NNPHI

Systems Approach

A Guide for Supporting the Public Health Workforce

National Network of Public Health Institutes

Health Communications Consultants
Knowledge, Innovation, & Equity.

Systems Approach: A Guide for Supporting the Public Health Workforce

by HCC, Inc in support of NNPHI

NNPHI™

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Other Resources from NNPHI/ HCC, Inc. Collaborative Efforts

The Essentials: NNPHI Report on the Essential Skills and Training Needs for Infection Prevention and Control, Healthcare Associated Infections & Antimicrobial Resistance
https://ipc.nnphi.org/

NNPHI Public Health LEADS Exploratory Report on Public Health Data Science & Leadership

NNPHI Public Health LEADS Exploratory Report on Public Health Science & Leadership for Recent Graduates
https://nnphi.org/public-health-leads/

Other resources from NNPHI

https://nnphi.org/

Other resources from HCC, Inc.

https://healthccinc.com/

"When you change the way you look at things, the things you look at change."

- Max Planck

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About This Handbook

Welcome! This book is designed to empower and support your journey through better understanding and developing the Public Health (PH) workforce. It is important to be clear here, that while our work is based on a systems approach, you don't have to know systems theory or even have your own data to use it. We've carefully divided this handbook into two insightful and easy-to-follow sections to help you navigate and apply our systems approach effectively with the challenges you are addressing in your own work and discipline.

Part 1: Our Systems Approach

In Part 1, we detail the methods and models that formed the backbone of our research. Chapter 1 kicks off with a step-by-step overview of the entire process, including real examples of mindmaps that capture the research team's insights into PH workforce challenges. Chapters 2, 3, and 4 delve into the specific models we used to organize our findings and deepen our understanding of these challenges. Finally, in Chapter 5, we bring it all together, demonstrating how a Requires/Enables model can swiftly pinpoint intervention opportunities.

Part 2: Use Cases

This section showcases the practical applications of our systems process. We present four intervention products, each accompanied by vignettes to illustrate their real-world use and impact.

Our goal is to provide the support you need to make meaningful progress. We hope this handbook becomes an invaluable resource on your path to understanding and addressing PH workforce challenges.

Introduction

An Exploration Towards Understanding

In 2023, Health Communications Consultants, Inc. (HCC, Inc.) partnered with the National Network of Public Health Institutes (NNPHI) to explore an area of tremendous importance and rapidly accelerating concern in public health: the public health workforce. Articles, commentaries, and reports over the past 20 years have advised of the challenges; a tangle of issues related to education, diversity, recruitment, training, retention, job satisfaction, pay, promotion, performance, and succession. Adding recent complexity, the COVID-19 pandemic witnessed the loss of tens of thousands of additional government public health workforce personnel, and all this has occurred in a space with a lack of empirical research to explore and help explain what is taking place. (1)

Enter NNPHI...

with a prime directive of addressing public health workforce challenges and a recognition of the urgency of moving forward to fill those gaps in knowledge and understanding and take critical action. A key result? Collaborating with HCC, Inc. to lead three projects of listening sessions with present and future members of the public health workforce, culminating in insightful, practical findings, recommendations, and future considerations spanning three reports.

Numerous moving pieces were revealed in each effort, and there were no easy solutions...

The reports we reference throughout this guide can be found at https://ipc.nnphi.org/ & https://nnphi.org/public-health-leads/ :

Essential Skills and Training Needs for Infection Prevention and Control, Healthcare Associated Infections and Antimicrobial Resistance

Public Health Data Science & Leadership with public health managers and supervisors

Public Health Data Science & Leadership with recent public health graduates

1. Beck AJ, Boulton ML. 2012. Building an effective workforce: a systematic review of public health workforce literature. Am. J. Prev. Med. 42:S6–16

We decided the only way to move forward was, to quote Albert Einstein, one of the greatest abstract thinkers in history, to stop looking at things in the same way in which they were created. We decided to combine the findings from all three reports, and instead of myopically examining the individual moving pieces for solutions, we moved up to a higher altitude to look at the non-linear relationships, interdependencies, and interactions between them. To allow ourselves to finally see the forest *and* all the trees. And, to quote Max Planck, one of the greatest systems thinkers of all time, when we changed the way we looked at things, the things we looked at changed. We now had a systems view, which could better facilitate the connecting of dots and untangling of knots, and from those great heights we could envision a myriad of methods for linking people in need with the workforce resources they needed. Even better, we could develop a flexible process path that our colleagues far and wide could follow and do the same within their public health workforce challenges.

To ground our theory in practice, we chose a handbook format that can be applied by anyone, in any discipline, level, or role to explore, understand, and address a spectrum of themes, people, pain points, problems, and, most importantly, possibilities.

We encourage you to review the “About this Handbook” and “How to Use this Handbook” primers on these pages, and then join us in the journey of applying systems thinking and analysis to support the public health workforce of today and tomorrow.

“We cannot solve problems with the same thinking we used when we created them.”

~Albert Einstein

How to Use this Handbook

First, keep in mind that this book is a guide for following *our process.* We used a few data mapping and modeling techniques to try to capture different aspects of some complex themes in PH workforce recruitment, development, and retention. It worked well in 2 ways: (1) it highlighted relationships between the challenge intersections we call “pain points” and (2) it helped us see how addressing one part of the system impacts the rest of that system. We acknowledge that there are countless ways to analyze and structure information but want to share what worked for us because this path helped us see practical solutions.

Where to Begin?

This is a process-based guide, and so we recommend that you work through each exercise in Part 1 in order if you’d like to analyze a challenge that you or your organization is facing in public health.

The tools provided in Part 2 can be used without reading the information in the text, but they are provided as examples of the kinds of interventions that help address the key topics we analyzed: resilience, communication, retention, and recruitment.

If you want to see what our work looked like, go to the Appendices. There you will find data, models, and resources from the 3 previous projects. Appendix A provides a summary of the results from each of the three projects.

Want a closer look? 
Go to Appendix A to see a summary of our results.

Helpful hints

This handbook uses simple icons to help you on your journey.

If you see this . . .	It means this...
Try this 	Try this activity to replicate our process.
	This information has appeared in an earlier section of the text.
	Read for explanations of how we did things and any advice we have for trying it on your own.
Want a closer look? 	This icon includes an appendix reference to let you see our work in closer detail.

Part 1

Applying Systems Approaches

1 A Systems Approach

To understand and use this handbook at the level for which it was intended, it is very important to understand what we mean when we use the term "systems approach" to explain why we chose that path to move forward in the area of public health workforce development.

At the simplest, most basic level, a systems approach means looking beyond the individual pieces of any problem or solution - and toward the interactions, intricacies, and inter-dependencies of those pieces together as a larger whole.

Think about the heart. The body cannot survive without one, but the entire cardiovascular system of veins, arteries, blood vessels, and a host of others are required to keep the heart functioning effectively. And, every single element within that cardiovascular system impacts every other element. A change in blood pressure, or artery wall strength, or platelet level will alter the entire system, even if only temporarily. What's more, the cardiovascular system is dependent on and impacted by other systems throughout the body: the respiratory, nervous, and immune systems; and vice-versa. A heart is nothing without the whole, and the whole is nothing without the heart.

Looking at the complexities of the human body is similar to looking at other systems as well, from food systems to forest systems, to the field of public health. It is represented by an immeasurable number of individual, yet highly interdependent, variables and systems. Just like in the human body, a change to one element impacts a myriad of others to varying degrees.

When you look at it that way, how could we ever approach a specific public health challenge or solution without looking at it within a larger system?

That is the path we chose to walk as we examined the 3 projects - as a systems approach with a goal of not only untangling the major findings and key interdependencies, but then using them as clear maps to point us in the direction of very practical answers and system-oriented solutions.

Systems Thinking & Systems Theory

Recognizing that a public health workforce development challenge and its solutions are components of larger systems is crucial to navigating and truly understanding both. But the work doesn't stop there, because a systems approach requires significant upfront decision-making about how to go about looking at those systems: through a lens of systems *thinking*? Or, through a more formal framework of systems *theory*? For our purposes here, first it becomes important to know the difference:

Systems Thinking views "challenges" as parts of an overall system. It focuses on the interactions and relationships between components within a larger context, rather than isolating smaller parts. Systems thinking emphasizes understanding how different elements influence one another within a whole. Systems thinking is something you DO!

Systems Theories are theoretical frameworks that formally study systems. They offer specific methodologies and tools for analyzing complex systems and behaviors, often using statistical models and simulations. Theories vary, and your exposure to various theories can empower ways of thinking about things. Systems theories are things you USE!

In essence, Systems Thinking is a mindset and practical approach, while Systems Theory is the formal, academic study of systems.

For this project, we began by exploring several formal Systems Theories. However, in order to scale down the effort to a more practical level, and to ensure the rapid deployment of results, we ultimately decided to apply Systems Thinking using our knowledge of System theories as a guiding, organizing force.

Thinking Like a Systems Thinker

So, now that you have a better idea of the difference between Systems Thinking and Theory, and how and why we chose the path we did for this project and report, we encourage you to approach this handbook from the perspective of a systems thinker. A systems thinker has:

Nonlinear Thinking: Systems thinkers recognize that cause and effect are not always proportional or direct.

Big Picture Orientation: Systems thinkers can step back and see the broader context of a situation.

A Holistic Perspective: Systems thinkers view situations as a whole, rather than focusing solely on individual components.

Interconnectedness Awareness: Systems thinkers understand and emphasize the relationships and interactions between different parts of a system.

