce development is one of the key strategic initiatives of the LEI. The workforce is critical to addressing budgetary and political challenges, as well as technological advances, improved efficiency and effectiveness of the PHL system, and assuring the survival of the critical services that PHLs provide. However, severe challenges exist that include: major gaps in the number of science majors needed to fill scientific and technology needs; impending loss of the baby-boom generation to retirement; and a deficit in training needed by the current workforce to address current and emerging demands. This is especially critical in informatics and in evolving technologies in molecular biology such as polymerase chain reaction (PCR). Such unmet challenges endanger our nation's ability to deliver quality information to guide public health decisions at all levels.

The APHL Workforce Development Committee (WDC) has been engaged in the initial stages of developing draft leadership and management competencies for Public Health, Environmental, and Agricultural Laboratory (PHEAL) workers to address multiple member needs such as defining appropriate job descriptions and developing career ladders. We are expanding the scope of this work from these recently developed competencies to a broader scope of laboratory core competencies that include the specific technical components. This expansion of scope will assure that the aggregated work will represent the first set of comprehensive competencies for PHLs; similar to the Council of State and Territorial Epidemiologists (CSTE) and Laboratory Biosafety competencies completed and endorsed by CDC during the last decade.

Competencies: Purpose and Use

Competencies are action-oriented statements that delineate the essential knowledge, skills, and abilities in the performance of work. Competencies are describable, observable and measurable. A number of public health disciplines, including Epidemiology and Informatics, have already developed comprehensive competencies through CDC partnership efforts to address multiple workforce needs. Competencies can be used in a number of ways, for instance:

- 1) **Practitioners/laboratory workforce** can assess their current skill level and define focus areas for additional training and strive to achieve higher competency levels as a career-development plan.
- 2) **Employers** can create job descriptions, career ladders, performance objectives, and performance appraisals for their laboratory positions aligned with the competencies to objectively evaluate workers' merits. Human resource management organizations can use competencies for recruitment.
- 3) **Managers** can use competency tools as reference materials in the performance management process. They also may be used to guide the development of performance objectives and professional development activities that can include providing a basis for certification examinations of employees and the accreditation of laboratories.

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- 4) **Educators and training developers** can design education and training programs that meet public health agencies' and laboratories' needs by mapping the competencies to academic courses and curricula, training plans, and workforce development plans. Critical elements of PHL practice defined within the competencies can be incorporated into existing coursework and used to help new graduates, as well as current workers.
- 5) **National Organizations** can use competencies to further develop the PHL workforce. For example, both the Epidemic Intelligence Service (EIS) and the CDC/CSTE Applied Epidemiology Fellowship curricula are being aligned to the Applied Epidemiology Competencies (AECs), and the Association of Schools of Public Health has developed guidelines for mapping the AECs to curricula.

Partnership in the Competencies Development Process

CDC and APHL worked together to develop laboratory competencies for the area of biosafety, which were recently published (<http://www.cdc.gov/mmwr/pdf/other/su6002.pdf>). Given CDC's limited resources and existing APHL competency development efforts, further development and vetting is proposed as a CDC/APHL partnership similar to that for the epidemiology and informatics competencies. Initial funding was provided to convene an APHL/CDC Steering Committee to provide direction, guidance, and oversight to the process of developing discipline-specific, discipline-crosscutting, and general core competencies with the engagement of various subject matter experts (SMEs) to assure appropriate input and vetting.

The final competencies will align with the Council on Linkages format for competencies used by other public health disciplines. Additionally the competencies will be based on the core public health laboratory functions and include: general competency domains that are tailored to the responsibilities of all laboratorians (e.g., quality management systems (QMS), leadership and management,); cross-cutting competency domains that apply to all laboratory workers (e.g., communication, informatics, emergency preparedness, safety and security, workforce training and education, surveillance); and technical competency domains for laboratory workers employed in specific scientific disciplines (e.g., general laboratory practices, microbiology, chemistry, bioinformatics, research,). In addition, each of the competencies will include sub-competencies that further outline the observable actions and behaviors that are included within the general competencies, cross-cutting competencies, and technical competencies.

This phase of the competencies development process will document the academic structural KPI (key performance indicators) for laboratorians. The real value of the work will result in subsequent phases where this first phase provides the foundation for the development of tools, resources, guidance, and measureable activities to demonstrate the Return on Investment for the project. This project scratches the surface of work that must be done to position the workforce for practical application. And although it is only the first step, it is the perhaps the most important part of the overall project adoption and implementation.

