# Public Health Laboratory Competencies: A Roadmap for Successful Job Performance

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Division of Laboratory Systems

Center for Surveillance, Epidemiology, and Laboratory Services

NLTC VIII

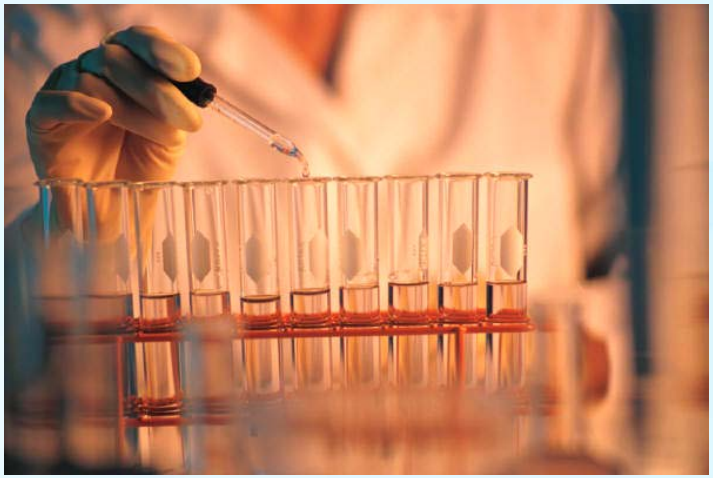
June 8, 2015

# Laboratory Efficiencies Initiative (LEI):

CDC Director's initiative (2011) to sustain PHL services

"The LEI needs to accomplish what more than 100 individual labs cannot accomplish by working alone."

– Dr. Thomas Frieden



LEI LABORATORY EFFICIENCIES INITIATIVE

Transforming to a Sustainable Public Health Laboratory System

APHL

CDC SAFER·HEALTHIER·PEOPLE™

# Laboratory Integration Unit (LIU)/ Division of Laboratory Systems

Mission:

To maximize the effectiveness and sustainability of state and local public health laboratory (PHL) testing services and capacity for surveillance and health protection nationally.

COMPREHENSIVE DATA ON PHL TESTING SERVICES

LABORATORY INFORMATICS

GUIDANCE FOR POLICY AND PRACTICE

REGIONAL NETWORKS


BUSINESS PRACTICES


WORKFORCE DEVELOPMENT

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Supplement / Vol. 64 / No. 1
May 15, 2015

# Competency Guidelines for Public Health Laboratory Professionals

## CDC and the Association of Public Health Laboratories

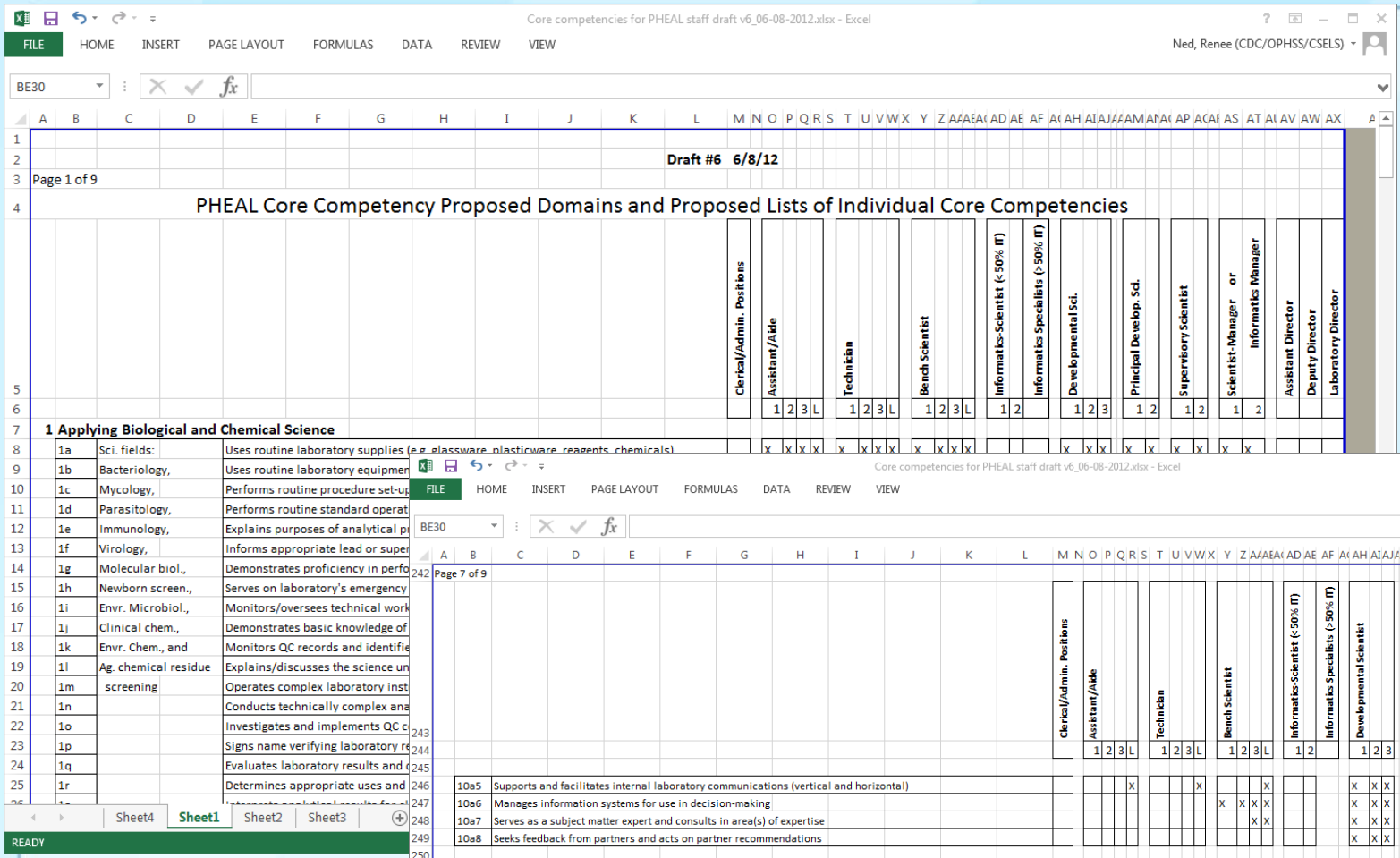
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