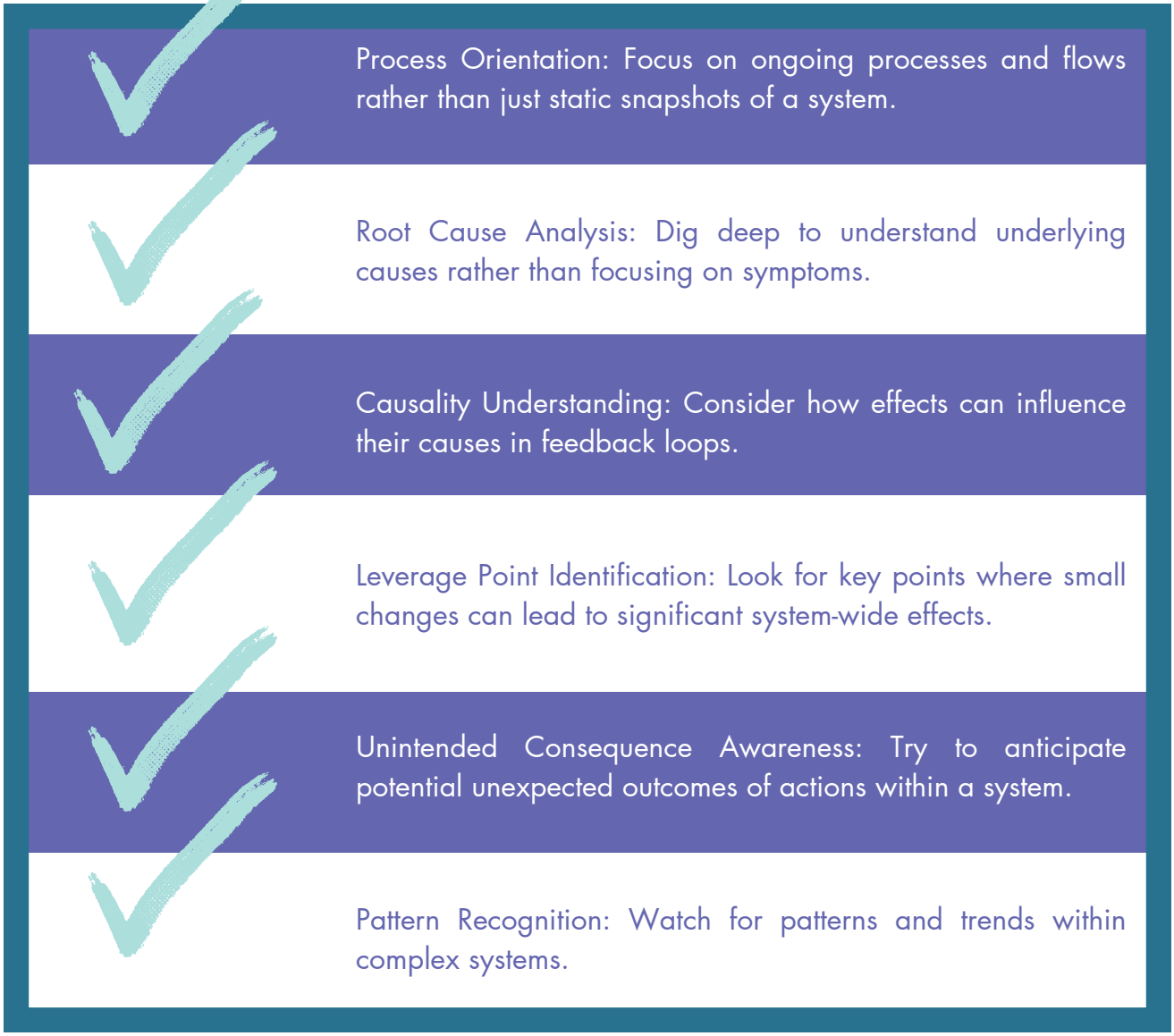
Dynamic Understanding: Systems thinkers recognize that systems are not static and consider how they change over time.

Multi-perspective Approach: Systems thinkers can view issues from multiple angles and partner perspectives.

Systems Thinking Strategies

Adopting a Systems Thinker's mindset will not only facilitate a stronger understanding of this project and the practical solutions it introduces, but the present and future systems within which the field of public health resides as well.

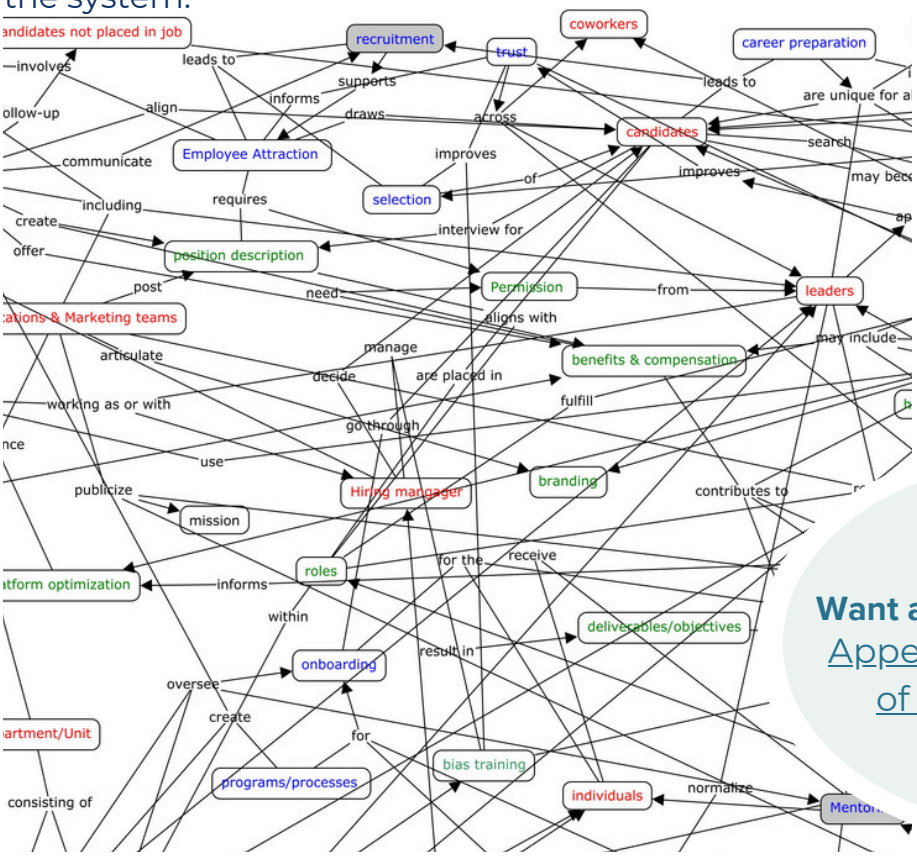
A systems thinker's mindset includes:



Now that you have a better understand the systems approach, next we will walk you through one of our initial methods for tackling a complex system like Public Health workforce development and visualizing relationships: Concept Mapping.

Concept Mapping

One of the first methods in our process (and possibly one of the first steps in yours, it's up to you; non-linear thinking, abstract, Einstein, remember?) was brainstorming the galaxy of variables that we were tackling related to public health workforce development. We then reflected on and mapped how the many different variables could be interconnected. At the end, we captured the complexity, but it was difficult to follow. We decided its greatest utility was the ability to zoom into any one point and examine the relationships in that part of the system.



Want a closer look? 
Appendix B has a sample of our final versions.

The image above is just one small section of the larger map. Look closely and you can see a grey box labeled, "Recruitment" which represented one of several starting variables for this project. We then identified other variables mentioned in the listening sessions that were related with those starting variables, connected those variables with lines, then labeled those lines with verbs to convey the nature of the relationship and what was taking place.

If you look closely into "Recruitment" at the top left of the map, you can see that the line connects it to the verb "Supports." "Supports" then leads to the variable, "Employee Attraction" which leads to the verb "Requires" which leads to the variable "Position Description." Now look at how each variable is connected to other variables in the map. We created numerous smaller maps that explore connections like these, all of which can be found in Appendix B.

Try this

Before you begin these exercises, you should be able to answer this question: Where will I get my insights? We used data from listening sessions. You can conduct that research too, but the process can work without it. Just know that the more your information is grounded in lived experiences, the easier it should be to develop a clear picture (as opposed to speculation). That lived experience may come from you and a colleague brainstorming to generate responses to the activities in this guide.

For this first exercise in concept mapping, start by brainstorming the challenges you might want to tackle. Next, ask what other variables are related? How are they connected? If terms don't connect directly, connect them with verbs like in the example to help you understand how things are related. It's ok if it gets messy and it's ok to have multiple maps!

At the end of this exercise you should have...

At least one concept map of the challenges you want to tackle, related variables, and all their many connections!

2 Lifecycle Model

Understanding a PH project through every phase and stage can help you anticipate challenges.

Development of the early thinking system maps illuminated several different possible next steps and directions. Because we had our systems thinker hats on, we recognized that the patterns in key topics related to recruitment and retention could be further explored within a lifecycle model.

A lifecycle model outlines the stages a product or project goes through from initiation and development, through growth and maturity, to decline and eventual retirement. While the one we present here is a great fit for challenges in workforce development, other lifecycle models can be used to address other challenges.

When listening to the experiences of various PH professionals, some experiential similarities became evident. Among them was how people all moved through their careers in phases. While experiences inside of those phases varied (such as the degrees to which people felt supported and the amount of time spent in each phase), everyone, and the challenges, barriers or successes they were experiencing could be mapped to a phasic lifecycle.

This does not come as a surprise, as research in human resource lifecycles has suggested this pattern in other domains. However, as human resources often focus on personnel who are in the career system, these other models overlook the interactions with career preparation that are essential for PH.