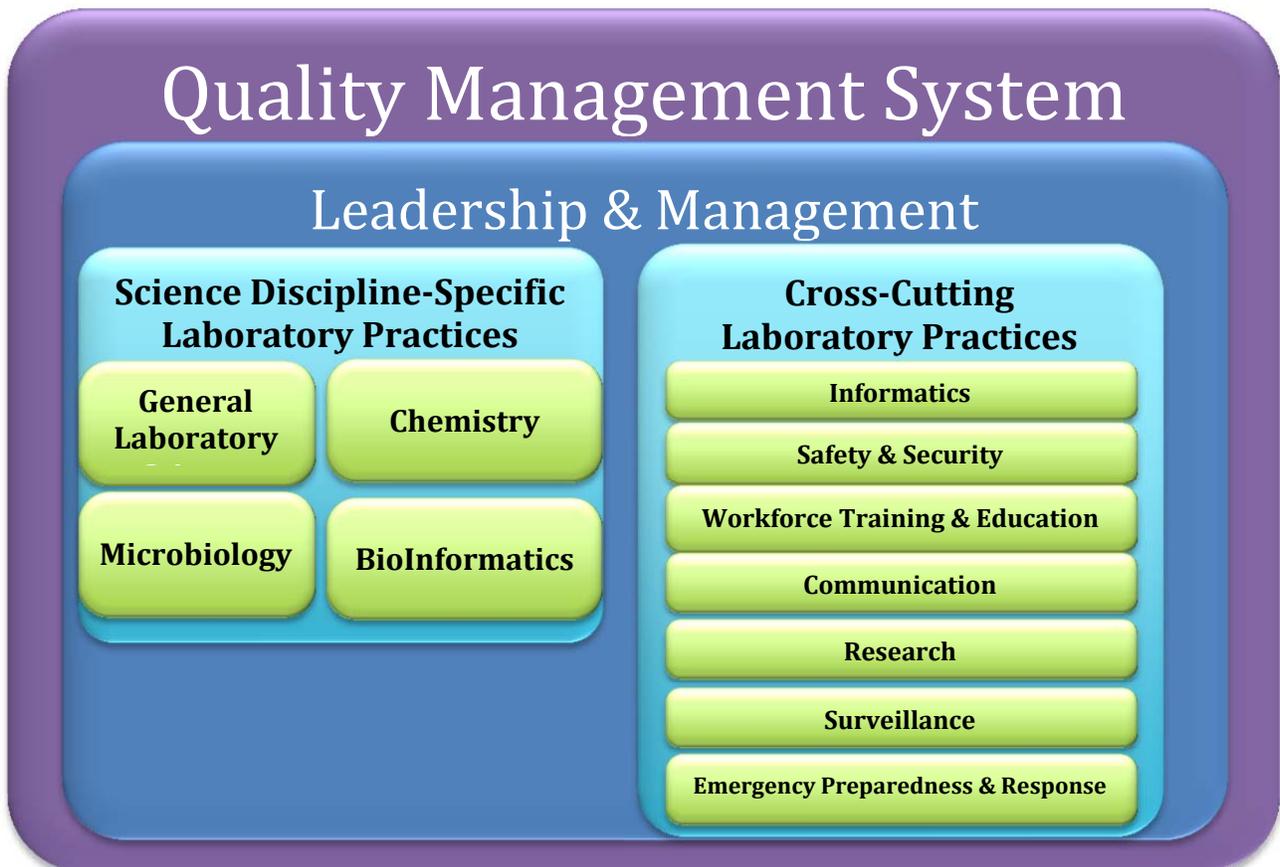
This project is the foundation for an iterative dynamic body of work going into the future. The demand for increasingly more complex competency sets is imperative for laboratorians, especially leaders as evidenced over the past two decades. Our commitment for this work is to begin the work with the most commonly recognized fundamentals, knowing that agricultural and environmental components must be integrated.

PHL Competencies Framework

PHL Competencies Domain Areas

Public health, environmental and agricultural laboratories' first responsibility is to provide quality testing and services to support the health of the public and meet the many needs of their customers. This diagram shows how this demand for quality superimposes itself over all aspects of laboratory operations. It is uppermost in the minds and duties of all laboratorians, from the laboratory's leaders and managers who must ensure it, through technical experts, supervisors, bench scientists, technicians, and assistants who must incorporate it. As all go about meeting their laboratory competencies and carrying out their professional duties, whether it be in a general competency domain (e.g., quality management systems (QMS), management and leadership); cross-cutting competency domain (e.g., communication, informatics, emergency preparedness, safety and security, training and education, surveillance); or in a technical competency domain (e.g., microbiology, chemistry, bioinformatics, or research), laboratory quality is in the foundation of every activity.

In public health laboratories, leadership is responsible for the overall operation and management of the policies, processes and procedures directing the work of the organization. The model depicts the major domain areas that represent the functions performed by the staff of a public health laboratory. Leadership implements and directs the Quality Management System activities essential to support the General Laboratory Science and Practices, laboratory testing disciplines, and the laboratory path of workflow. Leadership oversees the information produced by the laboratory which may be used to support research and surveillance activities.