# Why Competencies?

Competencies are:

- Action-oriented statements that delineate the essential KSAs critical to the effective and efficient performance of work responsibilities.


- Integral to any workforce development program, supporting job descriptions, performance objectives and evaluations, training and education programs, recruiting and orienting new staff, etc.



Core competencies for PHEAL staff draft v6_06-08-2012.xlsx - Excel

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Ned, Renee (CDC/OPHSS/CSELS)

BE30

Draft #6 6/8/12

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PHEAL Core Competency Proposed Domains and Proposed Lists of Individual Core Competencies

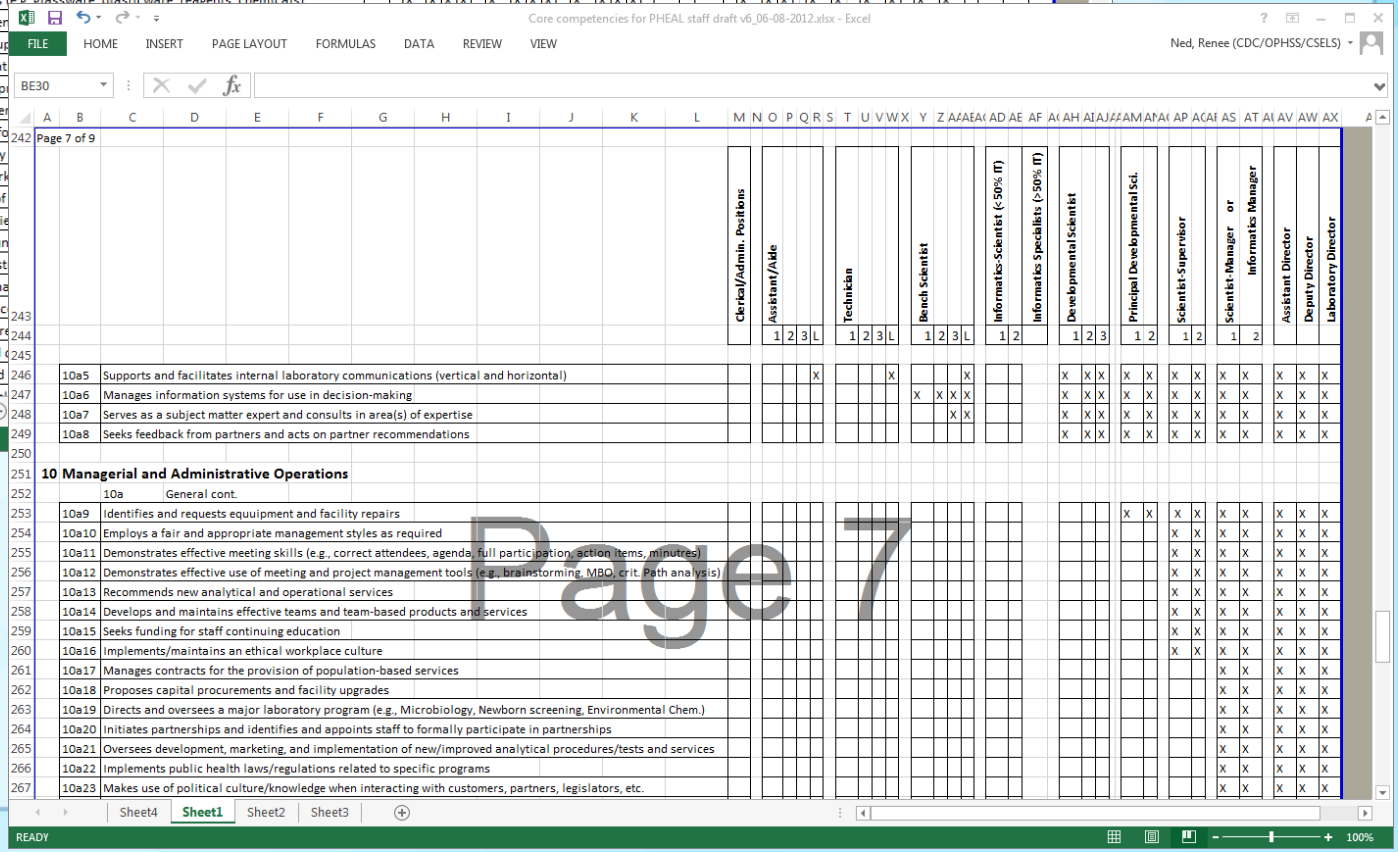
Clerical/Admin. Positions | Assistant/Aide (1 2 3 L) | Technician (1 2 3 L) | Bench Scientist (1 2 3 L) | Informatics-Scientist (<50% IT) (1 2) | Informatics Specialists (>50% IT) | Developmental Sci. (1 2 3) | Principal Develop. Sci. (1 2) | Supervisory Scientist (1 2) | Scientist-Manager or Informatics Manager (1 2) | Assistant Director | Deputy Director | Laboratory Director