As we explored that new model, which we encourage you to do, we recognized that the presence of challenges in any phase of the wheel could serve as a “Pain Point” for the person or group having to contend with it. We use that phrase “Pain Point” as representative of the intersection between trying to accomplish a task and the barriers to achieving it. These “Pain Points” will be discussed in greater detail in Part 2, Pain Points, Use Cases, and Examples.

As a next step, we saw the potential in adapting a traditional lifecycle model into a public health career lifecycle model that included those important interactions with career preparation. Our focus here was workforce development, but when you are approaching your topic, consider what lifecycles may be involved and explore how the life cycle model could be adapted to fit your challenge.

Lifecycle Phases - Abbreviated Version

Career Preparation: Process of preparing oneself to enter the workforce.

Attract: Attracting the correct number of suitable, talented individuals with the necessary skills and abilities to apply for the job vacancy that is advertised.

Recruit & Hire: Recruiting is the process of actively seeking, finding, evaluating, and hiring candidates for a specific position or job.

Onboard: The process for introducing a newly hired employee into an organization to help the person understand their new position and job requirements.

Perform & Develop: Includes everything that will help the employee mature within the organization, from learning new skills to facilitate their current role to advancing in their career.

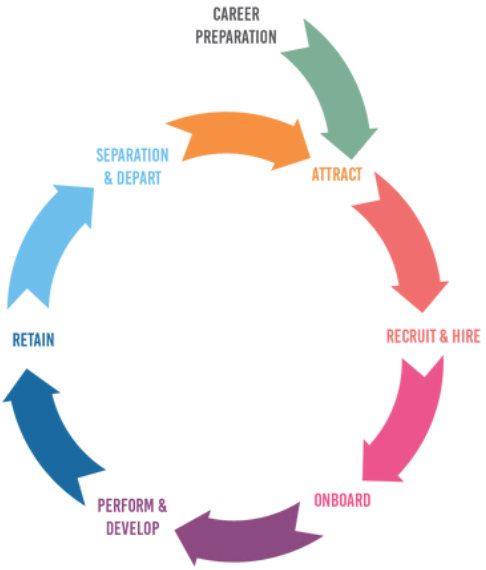
Retain: Systems, processes, and capacity to prevent employee turnover, either voluntarily or involuntarily.

Separation & Depart: Departure should be a positive experience as past employees become public health ambassadors, may come back in the future, and/or may be referral sources.

Viewing the life cycle model with a systems mindset, we realized that there were a significant number of processes and products that were integral to successful movement within and between the phases, and that lack in any phase could serve as a "pain point" that could impact future phases. You can see those pain points in the life cycle graphic on the next page. We then further expanded the public health professional life cycle model to include specific tasks for each phase, resulting in the Public Health Professional Lifecycle Wheel.

Want a closer look?

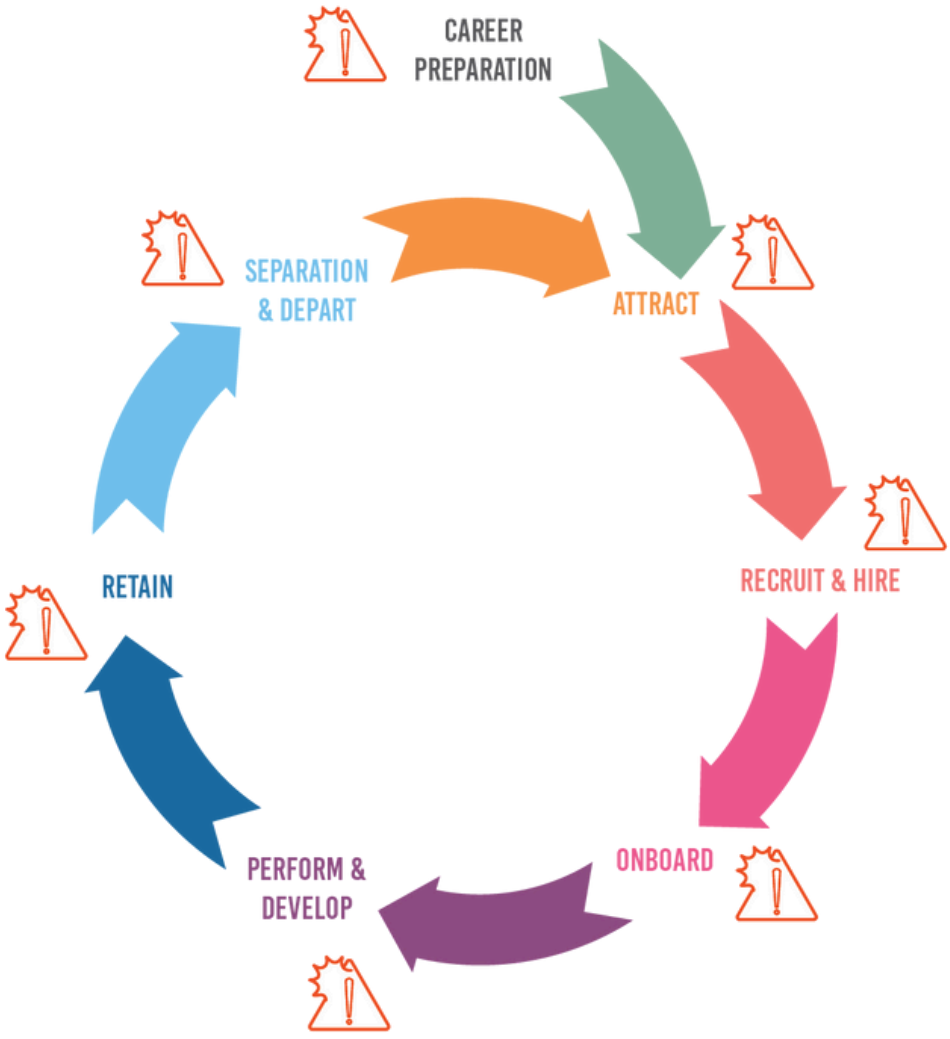
This page provides an abbreviated overview of the lifecycle as adapted for the PH workforce. The full description can be found in Appendix C.



Lifecycle Model Close-Up

Recall

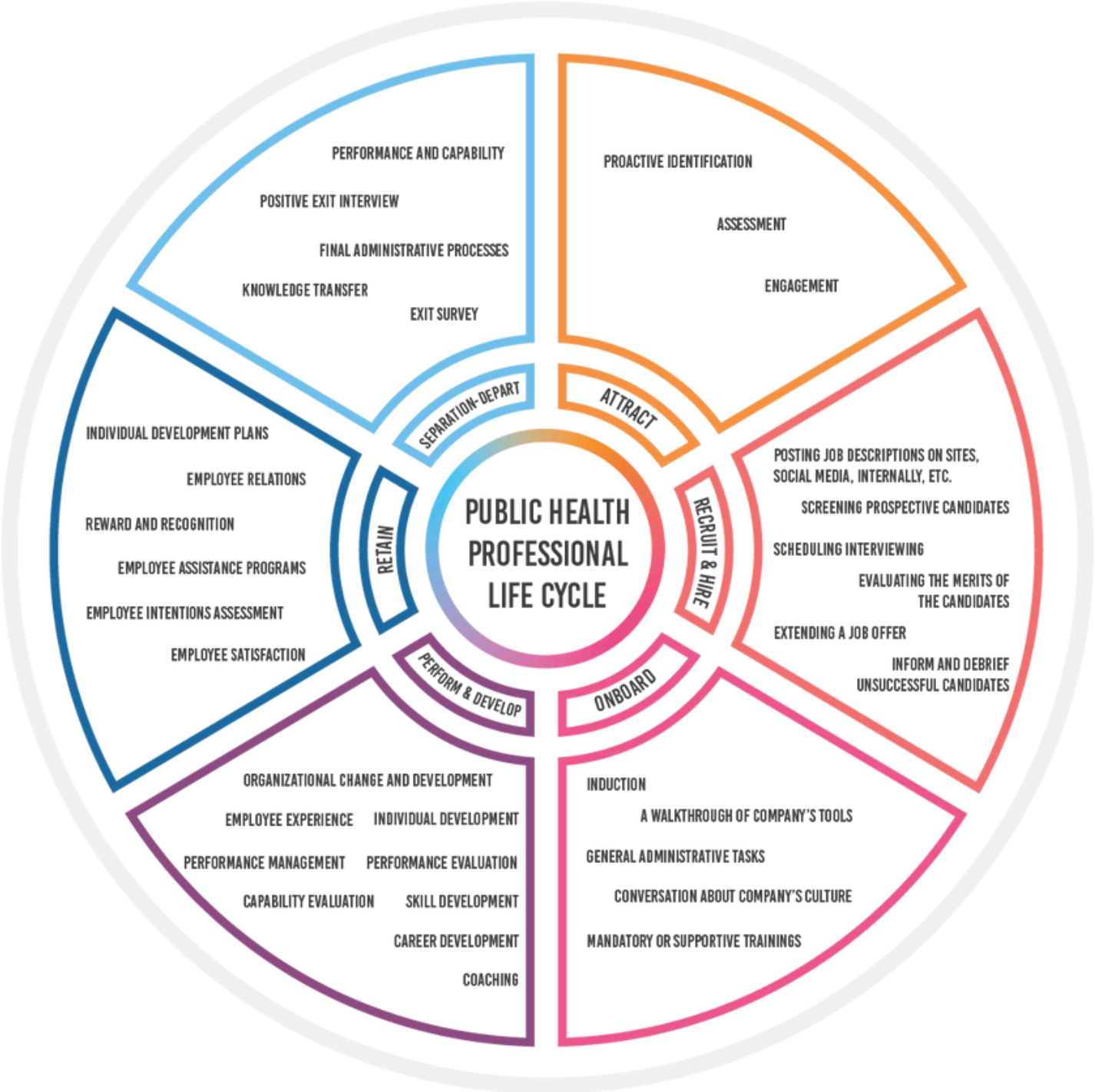
As we explored the Lifecycle Phases model, we recognized that the presence of challenges in any phase of the wheel could serve as a "Pain Point" for the person or group having to contend with it. We use that phrase "Pain Point" as representative of the intersection between trying to accomplish a task and the barriers to achieving it. The model below shows that pain points occur in each phase of the lifecycle. These "Pain Points" will be discussed in greater detail in Part 2, Pain Points, Use Cases, and Examples.