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The overarching proviso for this project is to provide the foundation for an iterative, dynamic body of work. The demand for increasingly more complex competency sets is imperative for laboratorians, especially laboratory leaders as evidenced over the past two decades. The project commitment for this work is to begin the effort with the most commonly recognized fundamentals of public health laboratory disciplines, knowing that agricultural and environmental components must be integrated in the future.

Project Scope and Design Criteria

A public health laboratory is defined as a governmental public health, environmental, or agricultural laboratory providing analytical biological and/or chemical testing, and testing-related services that protect human populations against infectious diseases, food and waterborne diseases, environmental hazards, treatable hereditary disorders, and other natural and man-made public health emergencies.

This project and process is focused on developing laboratory workforce competencies for public health laboratories and therefore will engage the relevant stakeholders and agencies. Ideally the public health laboratory workforce competencies will be universal in nature and provide value to many other laboratory disciplines. Public health laboratories have varied roles and this often includes some clinical testing. Efforts will also be made to acknowledge and, as much as possible, include existing competencies and representatives from other organizations representing clinical and other laboratory scientists.

Project Design Criteria

Design Criteria are guidelines or standards used to develop and evaluate a project's design. Design criteria are derived from a variety of strategy and guidance statements or principles, including, but not limited to, the organization's goals, strategic plans, stakeholder expectations, and requirements of the project.

Design Criteria can be both guidelines and specifications. As guidelines they tell the design team what the organization must do and must not do to successfully execute its requirements. As specifications they provide a final framework for the project to ensure the project meets the criteria decided by the Steering Committee.

Public Health Laboratory Competencies Project Design Criteria

1. Competencies must have proficiency levels (tiers).
2. Competencies must focus on Public Health Laboratories.
3. Competencies will be standardized core competencies.
4. Competencies will meet nationally established regulatory standards.
5. Activities will be captured at the competency level.

Project Governance

The Project Planning Workgroup is responsible for the delivery of the final product maintaining the intent of the project as determined by the Steering Committee. The key governance and activity groups within the Project Planning Workgroup are:

Coordinator for the project – Catherine Johnson, APHL

- Responsible for overall completion of the project
- Responsible to align support services for the project
- Responsible to ensure share-point site is enabled and functional
- Responsible to ensure the final document is created, synthesized, written and published
- Responsible to ensure compliance with expectations for all participants in the project

Support for the project – Steering Committee

- Responsible to procure financial support for the project
- Responsible to approve adaptations and changes to scope of the project
- Responsible for final approval of completed documents
- Responsible to support design teams with time, engagement, guidance and decision-making

Steering Committee Members

- Jack DeBoy, APHL
- Judy Delany, CDC
- Catherine Johnson, APHL
- Wendi Kuhnert, CDC
- Renee Ned, CDC
- Janet Nicholson, CDC
- Eva Perlman, APHL
- Anne Pollock, CDC
- Pandora Ray, APHL
- John Ridderhof, CDC
- Penney Reese, CDC (as available)

Support for the project – Synthesis Document team

- Responsible for developing a synthesis document containing competencies relatable to public health laboratory practices and organized by domains obtained from academic or published resources

Synthesis Document Team Members

- Eva Perlman, APHL
- Jack DeBoy, APHL
- Michael Pentella, APHL
- Renee Ned, CDC
- Pandora Ray, APHL
- Catherine Johnson, APHL
- LuAnne Forrest, AlignOrg
- Kerrie Naylor, AlignOrg

Partner for the Project – AlignOrg Solutions

- Responsible to partner and provide facilitation support to design teams
- Responsible to facilitate the 2-day face-to-face design work session
- Assess output and provide guidance and recommendations to the steering committee around project needs and support initiatives
- Partner with Project Coordinator in ensuring completion of objectives
- When recorder isn't available, responsible for data capture and review activities
- Partner in development of competencies documents e.g. Synthesis document strawman, domain team draft competencies document, final draft document

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- Responsible to collect feedback from team members throughout the process in designing additional and supplemental activities necessary to complete the project
- Responsible for assuring that project competencies document meet nationally recognized academic and applied competency standards

Partner Lead – Mike Smith, AlignOrg Solutions

- Responsible for partnering with Project Coordinator and the completion of all Project Lead responsibilities
- Responsible for assuring that project competencies document meet nationally recognized academic and applied competency standards
- Coordinate the activities of all AlignOrg Solutions resources and work performed with the individual teams
- Coordinate the data capture in ensuring adherence to applied standards and expectations

Support for the project – Writing team

- Responsible for developing the final draft competency document containing competencies relatable to public health laboratory practices
- Responsible for reviewing the work product of the professional writer

Writing Team Members

- | | |
|---------------------------|-----------------------|
| • Jack DeBoy, APHL | • Eva Perlman, APHL |
| • Judy Delany, CDC | • Pandora Ray, APHL |
| • Catherine Johnson, APHL | • John Ridderhof, CDC |
| • Renee Ned, CDC | • AlignOrg Solutions |

Support for the project – Review Team of Public Comments

- Responsible for reviewing the public comments and responding as appropriate to the comments.
- Responsible for determining edits to final draft competency document based on public comments.