**1 Applying Biological and Chemical Science**

| | | | |
|---|---|---|---|
| 1a | Sci. fields: | Uses routine laboratory supplies (e.g. glassware, plasticware, reagents, chemicals) | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 1b | Bacteriology, | Uses routine laboratory equipmen | |
| 1c | Mycology, | Performs routine procedure set-up | |
| 1d | Parasitology, | Performs routine standard operat | |
| 1e | Immunology, | Explains purposes of analytical pr | |
| 1f | Virology, | Informs appropriate lead or super | |
| 1g | Molecular biol., | Demonstrates proficiency in perfo | |
| 1h | Newborn screen., | Serves on laboratory's emergency | |
| 1i | Envr. Microbiol., | Monitors/oversees technical work | |
| 1j | Clinical chem., | Demonstrates basic knowledge of | |
| 1k | Envr. Chem., and | Monitors QC records and identifie | |
| 1l | Ag. chemical residue | Explains/discusses the science un | |
| 1m | screening | Operates complex laboratory inst | |
| 1n | | Conducts technically complex ana | |
| 1o | | Investigates and implements QC c | |
| 1p | | Signs name verifying laboratory re | |
| 1q | | Evaluates laboratory results and c | |
| 1r | | Determines appropriate uses and | |

Sheet4 Sheet1 Sheet2 Sheet3

READY



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| | | |
|---|---|---|
| 10a5 | Supports and facilitates internal laboratory communications (vertical and horizontal) | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a6 | Manages information systems for use in decision-making | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a7 | Serves as a subject matter expert and consults in area(s) of expertise | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a8 | Seeks feedback from partners and acts on partner recommendations | x x x x x x x x x x x x x x x x x x x x x x x x x x x |

**10 Managerial and Administrative Operations**

10a General cont.

| | | |
|---|---|---|
| 10a9 | Identifies and requests equuipment and facility repairs | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a10 | Employs a fair and appropriate management styles as required | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a11 | Demonstrates effective meeting skills (e.g., correct attendees, agenda, full participation, action items, minutes) | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a12 | Demonstrates effective use of meeting and project management tools (e.g., brainstorming, MBO, crit. Path analysis) | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a13 | Recommends new analytical and operational services | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a14 | Develops and maintains effective teams and team-based products and services | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a15 | Seeks funding for staff continuing education | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a16 | Implements/maintains an ethical workplace culture | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a17 | Manages contracts for the provision of population-based services | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a18 | Proposes capital procurements and facility upgrades | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a19 | Directs and oversees a major laboratory program (e.g., Microbiology, Newborn screening, Environmental Chem.) | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a20 | Initiates partnerships and identifies and appoints staff to formally participate in partnerships | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a21 | Oversees development, marketing, and implementation of new/improved analytical procedures/tests and services | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a22 | Implements public health laws/regulations related to specific programs | x x x x x x x x x x x x x x x x x x x x x x x x x x x |
| 10a23 | Makes use of political culture/knowledge when interacting with customers, partners, legislators, etc. | x x x x x x x x x x x x x x x x x x x x x x x x x x x |

Sheet4 Sheet1 Sheet2 Sheet3

READY 100%

# Public Health Laboratory* Competency Project

- In 2012, APHL and CDC formed a partnership
  - CDC/APHL Steering Committee to support and guide project
  - SME input and review by ~170 people:
    - State/local PHLs
    - State environmental lab
    - Federal and state agriculture and food testing labs
    - Clinical laboratories
    - Academia
    - CDC
    - APHL

* Broadly defined to include governmental public health, environmental, and agriculture labs

# Project Launch

- Oct 2012 kick-off meeting
  - Guidance by competencies expert
  - Present overview of competencies
  - Working meeting to:
    - ✓Define project scope, target audience
    - ✓Prioritize stakeholder expectations
    - ✓Establish criteria for writing comps
    - ✓Determine comp structure, proficiency tiers
    - ✓Develop list of draft domains


# Workgroups and Teams

- Establishment of Domain teams to develop competencies
  - Facilitated conference calls
- Vetting
  - Including clinical lab reps and others not involved in development
- **Lots** of harmonization and quality control:
  - Various workgroups to standardize language, address gaps and overlaps