Lifecycle Wheel - Abbreviated Version

We further expanded the public health professional life cycle model to include specific tasks for each phase as you can see below.

Want a closer look?
This page provides an abbreviated overview of the lifecycle wheel as adapted for the PH workforce. The full description can be found in Appendix D.



Try this 

Think about the PH personnel involved in the focus area you would like to address. What phase are those people in? What kinds of things should these people be doing? What pain points are they experiencing? What products and processes do they need? What support are they missing?

Take a look at preceding phases. Are things occurring earlier in the lifecycle that are contributing to the problems you see?

At the end of this exercise you should have...

A list of the people involved in your focus area, their phase of the life cycle, their pain points, and what support, products, or processes they need to address all of it!

3 PPP Model

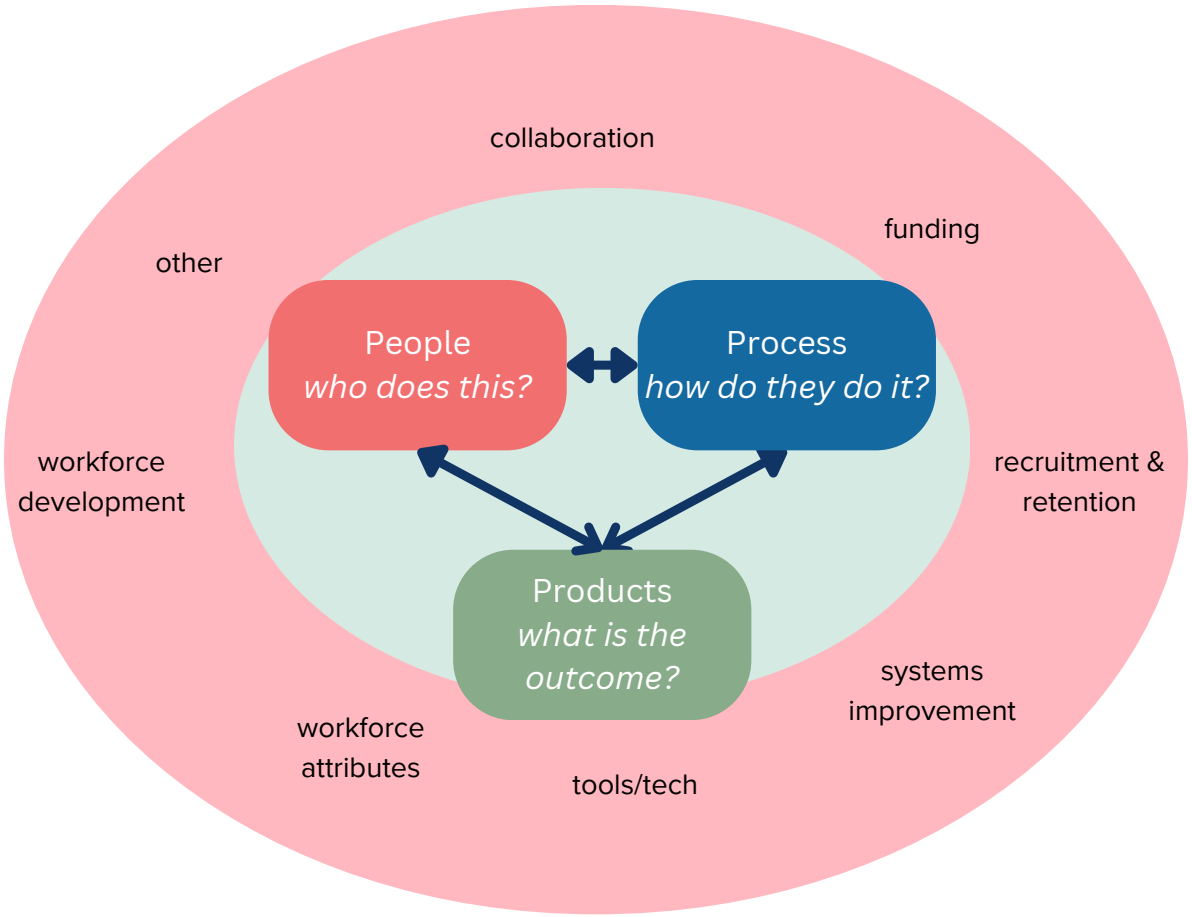
The moving pieces of any public health challenge can be organized by the people, products, and processes involved.

The lifecycle model suggested for us “when” in a career path phase a pain point is occurring, but a crucial question then became “what” is happening during any given career path phase. This section explores how a structured framework consisting of people, processes, and products (PPP) can provide one way to better understand these pain point challenges by addressing what is happening during any given phase. Applying the PPP model organizes the problem space, by asking what people are involved, what processes are followed, and what things a professional will use or need to be created in order to successfully navigate next steps. Answering those questions provides direction towards strategies and solutions for improvement.

When PH professionals talk about their challenges in public health, they can sound vague and abstract (i.e. “the work environment is problematic” or, “there is not enough funding”), however, these challenges involve people, products, and processes. Adjust any “P” and you can observe impacts in multiple areas.

People-oriented workforce development strategies, including quality mentorship, supportive leadership, and fostering a positive team dynamic, create an inclusive and engaging work environment. Effective workforce development processes such as targeted recruitment strategies, comprehensive onboarding programs, and continuous professional development opportunities are essential in ensuring new hires are well-integrated and supported. Additionally, providing access to modern products, including cutting-edge technology, innovative projects, and adequate resources, enhances job efficiency and satisfaction.

During our listening sessions for the *NNPHI Public Health LEADS Exploratory Report on Public Health Data Science and Leadership,* we heard participants share experiences and identify gaps and challenges within the current workforce. Their experiences highlighted the importance of people working within a context of processes and tools or products. Those themes are in the outer circle in the diagram below.



Once you know the PPP, you can choose interventions that address one aspect of the problem thereby affecting the whole. It's not always necessary (nor desirable) to change everything, and often not possible as these are dynamic systems and as we said, changing one piece changes the whole. The diagram to the right shows a general example of the application of the PPP framework.

Train to enable people to do

Support policies and procedures that emphasize efficiency and effectiveness

Specify measurable outcomes (e.g. products made, tools to use, goals accomplished)

Recall

When choosing an intervention, watch out for unintended consequences. Because PH is a complex system, changes in one area of the system can lead to changes in other areas.

Try this

Use each PPP to brainstorm the challenge you're working on. Who does the thing you're concerned about? How do they do it? What products do they use in the related processes, or what products need to be created? You may see some repeats and patterns from the previous brainstorms and work and that's great!

Once you have thought of these things, consider the costs and benefits of making changes to any of those PPPs. Might you add training? Does the person need better tools? Are there good steps and processes with adequate support for following? Each step can bring you closer to understanding what is taking place within the system which contributes to improved solutions.

At the end of this exercise you should have...

A list of key People, Processes, and Products, both existing and needed - plus costs and benefits of making changes to each

4 The Essentials

The Essentials are the behavioral objectives, skills, and values that PH requires from its workforce.

In 2023, HCC Inc. produced *The Essentials: NNPHI Report on Essential Skills and Training Needs for Infection Prevention and Control, Healthcare Associated Infections & Antimicrobial Resistance.* The objective of that report was to clarify the kinds of skills that every PH professional should have.

The results differentiated between skills, objectives, and values that would be required across the PH workforce as well as individuals.

Essential:*

Transferable Skills

Performance objectives

values and attitudes

ESSENTIAL TRANSFERABLE SKILLS

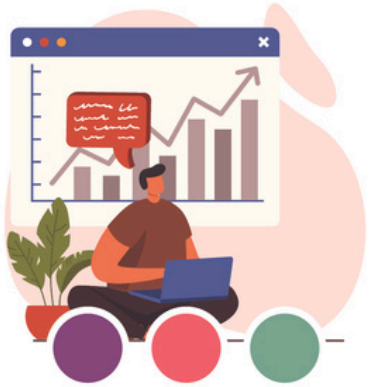
Things you do (cognitive & psychomotor) that are carried to every PH job.

Think of it like a standard toolbox every worker needs.

Everyone needs to use these and use them frequently.

Performance objectives cannot be met without them.

ESSENTIAL PERFORMANCE OBJECTIVES

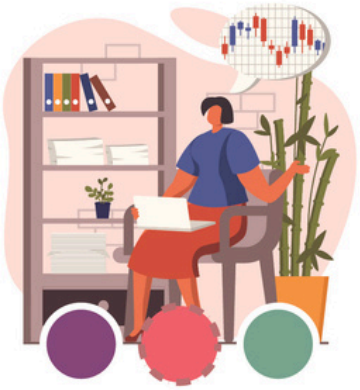


These are goal-based actions, so they may be unique to a context (such as a specific place, task, location). While the PH workforce needs to meet all of these objectives, it is not necessary for every PH worker to individually meet them.

PHW requires these, but extent varies based on role.

Meet objectives by applying transferable and techinical skills.

ESSENTIAL VALUES AND ATTITUDES



These affect the way that work is conducted. They inform priorities and support common goal-making.

Think of them as the guiding principles of PH.

Additional compass required for PHW to accomplish objectives and goals.