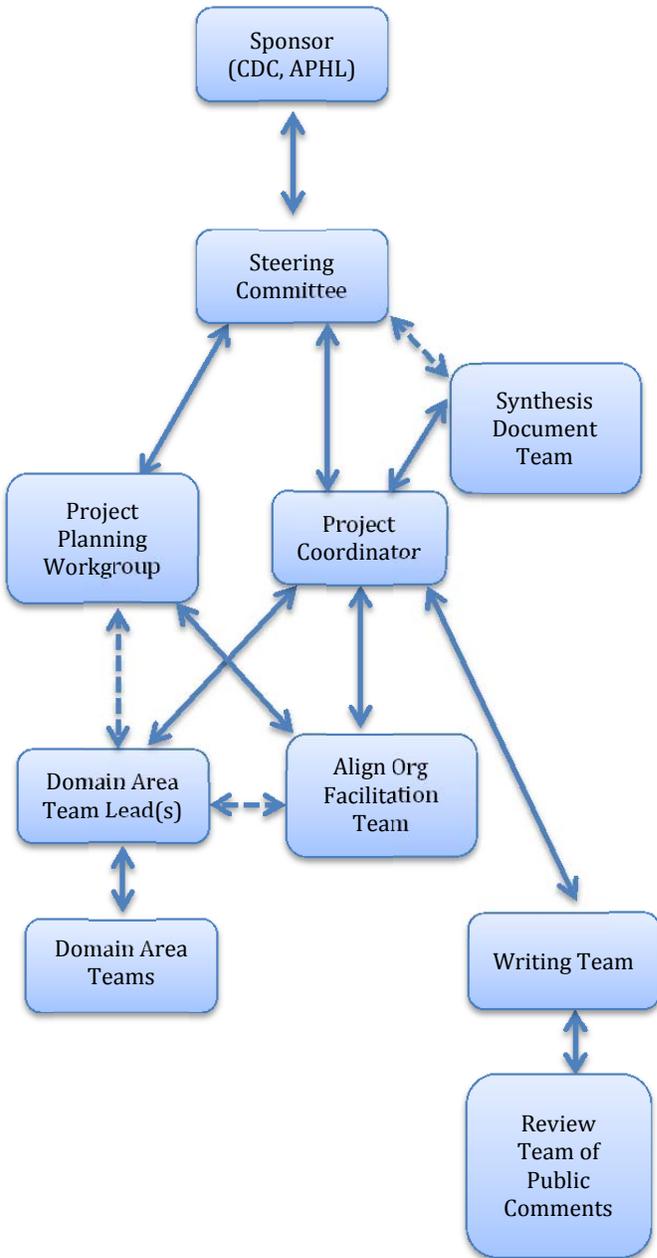
Review of Public Comments Team Members

- | | |
|---------------------------|-----------------------|
| • Jack DeBoy, APHL | • Eva Perlman, APHL |
| • Judy Delany, CDC | • Pandora Ray, APHL |
| • Catherine Johnson, APHL | • John Ridderhof, CDC |
| • Renee Ned, CDC | |

Additional Collaborator – Dr. Kathleen Miner

- Responsible for providing guidance to Partner Lead and Coordinator for Project.
- Responsible for providing ad hoc competency development support to Partner Lead and Coordinator for Project, as needed
- Responsible for final review and endorsement for all completed competency work

Project Structure



Sponsor

- Kicks-off the project
- Secures adequate funding
- Is a project champion
- Supports change & transition efforts

Steering Committee

- Sets project direction
- Clarifies strategy and provide guidance on design criteria and priorities
- Assesses competency design work and makes realignment decisions

Synthesis Document Team

- Develops a synthesis document containing competencies relating to public health laboratory practices obtained from academic or published resources

Project Coordinator

- Manages project logistics
- Ensures final document creation and completion
- Ensures compliance with expectations for all participants in project

AlignOrg Solutions Facilitation Team

- Facilitates the development of competencies
- Assesses output and provide guidance and recommendations on project
- Provides data capture, reviews activities and collects feedback from teams

Domain Area Teams and Leads

- Reviews current organization strategy, capabilities, work and design
- Participates in development sessions
- Supports change management and implementation planning
- Develops competencies

Review and Writing Team

- Reviews the draft competencies document submitted by the Domain Team areas.
- Participates in review and editing of document
- Prepares summary of comments submitted during public review period
- Makes final publication ready document

Domain Areas Team Structure

The Project Planning Workgroup decided to use Domain Area teams within the discipline-specific, discipline-crosscutting, and general competencies to complete the development work. Each team is designed for optimal usage of participants in areas of strength or expertise. Because of the scarcity of resources within laboratories, time and activities should be structured to facilitate optimal engagement and work from team members.