# Timeline:

Kick-off and Planning Meeting

Development Workgroup

Domain Teams

Synthesis Workgroup

Harmonization Workgroup

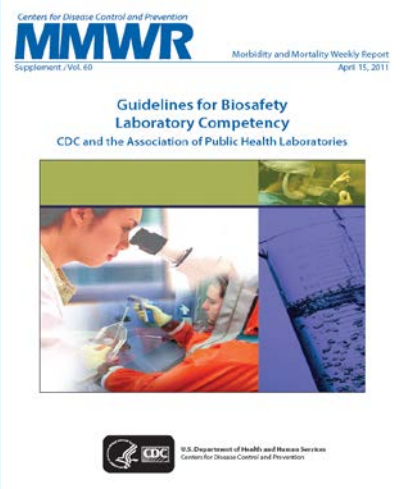
Aug. 2012

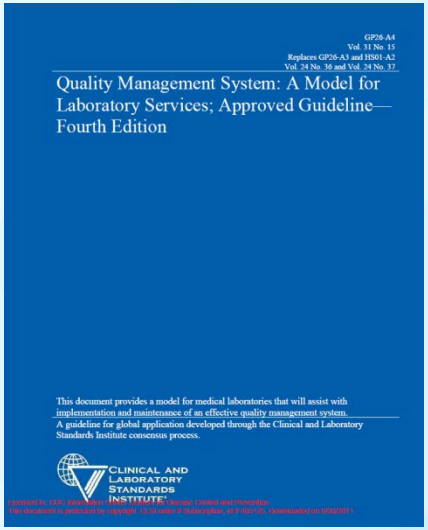
Vetting

Additional quality control and polishing

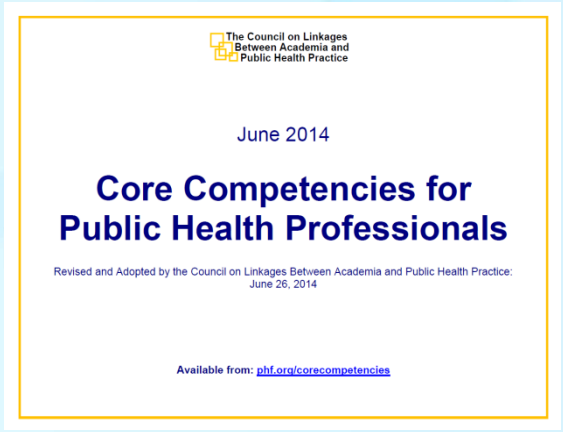
March 2015

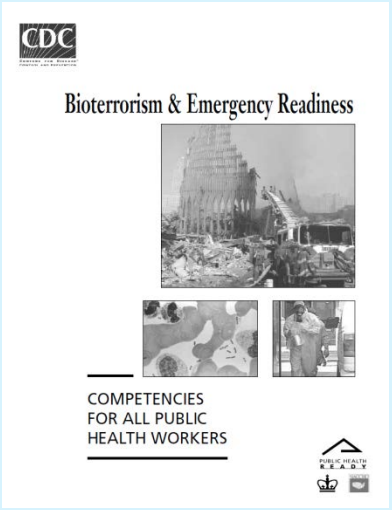
# Supporting Resources





# Competency Structure and Rules for Writing

**Bloom's Taxonomy**

observable and measurable

**Competencies Structure**

| A Domain | | | | |
|---|---|---|---|---|
| Domain Description | | | | |
| | **Beginner (Entry Level)** | **Competent (Mid-level)** | **Proficient (Senior Level)** | **Expert (Expert Lev** |
| 1 Competency statement | | | | |
| 1.1 Sub-competency | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 |
| 1.2 Sub-competency | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 |
| 2 Competency statement | | | | |
| 2.1 Sub-competency | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 | Responsibility statement<br>Task #1<br>Task #2<br>Task #3 |
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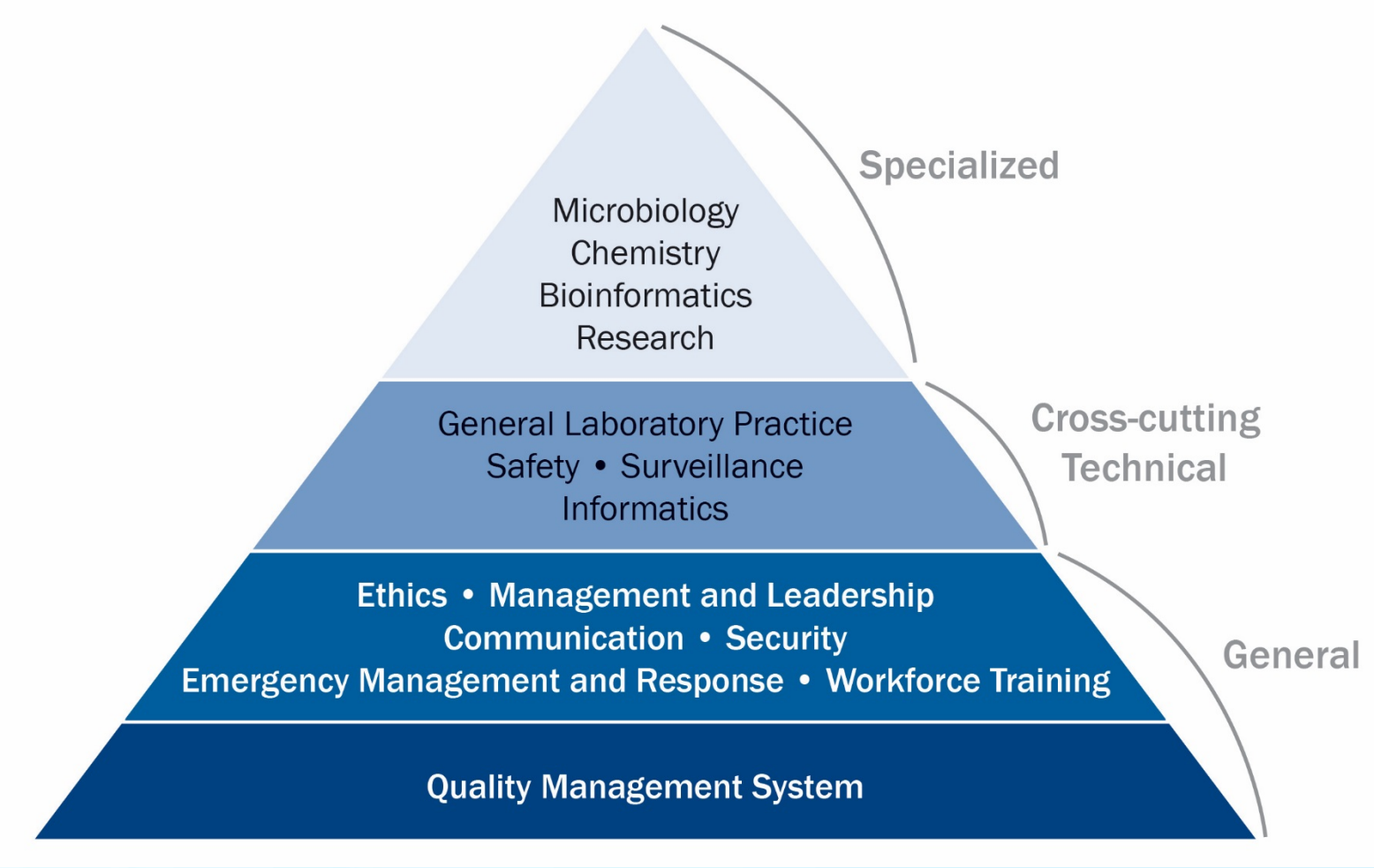
**Broad statements describing the "what", not the "how"**