Transferable Skills

“Essential Transferable Skills” are ones like situation awareness, communication, and emotional intelligence. These are the things that every person in PH must be able to do, but the ways they do these things may vary by what their roles and expectations are. For example, every PH professional communicates, but the way that a data analyst in PH communicates information may be very different from a community educator.

Performance Objectives

“Essential Performance Objectives” are needed across public health at large, but may not need to be instilled in every individual worker. However, in a systems approach, they should be considered as those performance objectives may impact other workers.

Values & Attitudes

“Essential Values and Attitudes” are those priorities that make your public health efforts successful by informing the way that you work.

Try this

The Essentials

For the challenge you’re working on, circle all of The Essentials that apply. Need definitions or more info? Go to https://ipc.nnphi.org/.

Essential (for all) Transferable Skills	Essential (for all) Values/Attitudes	Essential (for workforce/specific roles) Performance Objectives
Strategic Thinking	Openness to Learn	Information Management
Situation Awareness	Self-efficacy	Information Analysis
Problem Solving	Diversity & Inclusion	Change Management
Emotional Intelligence	Network/Community Building & Sustainment	Leadership
Communication	Trust	Policy Engagement
Data Literacy	Teamwork	Data Leadership
		Data Science

5 Putting it together

This chapter will guide you through our process for combining the various models into one framework.

In the previous chapters, we reviewed three frameworks that can help organize your thoughts around specific challenges. In this chapter, you will progress toward solutions, but it may be necessary to put everything out in the open first.

Looking at all these models at the same time might feel intimidating for some.

This feeling is probably familiar to anyone who has watched those TV shows where an expert helps someone organize their home by first pulling everything out, throwing it on the bed, and deciding to what categories the "stuff" belongs (Is this "keep" or "toss"? Does this item belong in the living room or a closet?). These shows portray an overwhelmed homeowner, who simply needs to work through some of the confusion and chaos to begin seeing progress.

the career lifecycle model:

The Lifecycle model helps by considering the phase of someone's career as we seek to understand pain points.

the PPP model:

This structured framework of people, processes, and products (PPP) provides one way of better understanding pain point challenges by addressing what is happening during any given phase.

the essentials model:

The Essentials gives structure to the skills that people within a given context need to engage when confronted with a challenge or in need of solutions.

The best way to get to achieve progress in this section is to walk through the analyses with us.

Step 1

Select one or more challenges to work through

Want a closer look? 
For a look at our triangulation models, go to Appendix E.

We are going to consider two career path lifecycle-related pain points (**recruitment** and **retention**) and two Essentials (a skill: **communication**, and a value/attitude: **resilience**).

Try this

Summarize the pain point(s)/ challenge(s) you would like to tackle. For us, it was "to improve recruitment, retention, communication, and resilience in PH workforce."

At the end of this exercise you should have...

Specific challenges that you can address using the techniques included in this handbook.

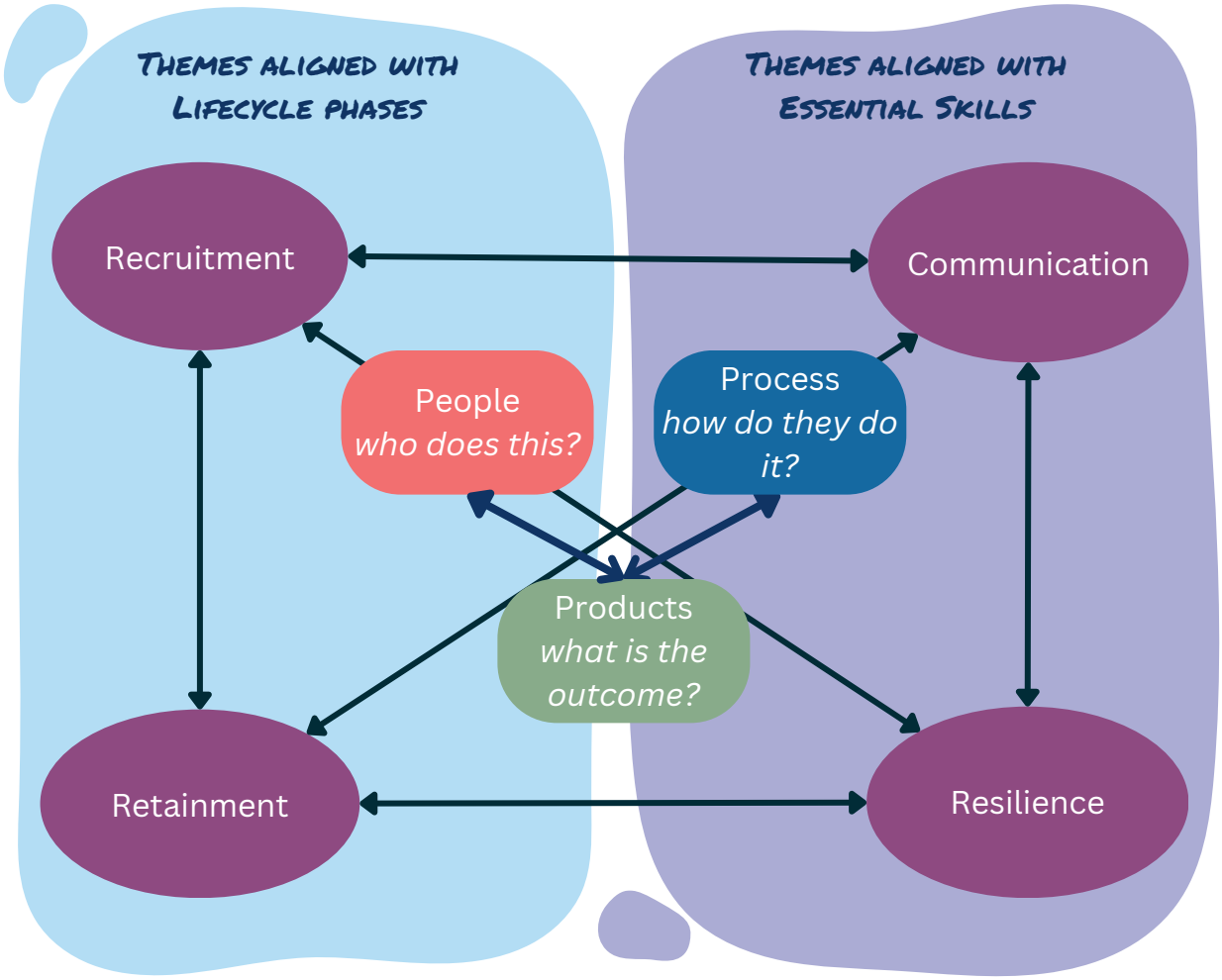
Tip: think positively and be solution-oriented! Make sure you list the pain point in its ideal state. For example, instead of saying your organization is failing to attract good talent, identify the positive skill that can be addressed (e.g., "Recruitment.") If your community is not responding to PH messages in the ways you hoped, instead of saying the community is angry, think of a positive skill that your organization can improve the way messages are received better by the community, such as "Communication".

Step 2

Identify the people, processes, and products.

For the examples provided, we have chosen to tackle four challenges or "pain points" which we encountered repeatedly in the listening sessions across all 3 projects. HCC, Inc. connected several challenges to each other, each with its own set of PPP.

We will begin examining these 4 factors by considering the PPP for each. Keep in mind that each of these factors are not independent, they interact with each other and other factors as elements within a system do. However, you can focus your attention on one challenge at a time when you start out. Just keep in mind that in complex systems (like PH organizations), any given pain point probably involves some aspect of both the career Lifecycle and the Essentials.



Try this

Use the worksheet below to organize your thoughts as you build your systems model, starting with PPP. For example, if you are tackling "communication" ask yourself the questions in relationship to that challenge (e.g., People: Who communicates?).

People

Who does this?

How might you train them better?

Process

How do they do it?

Are there ways to clarify or improve the processes?

Products

What should be the outcome?

How can you better support measurable objectives?

At the end of this exercise you should have...

Organized the PPP related to your challenge, with a brainstormed list of ways to improve.

Step 3

Consider which PPP are "required."