Team Lead(s) and Primary Team Lead

Each team leader is either an APHL or CDC subject matter expert responsible for the following:

- Identify, select, and invite team members to participate in the project
- Participate in competencies development calls or meetings, as scheduled

Domain Area teams may have several co-leads with one lead designated as the primary lead for the team who is responsible for the following:

- Partner with the coordinator in preparing all of the logistical necessities for the project, i.e. scheduling calls, homework assignments, sharing opportunities, etc.
- Partner with the facilitator in meeting the work team agenda
- Ensure completion of routine and non-routine assignments
- Participate in a monthly phone call with other domain area team leaders to help support issues, identify commonalities and cross-over, and to reassign work as needed

Facilitator

Each team will be assigned a facilitator to support the competency development work. The facilitator may or may not be a subject matter expert on the subject, but is an expert in the mechanics of the writing formal competencies. They are responsible for the following:

- Partner with the Team Lead and Project Coordinator in determining logistics for the project.
- Facilitate through demonstrations, questions, teaching, and/or one-on-one support activities the acquisition of team members' abilities to write coherent competencies that follow the model.
- Ensure that documentation is correct.
- Collect feedback continually from team members.
- Plan for and deliver competency development activities.

Recorder

If a recorder is available for a team, they are responsible for (if a recorder is not available, then the facilitator will be responsible for the following):

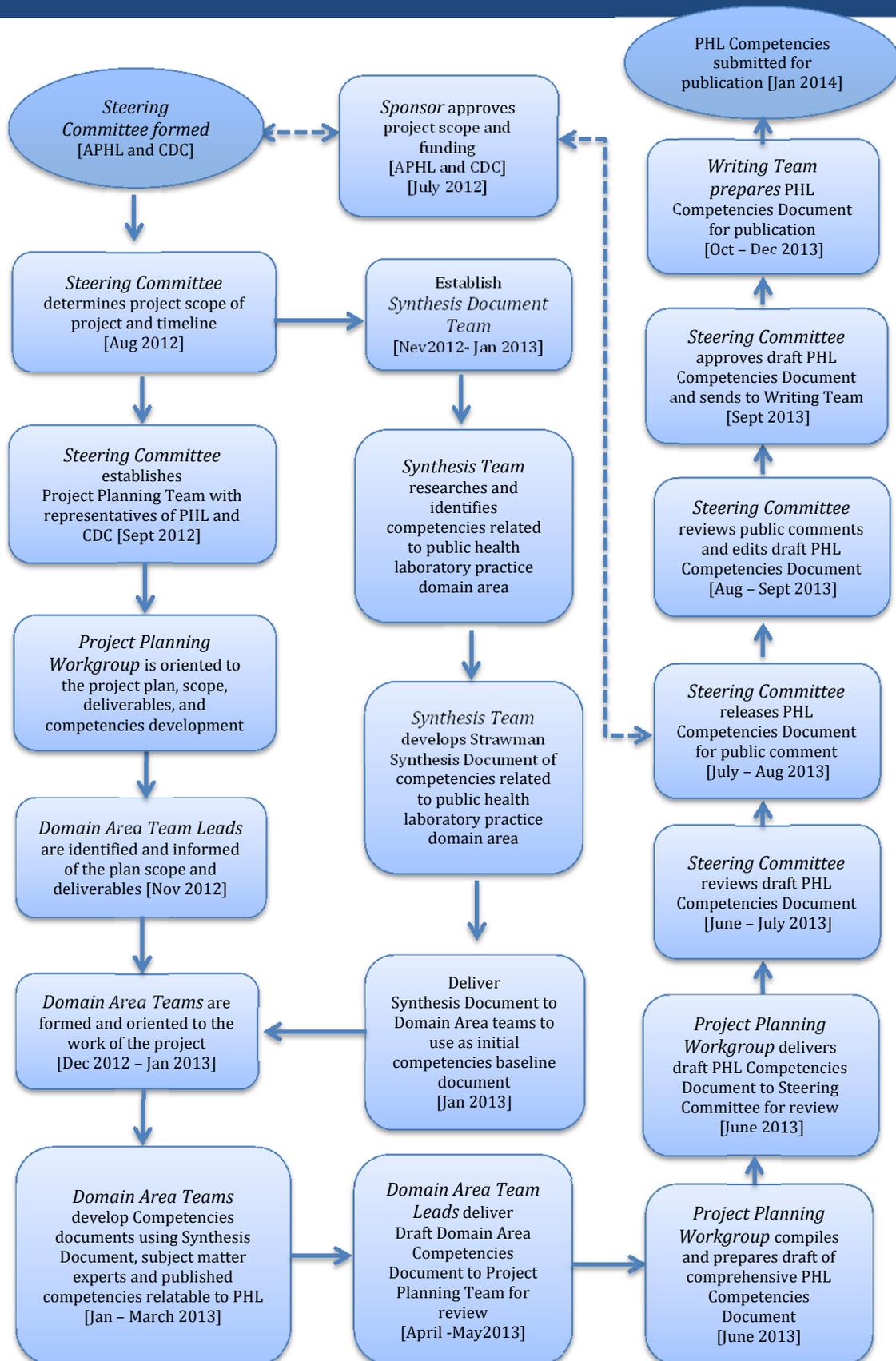
- Recording documentation from meetings
- Making changes to documentation as suggested by team