No correlation to any particular job title or degree!

One verb only!

**modifiers**

# Schematic of Competency Domains for PHL Professionals




Teams of subject matter experts developed general, cross-cutting technical, and specialized competencies, with a quality management system as the foundation of every activity.

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# Example Competency Domain

## Workforce Training Competency Guidelines

**Purpose statement:** The competencies in Workforce Training address the knowledge, skills, and abilities needed to train public health laboratory professionals (Table 7). This includes the design, development, implementation, and evaluation of all types of training.

**Introduction:** Workforce Training is a process that uses principles of adult learning and instructional design to develop, manage, deliver, and evaluate internal and outreach education and training activities. Although training services and resources can be accessed externally, management should also support internal activities to ensure staff members possess the skills and knowledge to carry out their responsibilities in all aspects of their job performance. This domain provides guidance to staff members on subject matter expertise and project management for the development and delivery of training.

As persons are an organization's most valuable asset, having well-trained staff members at all functional levels improves organizational performance and ensures the success of the laboratory in providing services to address public health concerns.

**Notes:** Sources were identified as support documents for this domain (*36*,*58*). This domain is intended for the general laboratory scientist and not solely for education or training specialists or subject matter experts. The competencies apply to all types of training modalities.

**TABLE 7. Public health laboratory competency guidelines: Workforce Training domain**

**WFT 1.00. Content: gathers training content**

| Subcompetency | Beginner | Competent | Proficient | Expert |
|---|---|---|---|---|
| WFT 1.01. Needs assessment* | Supports needs assessment activities | Conducts needs assessments | Develops needs assessment tools | Prioritizes training needs based on needs assessments |
| WFT 1.02. Adult learning methodologies | Explains adult learning methodologies | Selects principles and methodologies which underpin adult learning | Integrates principles of adult learning for use in designing training | Ensures that adult learning principles are applied in designing training |
| WFT 1.03. Subject matter expertise | Employs subject matter knowledge in order to train entry-level staff | Implements established science and technology content | Develops emerging science and technology content | Collaborates with national and international scientific communities to create new knowledge on subject matters |

# How Can Competencies Be Used?

- Personnel Management
- **Training and Professional Development**
- Organizational and System Capacity
- Advocacy

# Personnel management

- Developing position descriptions
- Defining job requirements/performance expectations
- Establishing career ladders
- Assessing individual staff performance

# Example Biosafety Outreach Officer Position Description



## Program/Department: Public Health Laboratory

**Position Title**: Biosafety Outreach Officer

**Reports to**: Laboratory Director / Operations Director / Division Director

**Previous Incumbent:** *None (New position)*

**Job Position Summary:**

The Biosafety Outreach Officer within the Public Health Laboratory will ensure adequate biosafety training and practices to avoid potential hazards associated with the handling of biological materials, the spread of multi-drug resistant pathogens and threats of emerging pathogens, and acts of biological terrorism. The person in this position develops and ensures adherence to laboratory biosafety programs, provides related workforce training and assessments for biosafety in the agency and sentinel laboratories, and works cohesively with key system partners and public health officials to improve current communications and emergency management and response practices. Efficient communication skills, knowledge of microbiology and general laboratory practices, and experience in laboratory safety, outreach training, and quality management systems would be necessary for this position.