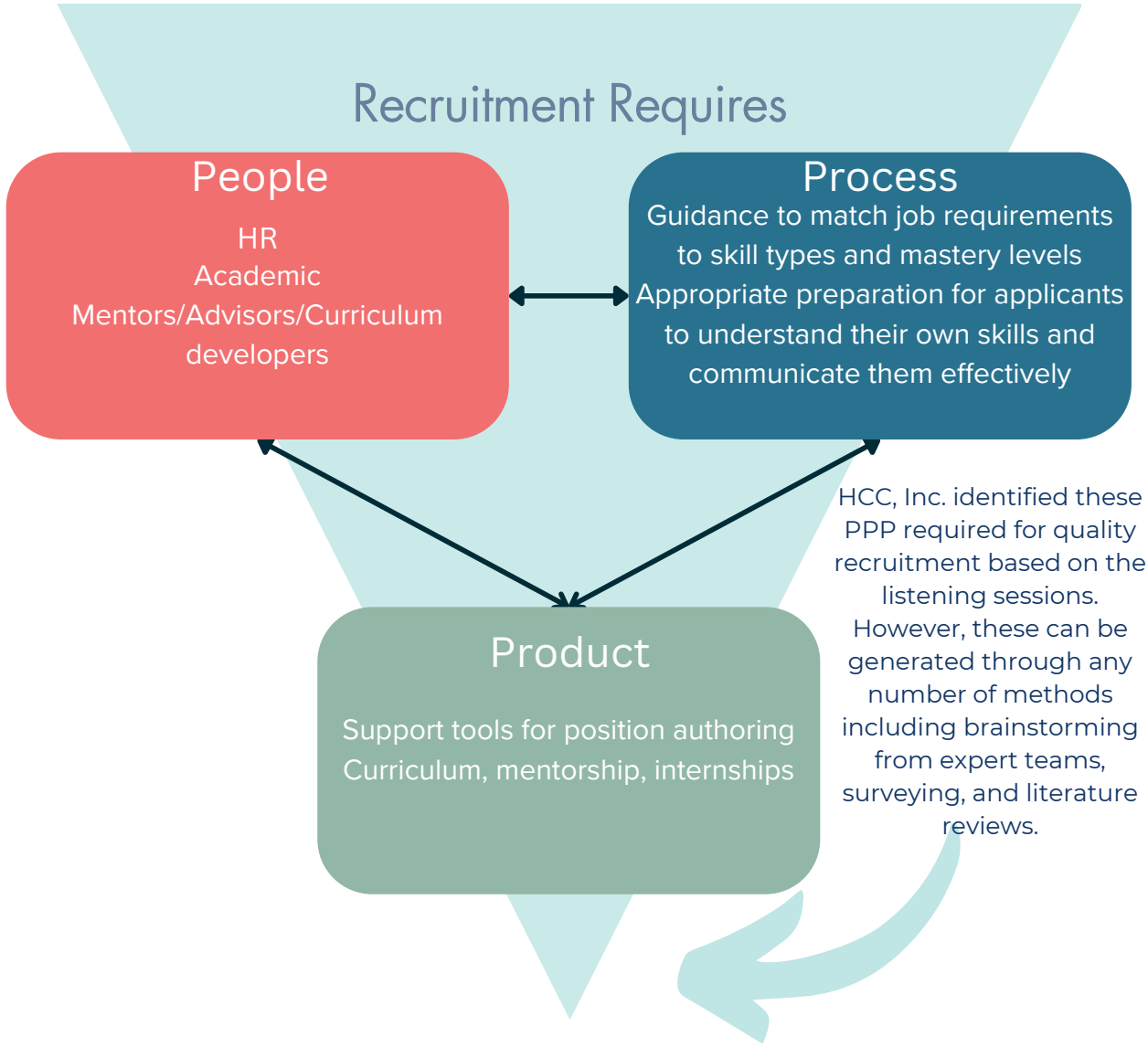
Phrasing your challenges positively make it easier to do this step. You are going to use the PPP framework to answer each question in the context of "What does this require?"

For example, if you are working on recruitment, you would ask:

Recruitment requires...

- What people?
- What processes?
- What products?

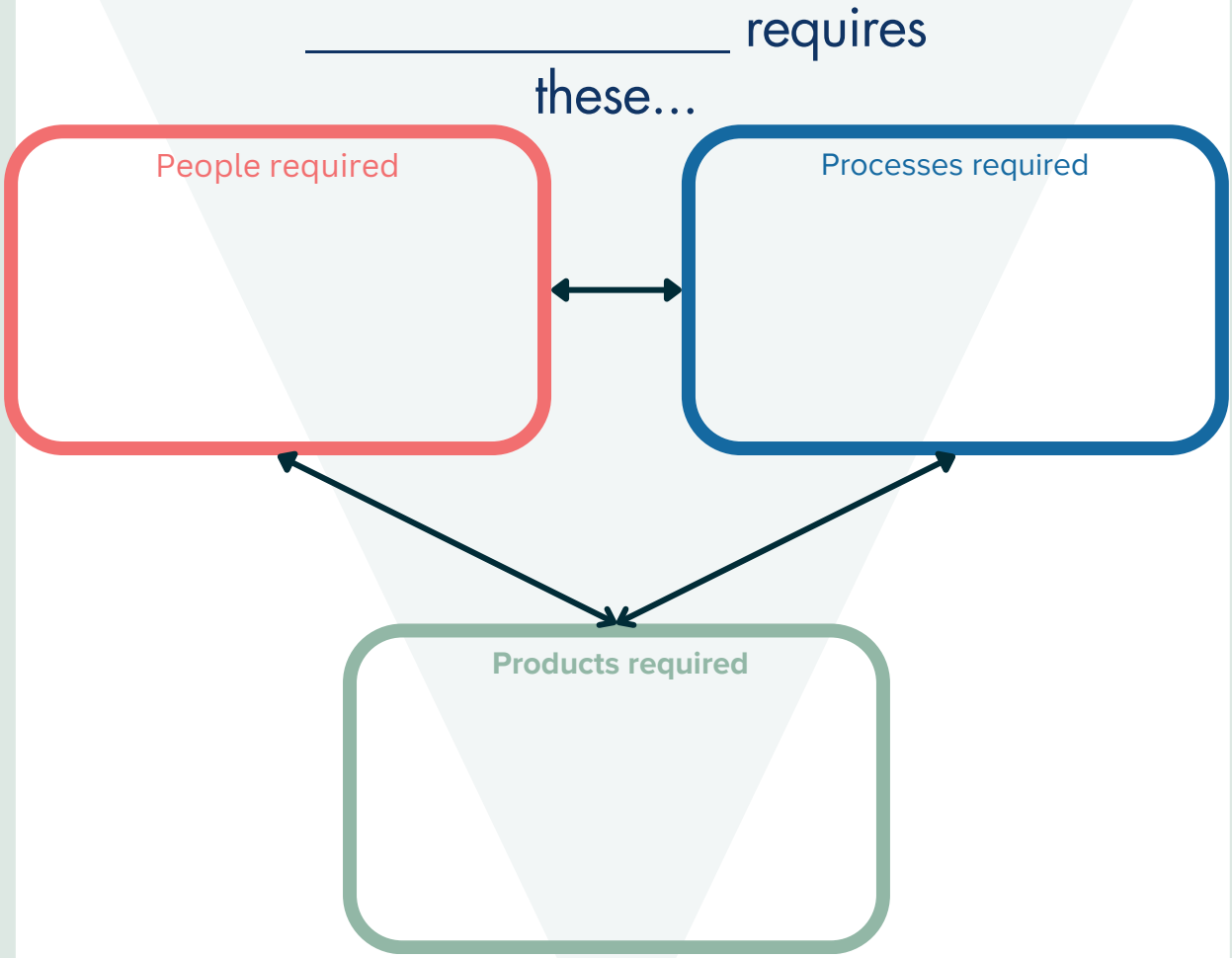
Don't overthink it. This is the perfect exercise to be completed with collaborators who can help you rapidly generate a set of responses from multiple perspectives, knowing that your organization may be unique.



HCC, Inc. identified these PPP required for quality recruitment based on the listening sessions. However, these can be generated through any number of methods including brainstorming from expert teams, surveying, and literature reviews.

Try this

When you think about what is **required** to make this thing happen, you may generate very different things than you did when you first considered what was involved more generally. Your PPP that are needed may be in different areas of your organization.



At the end of this exercise you should have...

A map of the PPP required to accomplish your objectives. This helps see additional ways to address your pain points

Step 4

Consider which PPP are "enabled."

This is where the power of a systems approach shines.

Before trying to find or develop an intervention, it is important to think about why improving the pain point matters and with which other factors it interacts. For each challenge (in these examples: recruitment, retention, communication, and resilience), you want to find what other things are made possible or enabled in the PPP. This will help you explain to other stakeholders why it is important to address the challenge.

Complete the PPP model for "Enables" by listing the following for each challenge topic:

When recruitment works well...

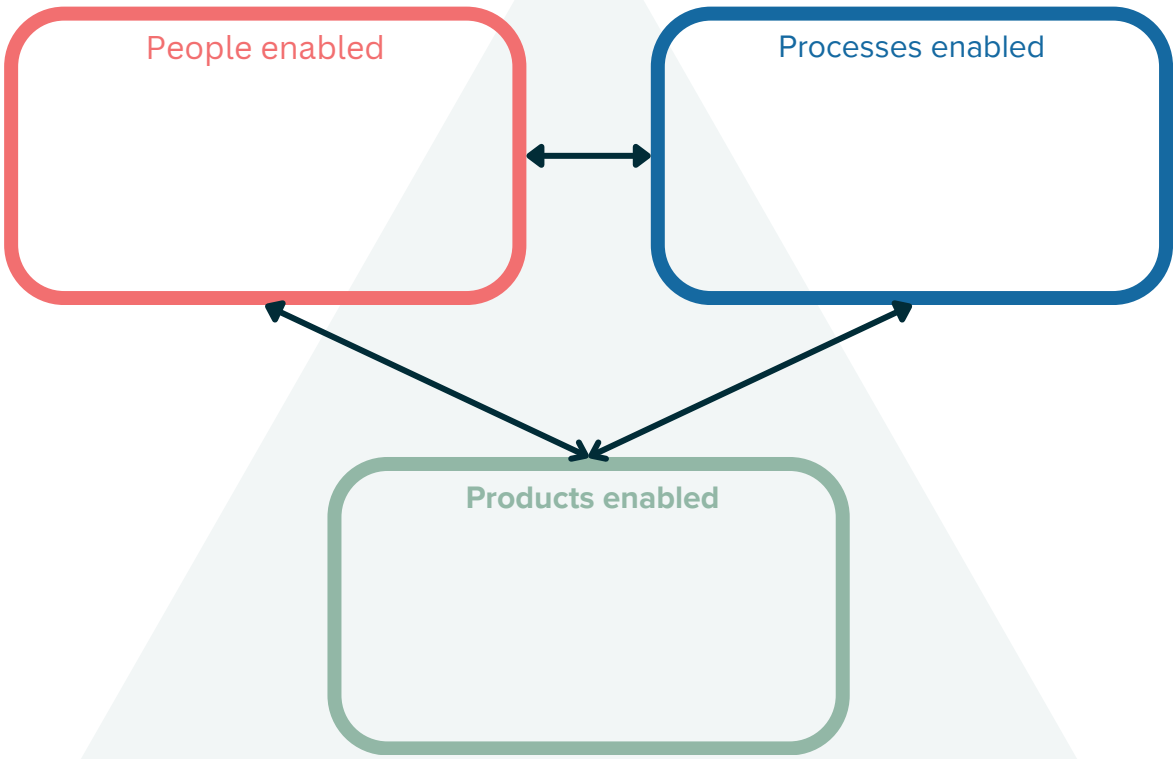
It enables these people.
It enables these processes.
It enables these products.