Team Member(s)

A team member should be a subject matter expert currently or recently engaged in activities that directly relate to the team. The team member has the following assignments:

- Participate fully in the competency development process
- Be prepared to complete assignments outside of the biweekly phone call meeting
- Provide follow-up and review of captured data for authenticity and correctness

Project Process



Timeline & Phases

| Project Timeline | |
|-------------------------|--|
| Oct 17-18, 2012 | Project Planning Team face-to-face meeting for project scope and orientation to competencies writing techniques. Team Lead(s) for Domain Teams are identified. |
| Dec 5-6, 2012 | Synthesis Team meeting to initiate development of a strawman competencies document synthesized from published competencies relatable to public health laboratories |
| Nov 2012 to Jan 2013 | Domain teams are selected, participants approved and domain team meet for orientation meeting |
| Jan 2013 to March 2013 | Domain teams have five to seven 90 minute sessions to review synthesized competencies document and identify gaps in competencies. Develop competencies to address gap. |
| April 2013 to May 2013 | Team Leads work with Project Coordinator, Facilitators and individual team members to finalize the work product |
| June 2013 | Team Leads and Steering Committee to review final draft project |
| June to July 2013 | Writing committee writes final draft of competencies for public comment |
| July to Aug 2013 | Public review and comment period |
| Aug to Sept 2013 | Writing committee and Steering committee review public comments and respond to comments |
| Aug to Sept 2013 | Vetting period with SMEs and stakeholder groups to ensure accuracy, reliability and validity to identified and captured competency work product. |
| Oct to Dec 2013 | Final document prepared by publication team |
| Jan 2014 | Submit final document for publication |

Phase I (Aug 2012 – Oct 2012)

- Identification and creation of Steering Committee
- Contract with key partners
- Initial kick-off 2-day session to determine domains, proficiency levels, and introduction to writing competencies

Key Activities

- Identify and select Steering Committee - Completed
- Contract with key partners - Completed
- Identify leaders for design teams - Completed
- Identify initial domains for competencies - Completed
- Identify initial proficiency levels for competencies - Completed
- Finalize documentation capture tools and processes for teams - Completed
- Introduce team leaders to competency writing process – Completed
- Identify, select, and engage design teams – In Progress – complete by January 14, 2013

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Phase II (November 2012 – March 2013)

- Synthesis team develops a strawman competencies document
- Teams begin work within assigned domain(s)
- Collection, abridgement and review of finalized work
- First draft completed

Key Activities

- Synthesis team develops a competencies document from competencies relatable to public health laboratory domain topics - Completed
- Team members meet and develop competencies for their respective domains working from the strawman competencies document
- Complete first draft of competencies

Phase III (April 2013 – Jan 2014)

- Preview final document created for vetting purposes with key stakeholders, outside organizations, and internal decision makers at APHL/CDC
- Write final document, present, and submit for publication

Key Activities

- Competencies vetted and reviewed by key stakeholders both inside and outside of the supporting organizations
- Final document prepared
- Final document presented
- Final document submitted for publication

Laboratory Competency Domains

The following domains were selected through group work during the October 2012 conference in Atlanta. It was determined that these would be the beginning or starting place and that some new ones may need to be added and that some domains might fit into others as the work develops.

Domains and Initial Team Leads (revised as of 01/07/2013)*

| Domain(s) for Teams** | Team Lead(s) |
|---|--|
| Chemistry Emergency Preparedness General Lab Science | Brenda Snodgrass Scott Shone Michael Wichman |
| Microbiology Emergency Preparedness General Lab Science | Michael Pentella |
| QMS | Susie Zanto Debbie Kuehl Anne Pollock |
| Safety & Security | Lia Haynes Anne Pollock |
| Management Leadership | Rick Panning Jack DeBoy |
| Workforce Training & Education | Rick Parry Bob Kobelski |
| Informatics | Sara Imholte John Ridderhof |
| Research | Laura Gillim-Ross |
| Bioinformatics*** | Scott Sammons |
| Communication | Kathryn Wangsness Leah Gillis Susan Hunter |
| Surveillance | Susan Hunter Kathryn Wangsness Leah Gillis |

*Note 1: Other team leads or co-leads continue to be identified from the Work Group members.