**Essential Job duties:**

Biosafety in Public Health Laboratory and Sentinel (outreach) facilities:

- Educates, trains and provides guidance to in-house, outreach, and sentinel site staff on the use of personal protective equipment (PPE), the packaging and shipping of infectious agents, and the review of waste management plans, including methods for recycling and disposal of biological hazards
- Encourages a culture of safety and reporting of actual and potential situations which may place staff and others at risk; assesses those risks; and implements redundant systems to keep risks to the absolute minimum
- Ensures the safety of laboratory staff and the provision of a safe physical environment to meet agency biosafety requirements
- Develops and oversees site-specific workplace safety policies and procedures (including review) and maintains a safety plan that meets agency requirements
- Provides input on emergency management and response policies and assists in implementation of processes and procedures in coordination with agency management and systems partners

**Job Position Competencies*:**

Safety (25%)

1. *Biological materials: works safely with biological materials in the laboratory*
   a. Distinguishes biohazardous materials from non-biohazardous materials in the laboratory (C)
   b. Recognizes hazards associated with new biological materials used in laboratory procedures (C)
   c. Trains staff in the hazards associated with the laboratory procedures employed (C)

# Competency Assessment Tool

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SUGGESTED COMPETENCY DOMAINS TO CONSIDER FOR LABORATORY POSTION TYPE | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | |
| 3 | **Laboratory Position Type** | **QMS** | **ETH** | **MLD** | **COM** | **SEC** | **EMR** | **WFT** | **GEN** | **SPH** | **SHC** | **SAC** | **SDR** | **SRV** | **INF** | **MCB** | **CHM** | **BIO** | **RES** |
| 4 | data entry | x | x | | | | x | | x | | | | | x | x | | | | |
| 5 | specimen receiving/shipping | x | x | | | | x | | x | | x | x | | x | | x | x | | |
| 6 | aide/assistant | x | x | | | | x | | x | x | x | x | | x | | | | | |
| 7 | technician* | x | x | x | | | x | | x | x | x | x | | x | x | x | x | | |
| 8 | scientist* | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | |
| 9 | developmental scientist* | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x |
| 10 | prinicpal developmental scientist* | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x |
| 11 | scientist-supervisor* | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| 12 | scientist-manager* | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | |
| 13 | assistant director | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| 14 | deputy director | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| 15 | director | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| 16 | quality assurance officer* | x | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | | |
| 17 | safety officer* | x | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | | |
| 18 | emergency response officer* | x | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | | |
| 19 | training officer* | x | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | | |
| 20 | building maintenance | x | x | x | x | x | x | | x | x | x | x | x | | | | | | |
| 21 | human resources | x | x | x | | x | x | | | | | | | | | | | | |
| 22 | information technologist | x | x | x | | x | x | | | | | | | | x | | | x | |
| 23 | customer service | x | x | | | | x | | | | | | | | x | | | | |
| 24 | accountant | x | x | | | | x | | | | | | | | x | | | | |
| 25 | purchasing specialist | x | x | | | | x | | | | | | | | x | | | | |
| 26 | contract specialist | x | x | | | | x | | | | | | | | x | | | | x |
| 27 | billing specialist | x | x | | | | x | | | | | | | | x | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | *chemistry or microbiology | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |

# Competency Assessment Tool

| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | POSITION: | | TECHNICIAN | | | | | | | | |
| 2 | EMPLOYEE: | | JANE DOE | | PROFICIENCY TIER LEVEL: E = Expected and C = Current | | | | | | |
| 3 | DATE OF REVIEW: | | 2/26/2015 | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | Select | Domain | Competency | Sub-competency | None | Beginner | Competent | Proficient | Expert | Include in Postion Description | Areas for Improvement |
| 6 | X | QMS | QMS 1.00 Organization | QMS 1.01 Commitment to quality | C | | E | | | | X |
| 7 | X | QMS | QMS 1.00 Organization | QMS 1.02 Organizational structure | | C | E | | | | X |
| 8 | X | QMS | QMS 1.00 Organization | QMS 1.03 Quality culture | | | E,C | | | | |
| 9 | X | QMS | QMS 1.00 Organization | QMS 1.04 Resources | | E,C | | | | | |
| 10 | | QMS | QMS 1.00 Organization | QMS 1.05 Cost of quality | | | | | | | |
| 11 | X | QMS | QMS 2.00 Customer focus | QMS 2.01 Customer satisfaction | | C | E | | | | X |
| 12 | X | QMS | QMS 2.00 Customer focus | QMS 2.02 Customer services | | C | E | | | | X |
| 13 | X | QMS | QMS 3.00 Facilities and safety | QMS 3.01 Workplace safety | | E,C | | | | | |
| 14 | X | QMS | QMS 3.00 Facilities and safety | QMS 3.02 Facilities | | E,C | | | | | |
| 15 | X | QMS | QMS 3.00 Facilities and safety | QMS 3.03 Waste management | | C | E | | | | X |
| 16 | X | QMS | QMS 3.00 Facilities and safety | QMS 3.04 Emergency management and response | | E,C | | | | | |
| 17 | X | QMS | QMS 4.00 Personnel | QMS 4.01 Staff qualification process | | | E,C | | | | |
| 18 | X | QMS | QMS 4.00 Personnel | QMS 4.02 Orientation and end-of-employment | | E,C | | | | | |
| 19 | X | QMS | QMS 4.00 Personnel | QMS 4.03 Training | C | E | | | | | X |
| 20 | X | QMS | QMS 4.00 Personnel | QMS 4.04 Competence assessment plan | C | | E | | | | X |
| 21 | X | QMS | QMS 4.00 Personnel | QMS 4.05 Professional development plan | | C | E | | | | X |
| 22 | X | QMS | QMS 4.00 Personnel | QMS 4.06 Performance evaluation process | | | E,C | | | | |
| 23 | | QMS | QMS 4.00 Personnel | QMS 4.07 Recruitment, retention, and succession plans | | | | | | | |
| 24 | | QMS | QMS 5.00 Purchasing and inventory | QMS 5.01 Procurement process | | | | | | | |
| 25 | X | QMS | QMS 5.00 Purchasing and inventory | QMS 5.02 Inventory processes | | E,C | | | | | |
| 26 | | QMS | QMS 5.00 Purchasing and inventory | QMS 5.03 Evaluation process | | | | | | | |
| 27 | | QMS | QMS 6.00 Laboratory equipment | QMS 6.01 Acquisition and decommissioning | | | | | | | |
| 28 | | QMS | QMS 6.00 Laboratory equipment | QMS 6.02 Equipment qualification plan | | | | | | | |
| 29 | X | QMS | QMS 6.00 Laboratory equipment | QMS 6.03 Maintenance process | | | E,C | | | | |
| 30 | X | QMS | QMS 6.00 Laboratory equipment | QMS 6.04 Instrument and equipment calibration | C | | E | | | | X |
| 31 | X | QMS | QMS 7.00 Process management | QMS 7.01 Workflow processes | | | E,C | | | | |
| 32 | X | QMS | QMS 7.00 Process management | QMS 7.02 Process control | | | E,C | | | | |
| 33 | X | QMS | QMS 7.00 Process management | QMS 7.03 Method Validation and performance verification processes | | C | E | | | | X |
| 34 | X | QMS | QMS 8.00 Documents and records | QMS 8.01 Document management system | | | E,C | | | | |
| 35 | X | QMS | QMS 8.00 Documents and records | QMS 8.02 Records management system | | | E,C | | | | |
| 36 | X | QMS | QMS 9.00 Information management | QMS 9.01 Confidentiality | | | E,C | | | | |
| 37 | X | QMS | QMS 9.00 Information management | QMS 9.02 Security | | | E,C | | | | |
| 38 | X | QMS | QMS 9.00 Information management | QMS 9.03 Information Integrity | | | E,C | | | | |
| 39 | X | QMS | QMS 10.00 Nonconforming event management | QMS 10.01 Management of nonconforming events (NCEs) | | | C | E | | | X |
| 40 | X | QMS | QMS 10.00 Nonconforming event management | QMS 10.02 Documentation of NCEs | | | E,C | | | | |
| 41 | X | QMS | QMS 10.00 Nonconforming event management | QMS 10.03 Investigation and root cause analysis | | E,C | | | | | |
| 42 | | QMS | QMS 10.00 Nonconforming event management | QMS 10.04 Notifications of recalls and technical bulletins | | E,C | | | | | |

Instructions | PHL Comp Matrix | PD-Assessment Builder | Proficiency Tier Statements | PD Example | **Assessment Example**

# Training/Professional Development

- Performing training needs assessments
- Designing training courses/curriculum, education programs
- Refining professional development plans

# Pre-publication Use of PHL Competencies at CDC

- Mapping recommended and required competencies for biosafety training in response to laboratory incidents
- Developing position descriptions for Bioinformatics specialists as part of Advanced Molecular Detection (AMD) Initiative
- Identifying recommended competencies for the new CDC Laboratory Leadership Service (LLS) Fellowship

# Organizational and System Capacity

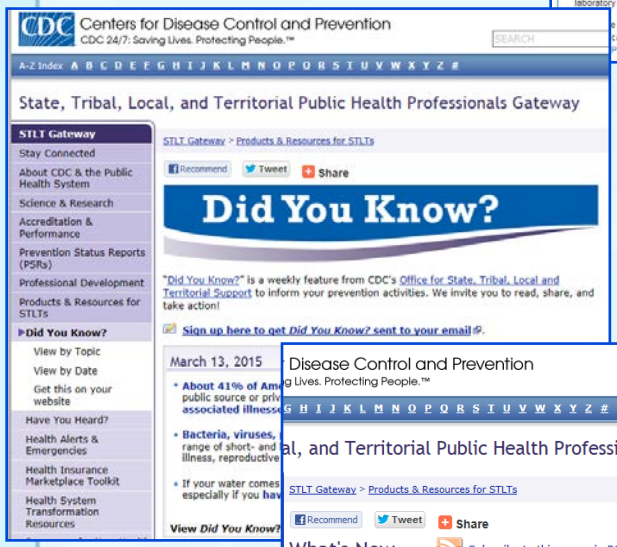
- Assessing organizational capacity
- Improving program development and management
- Supporting quality improvement
- Ensuring a sustainable PHL system