Identifying these things *before* you try to find a solution helps in a few ways. First, it allows you to better understand the impact of making changes in any one area. The impact areas (whether in people's performance, the organization's processes, or the product outcomes) can then be targeted for measuring the success of whatever intervention you choose. After all, if you say that an area is impacted, that impact should be observable, and if it is observable, it is measurable.

The awareness gained from this step helps you when it comes time to advocate for the interventions you choose. Use the information organized in Step 3 to help partners understand that your efforts in one area enable future successes in other areas.

Try this

Think about what is **enabled** when your topic area works well. The PPP that are enabled may be in different areas of your organization. Remember, this is used to help communicate the value of this topic so that you can build support and resources.



_____ enables these . . .

At the end of this exercise you should have...

A list of the PPP that will be impacted if you address the challenge.

Identifying Interventions

So you have a picture of the problem…how do you find a solution?

Part 1 of this guide has focused on using a systems approach to unpacking complex challenges in the PH workforce. However, this isn't merely an academic exercise. We want to get to solutions.

The good news is that if you improve any part of a system, you can positively impact other parts of that same system. But where do you begin? The table below provides example interventions organized by the PPP framework. These are just examples of the kinds of interventions that can happen.

"People" interventions
Training and Development, including online learning, workshops, onsite opportunities and resources (like this guide).
Performance Feedback and Coaching, including structured feedback to give constructive criticism and praise, Provide one-on-one coaching, and mentorship.
Career Pathing and Growth Opportunities, including clear advancement opportunities and lateral moves to diversify skills and experience, job rotation programs to expose employees to different functions and roles.
Health and Well-being Initiatives, including healthy work-life ratios with flexible working hours and remote work options.
Mental health resources and counseling services.
Wellness programs that include fitness challenges, healthy eating initiatives, and stress management workshops

Improving a process requires considering how the organization supports Essential Skills like communication, collaboration, and systems thinking.

"Process" interventions

Process Mapping and Analysis: looking for inefficiencies and bottlenecks, visualizing workflows to improve understanding, reviewing processes through employee sessions.

Standard Operating Procedures (SOPs): Develop clear, concise, and accessible SOPs for all critical processes; regularly review and update SOPs to reflect changes and improvements.

Continuous Improvement Programs: Implement Lean, Six Sigma, or other continuous improvement methodologies; encourage a culture of continuous improvement through regular events and suggestion programs; cross-functional teams to tackle specific process improvement projects.

Performance Metrics and Monitoring: Define objective, fair, and measurable key performance indicators (KPIs) for all major processes.; use data analytics to identify trends, predict issues, and make informed decisions.

Change Management: Develop a robust change management strategy to handle process changes smoothly, communicate changes clearly and effectively to all stakeholders; provide ongoing support for employees to anticipate and respond to changes.

“Products” interventions

Technology Upgrades:

Invest in modern hardware and software to improve efficiency and reduce downtime.

Ensure regular updates and maintenance of existing tools and systems.

Introduce automation tools to handle repetitive tasks and free up employee time for more critical work.

User-Friendly Software and Platforms:

Choose intuitive, user-friendly software that requires minimal training.

Conduct user testing and gather feedback to improve software usability.

Provide training and resources for employees to effectively use new tools.

Collaboration Tools:

Implement collaboration platforms to enhance communication.

Use project management tools to track tasks and projects.

Introduce document sharing and storage solutions to streamline information access.

Ergonomic Equipment:

Provide ergonomic office furniture and equipment to prevent strain and injury.

Conduct ergonomic assessments to customize workstations for individual needs.

Offer standing desks and other alternatives to traditional seating arrangements.

Great products don’t have to be “high-tech” or expensive. Sometimes the best solutions are the simplest.

Part 2

Pain Points, Use Cases, and Examples

6 From Pain to Solutions

Looking at the "big picture" helps you find ways to address problems to scale.

Depending on where you chose to begin with this handbook, up to this point you have likely made significant progress exploring your challenges and the systems within which they function. In part 1 we covered:

The **Lifecycle** model helps by considering the phase of someone's career as we seek to understand pain points.

The **PPP** This structured framework of people, processes, and products (PPP) provides one way of better understanding pain point challenges by addressing what is happening during any given phase.

The Essentials gives structure to the skills that people within a given context need to engage when confronted with a challenge or in need of solutions.

Applying one or more of these models should have amplified your understanding of your challenge and provided greater insight into the system within which it operates, the interactions of other variables at a number of levels, and the rumblings of some very possible solutions.

In this section we're going to walk through how we put our systems approach to work to develop a list of priority "pain points", based on what we heard in the listening sessions. Then, we provide Use Case vignettes. These stories are fictional, but they are very real and based on the lived experiences of the professionals we spoke with during our listening sessions. Finally, you'll see tools that we developed to address the Pain Points identified.

Want a closer look?
Go to Appendix F to see how we determined which pain points aligned with which Use Case Vignettes .

Identifying Themes and Pain Points

One of our primary tasks in the project was to identify themes that had occurred across the Listening Sessions for all 3 projects, and thus, were present in all 3 project reports. It was our hope that the themes could set us on a path towards solutions to the real problems being encountered by our listening session participants, or as we say, their “pain points”.

Want a closer look? 
Go to Appendix F to see what we did.

Our Methods:

Four HCC team members reviewed the data and reports and provided their results, which were then synthesized into one list of themes.

Only those themes which appeared in all 4 analyst’s lists were included in the final “Data Themes” table which reflects 11 themes, including: Career Preparation, Recruitment, Development, Succession Planning, Retention, Resilience, Communication, Data Science Leadership, Onboarding, Financial Support, and Partnerships & Collaboration.

Next, for each of the 11 themes, we examined the data and reports again, this time identifying the possible “pain points” related to each theme.

Within the last column in the Data Themes table, we presented possible products/ solutions for addressing those 11 themes and their many related pain points. These products/ solutions came from concepts previously presented in the 3 project reports, as well as new ideas rooted in the team’s significant experience in PH workforce development as well as state, national, and global best practices in PH workforce development.

The complete resulting table with all 11 themes, is provided in Appendix F, but on the next page is a simple example with one theme row completed:

Theme: Recruiting

Lay Definition:

The process of attracting and enrolling individuals into the public health workforce

Want a closer look? 
Go to Appendix F to see the complete table

Why does it matter?	Training Implications	Pain Points	Possible solutions/tools to address
This highlights that both comprehensive recruitment strategies and the readiness of individuals through systematic, standardized career preparation are essential for building the Public Health workforce.	>How do we develop talented, appropriately-skilled people? >How do we match talented, appropriately skilled people to workforce needs? >How do we accurately assess workforce needs? >How do we accurately capture workforce needs in position descriptions and recruit and interview in alignment with PDs? Talent ACCESS vs talent acquisition. This opens up new work structures (e.g. freelance teams) and drives job descriptions to be designed for accessibility.	1. Lack of alignment between academics and practice 2. Lack of willingness to hire new graduates 3. Lack of alignment between position descriptions and actual role needs 4. High edu and exp indiviuals being recruited for entry level jobs 5. Emphasis on recruiting short term consultants over long term employees 6. Misalignment between applicant quals, position requirements, position description and ATS programming. 7. Wanting > experience for < wages, recruiting accordingly 8. Not marketing public health, the agency, or roles available 9. Lack of collaboration between academics and practice for recruitment 10. Lack of funding to pay competitive wages 11. Need for more streamlined processes for hiring, people find other jobs 12. Ghosting, unprofessional protocol with applicants	>Collaboratively developed content to train academicians in what to incorporate into academic curriculum to ensure graduates are prepared to practice (with special focus on skills development, field projects and field placement, and assessment). >Practitioner-developed, standardized position descriptions for key Public Health roles. >Training in the process of translating program needs into position requirements that then feed into position descriptions which are utilized for valid and reliable ATS programming which results in high quality, aligned candidates for valid interviews >Guides and standard operating procedures for how Public Health agencies can systematically and effectively market their agencies within academic programs, the student population, and their own workforce (retention).

Try this

Recall from the life cycle section that “pain points” are our challenges - We use that phrase “Pain Point” as representative of the intersection between trying to accomplish a task and the barriers to achieving it. In your work, you personally experience pain points, and you witness colleagues experience them. Take a few minutes to jot down some of those pain points using the format here. Once you’re done, take time to reflect. Did any of the items that came to mind surprise you? Can you start to see patterns in the kinds of problems? Are there parts of the “Requires” and “Enables” pyramids that relate to your pain points?

Theme:
Lay Definition:

Theme	Why does it matter?	Training Implications	**Pain Points**	**Possible solutions/tools to address**

Creating Use Cases and Examples

Once the Themes, Pain Points and Products table had been completed, it was determined that the best way to convey the information was by exemplifying how the themes, pain points and products could be addressed by developing fictional “Use Case” scenarios mirroring real life issues in public health workforce development. The final Use Cases and their corresponding Pain Points and Product solutions (aka “Tools”) are presented on the next pages.