**Note 2: It was determined that Molecular Biology is a methodology used by multiple public health laboratory testing disciplines. As such, it is no longer an independent domain topic under the scope of this project. It will, instead, be incorporated into the Microbiology and possibly Chemistry domains.

***Note 3: Bioinformatics was initially being considered as an independent domain area. However, as the competencies are developed, it may be incorporated into another domain area (e.g., Research).

Laboratory Competency Proficiency Levels

Proficiency refers to the levels of achievement of a particular competency. It is a work performance characteristic that distinguishes a person from everybody else on certain activities that are a little more complex or important. Proficiency levels should be progressive and show a clear line of progression toward a higher level of achievement within the profession.

Competencies are written in such a way that they can measure levels of ability. Proficiency levels provide a structure of continuing improvement as one’s skills grow, not just as a rubric with good/better/best.

Each Domain Area Team will use a standardized competency development tool based on a modification of the Dreyfus model to differentiate the levels of proficiency within a competency. Teams will also use Bloom’s Taxonomy to select verbs that align with a description of progressive competency as is represented in the Dreyfus model.

For the PHL Competencies Document, the Novice and Advanced Beginner levels (Dreyfus Model) will be combined as the Entry Level / Beginner Proficiency Level.

| PHL Competencies: Proficiency Levels (Tiers) | | | |
|---|--------------------------|------------------------------|--------------------------|
| Beginner (Entry Level) | Competent (Mid-Level) | Proficient (Senior Level) | Expert (Expert Level) |

Dreyfus Model: Modified for PHL Competencies Project

The Dreyfus model of skill acquisition includes five progressive stages of development. The model is based on the idea that beginners rely on the rules of how to deal with a situation and reliance on those rules diminishes as one advances in proficiency. Learners are able to handle more complex situations with higher levels of pattern recognition and adjust to different and more complex situations.

| Descriptions of PHL Competencies Model Based on Dreyfus Model | |
|--|--|
| Beginner (Entry Level) | <ul style="list-style-type: none"> Rigid adherence to taught rules of plans Guidelines for action based on attributes or aspects Situational perception still limited All attributes and aspects are treated separately and given equal importance |
| Competent (Mid-Level) | <ul style="list-style-type: none"> Coping with “crowdedness” Now sees actions at least partly in terms of longer-term goals Conscious deliberate planning Standardized and routinized procedures |
| Proficient (Senior Level) | <ul style="list-style-type: none"> Sees situations holistically rather than in terms of aspects Sees what is most important in a situation Perceives deviations from the normal pattern Decision-making less labored |

| Descriptions of PHL Competencies Model Based on Dreyfus Model | |
|--|--|
| | <ul style="list-style-type: none"> • Uses maxims for guidance, whose meaning varies according to the situation |
| Expert (Expert Level) | <ul style="list-style-type: none"> • No longer relies on rules, guidelines or maxims • Intuitive grasp of situations based on deep tacit understanding • Analytic approaches used only in novel situations or when problems occur • Vision of what is possible |

Eraut, M. (1994). Developing professional knowledge and competence. London: Falmer Press

Stages of Clinical Competence

For the purpose of the PHL Competencies project, four levels of proficiencies will be used: Beginner, Competent, Proficient and Expert. The table shows an example of adapting Dreyfus's work by Benner. He interviewed multiple individuals and adapted the Dreyfus model to define stages of clinical competence in nursing. The table is adapted to public health laboratorians and provides a suggestion on how each of the proficiency levels can be determined based on observation of actions and behaviors representing skills, knowledge and attitudes based on the proficiency levels.

| PHL Competencies Model Benner's Stages of Clinical Competence¹ (modified) | |
|---|--|
| Beginner | Beginners are those who can demonstrate marginally acceptable performance, those who have coped with enough real situations to note, or to have pointed out to them by a mentor, the recurring meaningful situational components. These components require prior experience in actual situations for recognition. Principles to guide actions begin to be formulated. The principles are based on experience. |
| Competent | Competence, typified by the laboratorian who has been on the job in the same or similar situations two or three years, develops when the laboratorian begins to see his or her actions in terms of long-range goals or plans of which he or she is consciously aware. For the competent laboratorian, a plan establishes a perspective, and the plan is based on considerable conscious, abstract, analytic contemplation of the problem. The conscious, deliberate planning that is characteristic of this skill level helps achieve efficiency and organization. The competent laboratorian lacks the speed and flexibility of the proficient laboratorian but does have a feeling of mastery and the ability to cope with and manage the many contingencies of laboratory operations. The competent person does not yet have enough experience to recognize a situation in terms of an overall picture or in terms of which aspects are most salient, most important. |
| Proficient | The proficient performer perceives situations as wholes rather than in terms of chopped up parts or aspects, and performance is guided by maxims. Proficient laboratorians understand a situation as a whole because they perceive its meaning in terms of long-term goals. The proficient laboratorian learns from experience what typical events to expect in a given situation and how plans need to be modified in response to these events. The proficient laboratorian can now recognize when the expected normal picture does not materialize. This holistic understanding improves the proficient laboratorian's decision making; it becomes less labored because the laboratorian now has a perspective on which of the many existing attributes and aspects in the present situation are the important ones. The proficient laboratorian |