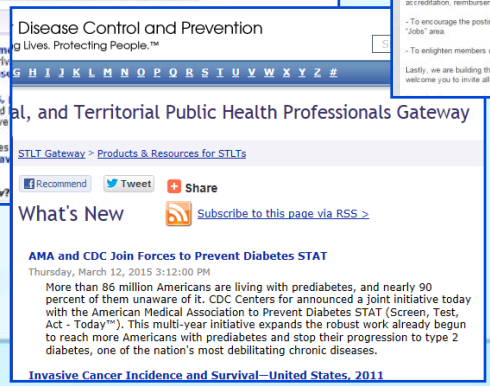
# Advocacy

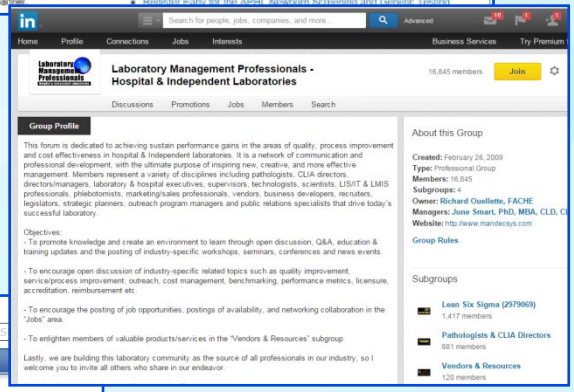
- Articulating the role of PHLs in the public health system
- Standardization across the PHL system

# Promotion



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# THANK YOU

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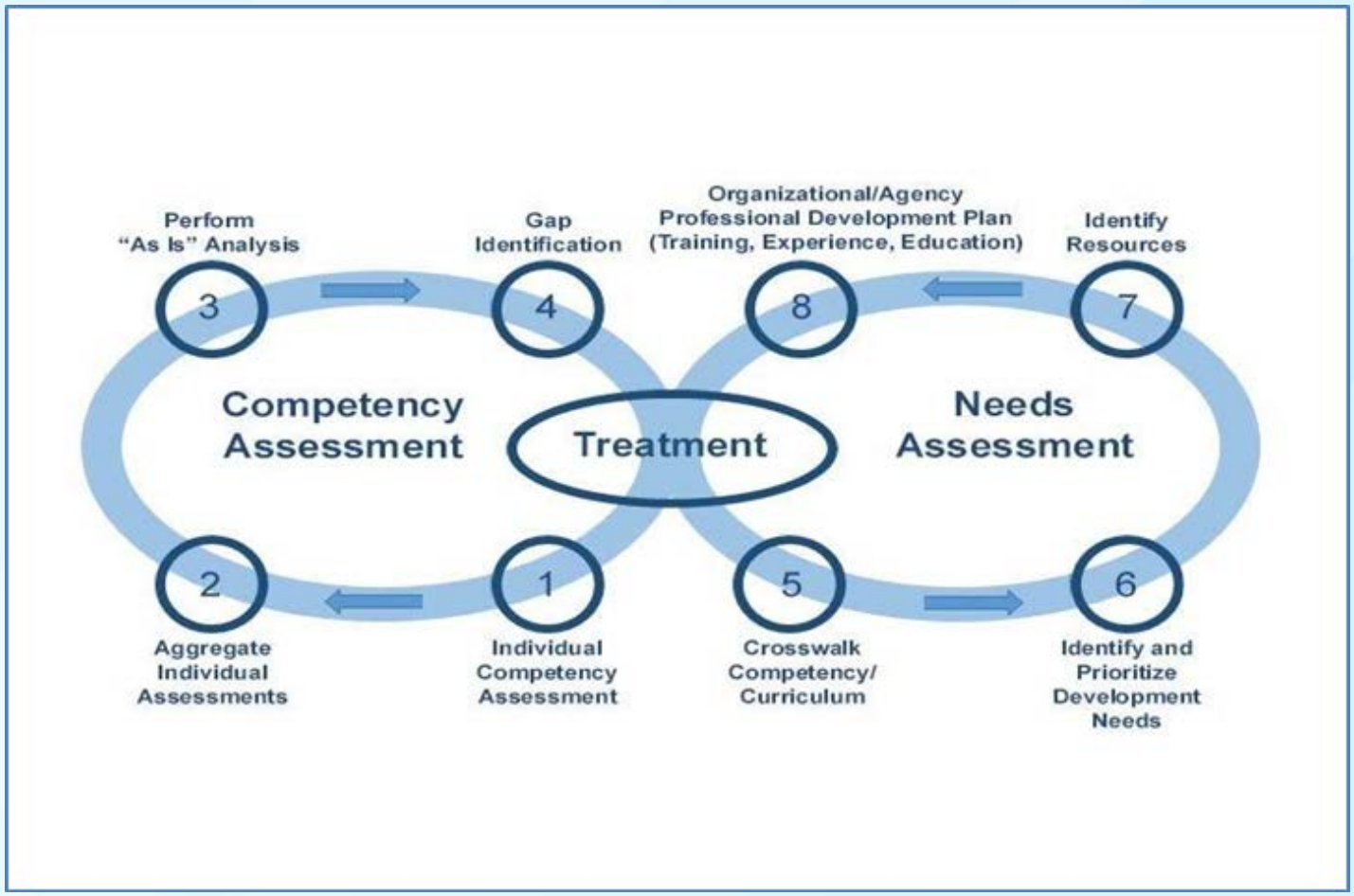
**The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention**.

# Competency Infinity Cycle




Infinity cycle courtesy of the International Food Protection Training Institute (IFPTI).