| PHL Competencies Model Benner's Stages of Clinical Competence¹ (modified) | |
|--|--|
| | uses maxims as guides, which reflect what would appear to the competent, or novice performer as unintelligible nuances of the situation; they can mean one thing at one time and quite another thing later. Once one has a deep understanding of the situation overall, however, the maxim provides direction as to what must be taken into account. Maxims reflect nuances of the situation. |
| Expert | The expert performer no longer relies on an analytic principle (rule, guideline, maxim) to connect her or his understanding of the situation to an appropriate action. The expert laboratorian, with an enormous background of experience, now has an intuitive grasp of each situation and zeroes in on the accurate region of the problem without wasteful consideration of a large range of unfruitful, alternative diagnoses and solutions. The expert operates from a deep understanding of the total situation. The chess master, for instance, when asked why he or she made a particularly masterful move, will just say: "Because it felt right; it looked good." The performer is no longer aware of features and rules; his/her performance becomes fluid and flexible and highly proficient. This is not to say that the expert never uses analytic tools. Highly skilled analytic ability is necessary for those situations with which the laboratorian has had no previous experience. Analytic tools are also necessary for those times when the expert gets a wrong grasp of the situation and then finds that events and behaviors are not occurring as expected. When alternative perspectives are not available to the laboratorian, the only way out of a wrong grasp of the problem is by using analytic problem solving. |

¹ Benner, P. (1984). From novice to expert: Promoting excellence and power in clinical nursing practice. Menlo Park, CA: Addison-Wesley

Project Definitions

Accepting casualties is the acceptance that people who cannot adapt when an organization undergoes significant change will be left behind when choosing between keeping them or making progress.

Adaptive change is change requiring people with a problem to learn new ways.

Coaching is a specific, face-to-face behavior modification technique for supervisors and managers to improve their subordinates' performances, quantitatively and qualitatively.

Competence develops when the individual develops organizing principles to quickly access the particular rules that are relevant to the specific task at hand; hence, competence is characterized by active decision making in choosing a course of action.

Competency Structure

Domain is a field of action, thought, range of personal knowledge, and/or responsibility. Domains are delineated into competencies.

Competency is an important function topic that is a sufficiently broad to include a number of sub-competencies. It may be general, cross-cutting, or technical. A competency statement may also be referred to as a Core Competency.

General Competency is a competency that applies to the responsibilities of all laboratory employees including leadership, laboratorians and support staff. (e.g., quality management systems (QMS), leadership and management, workforce training and education);

Cross-Cutting Competency is a competency that applies to all laboratory workers regardless of the scientific discipline(s) in which they work (e.g., communication, informatics, emergency preparedness, safety and security, surveillance)

Technical Competency is a competency specific to a laboratory worker working in one or more scientific disciplines (e.g., general laboratory practices, microbiology, chemistry, bioinformatics, research).

Sub-Competency is a single or specific aspect of a competency.

Activity or responsibility statement is the performance aspect statement of the work.

Task is a specific detail of the work performed. This phase of the project will not be identifying and addressing tasks.

Critical thinking refers to the thought processes used to conceptualize and evaluate information, and the practice of using conclusions to guide individual and organizational behavior.

Laboratory program is an organizational component covering a major laboratory discipline (e.g., environmental chemistry, public health microbiology, newborn screening, environmental microbiology, molecular biology).

Learning Organization is an organization that is continually expanding its capacity to create its future.

Political thinking is a process based on the nature and quality of connections between human beings that uses networking and personal relationships to exercise leadership.

Proficiency is the level of achievement within a particular competency. It is a work performance characteristic that distinguishes a person from everybody else on certain activities that are a little more complex or important. **Proficiency levels** should be progressive and show a clear line of progression toward a higher level of achievement.

Public health laboratory is a governmental public health, environmental, or agricultural laboratory that provides analytical biological and/or chemical testing and testing-related services that protect human populations against infectious diseases, food and waterborne diseases, environmental hazards, treatable hereditary disorders, and other natural and man-made public health problems and emergencies.

Strategic thinking is a process in which an individual develops a vision or goal and then work backwards to develop a plan to accomplish that vision or goal.

Systems thinking is the set of habits or processes of approaching problems by seeing and understanding interrelationships rather than linear-cause-effect chains, and seeing change as a series of on-going processes or events rather than as a single endpoint.

Technical change is change based on current know-how provided by authorities.

References

- PHL Competencies Project document: Synthesized competencies relatable to public health laboratory science and practice
- APHL list of draft laboratory director competencies and list of public health laboratory manager competencies
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