Case 1: Job Author

Xander is an Epidemiologist Supervisor at a local health department. Their role is to manage a small team of epidemiologists who collect, analyze, and report on data related to infectious diseases in the county. One of their longtime employees received a new position at a higher level within an agency, leaving a role on the team vacant, Xander began recruitment activities with the support of Human Resources staff. Xander reviews the dated position description for this role, and quickly realizes that they will not get the best pool of candidates for the role if they simply re-used this description. Xander must identify what knowledge, skills, and abilities this staff person should have to perform their responsibilities. Additionally, Xander must develop a scoring tool for application packet reviews in alignment with the needs identified in the job description.

Xander: Local or State Position Description Author

Due to large workloads with limited time to conduct these activities, Xander decides to use **HCC/NNPHI Decision Tree**, **HCC/NNPHI KSA Summary Matrix** and the **HCC/NNPHI Scoring Matrix** to support them in writing a position description that ensures alignment with the needs of the role. This tool supports them to ensure recruitment aligns with agency needs and saves time in the recruitment process.

Pain Points (Recruitment):

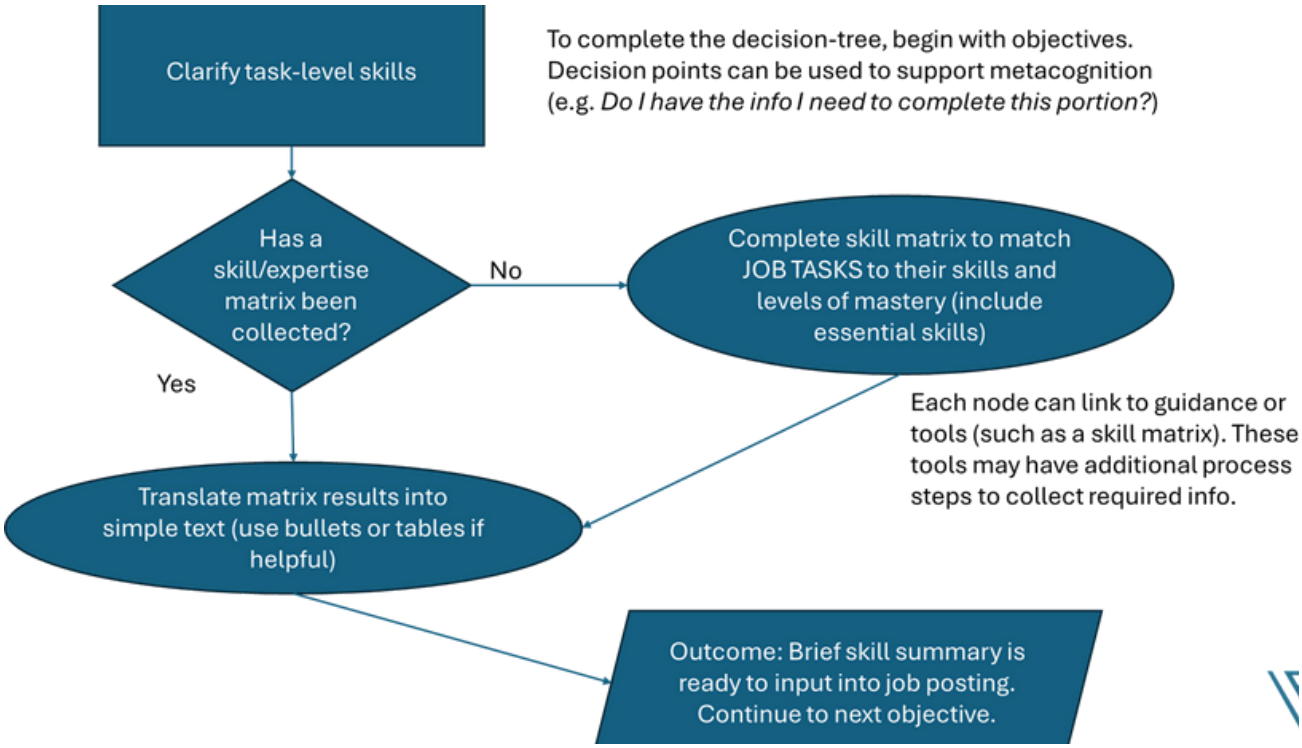
- Lack of alignment between position descriptions and actual role needs
- Misalignment between applicant qualifications, position requirements, position description and Applicant Tracking System (ATS) programming.

Lifecycle Context

skills enable
Process Intervention-Decision Tree
KSA Summary Matrix
Scoring Matrix

HCC/NNPHI Job Authoring Decision Tree

How to Use this Tool: Begin at the “Clarify Task-Level Skills” Box by identifying the skills needed for the role. Then, for each skill identified, follow the path diagram through the skill matrix to develop your skill summary for the job posting.



We created this tool to help someone think through ways to improve the job description

HCC/NNPHI KSA Summary Matrix
County Epidemiologist

Want a closer look? Go to Appendix G to see the complete Matrix, a sample position description, and position advertisement.

How to Use this Tool: For each role of interest, complete the Skills Matrix to match their job tasks identified in the Position Description Decision Tree. Elaborate and expand to reflect the level of KSA mastery required for each, being sure to include the Essential skills. The sample on this page is completed for a County Epidemiologist. The desirable and critical assignment will help to reduce "must have" requirements in the PD which is one strategy to ensure inclusive recruitment strategies. You will find all pages of the complete form in Appendix F.

KSA SUMMARY

CLASS TITLE: _____ POSITION NUMBER: _____ DATE: _____

PREPARED BY: _____ APPROVED BY: _____

DUTIES	PERCENT OF TIME	KSA	DESIRABLE OR CRITICAL	RANK
Epidemiological Assessment and Reporting (60%): Coordinate, investigate, analyze, and control outbreaks of suspected diseases in the community. Provide technical assistance for the required reporting of communicable diseases and conditions in the County and assist neighboring counties as requested. Create reports using internal, external, state, and private data. Utilize GIS to map data for analyzing disease clusters. Conduct health assessments of the county and its sub-populations using epidemiological and biostatistical tools. Analyze data for outbreak and communicable disease surveillance reports using programming techniques (e.g. SAS, R). Monitor and follow up on various state and local data reporting sources, including hospital and clinical data, school data, laboratory results, and zoonotic disease data.	60%	Knowledge of basic epidemiological principles and practices Skill to conduct epidemiological investigative case follow up, Ability to communicate effectively with clients, staff and the community, ability to prepare and deliver presentations to staff and the community. Ability to utilize problem-solving techniques Ability to work independently, Ability to establish and maintain effective working relationships with others Ability to plan, organize and coordinate work assignments Ability to document work products. Knowledge of basic computer skills, office equipment and epidemiology programs. Ability to complete reports.	Critical	1
Mentorship and Training (20%): Serve as a mentor for the distance-learning program for the University of Master of Public Health Program, fellows, and other students. Implement and monitor a new syndromic disease surveillance system. Analyze and provide comparative data and syndromic disease reports from peer counties and national systems. Report significant findings to appropriate staff and agencies, including the Sheriff's office regarding homeland security issues.	20%	Skilled in ESSENCE or other syndromic surveillance systems Ability to communicate effectively both orally and in writing Skilled in data analysis and interpretation	Desirable	4

HCC/NNPHI Scoring Matrix
Example County Epidemiologist

How to Use this Tool: Once the position description has been developed using the previous tools, a scoring matrix like this one can be developed to ensure that the priority KSA and qualification areas are included and have the proper scoring and weighting. Once completed, this tool allows a systematic, comprehensive, consistent review for each candidate interviewed. The sample below has been completed for the County Epidemiologist. The posting and PD description do not indicate an advance degree is needed, the education section could be deleted.

Names of Applicants for Potential Interviews

County Epidemiologist
Position #123456
Total Possible Score = 37 points

Scoring Categories identified within the Position Description and the Job Advertisement

Name of Applicant	Education	Computer Skills	Public Contact	Bi-lingual	Emergency Response	Epidemiology	Policy Dev & Strategic Plan	Veteran	Score

Legend contains scoring categories with point system

Legend:

EDUCATION
SELECT ONE

AA	1 pts
BA/BS	2 pts
Master	3 pts

COMPUTER SKILLS
MULTIPLE SELECT

MS Word	1 pt
MS Excel	1 pt
MS PowerPoint	1 pt
MS Outlook	1 pt
Disease Surveillance	2 pt
Electronic Health	1 pt
Syndromic Surveillance	2 pt
GIS Mapping	2pt
Other Computer	1 pt

PUBLIC CONTACT
MULTIPLE SELECT

Public Speaking	3 pts
Outreach	2 pts
Marketing	1 pts
Health Education	2 pts
Team Building/Motivation	1 pt
Training Implementation	1 pt
Mentorship	1 pt
Community Engagement	1 pt

BILINGUAL

Spoken proficiency 2 pts

Bilingual points are not included in the total possible points scores. It is considered a preferred qualification.

EMERGENCY RESPONSE
SELECT ONE

0 – 1 year	1 pt
2 – 4 years	2 pts
5 – 7 years	3 pts
8+ years	4 pts

EPIDEMIOLOGY
SELECT ONE

0 – 1 year	1 pt
2 – 4 years	2 pts
5 – 7 years	3 pts
8+ years	4 pts

POLICY DEV & STRATEGIC
MULTIPLE SELECT

Develops and Updates Epi Plans 2 pts

Data analysis and reconciliation 2 pts

Develops, Coordinate & conducts trainings 1pt

Policy & Procedure development & revision 1pt

VETERAN PREFERENCE
SELECT ONE IF APPLICABLE

1 – 2 on application = 1.85 (5% of total possible score)

3 – 5 on application = 3.7 (10% of total possible score)

Veteran preference is required for governmental jobs. Check with organization for the appropriate scoring.

Case 2: Local Interviewer

Krystle: Local or State Position Interviewer

Krystle is a panelist on an interview panel for a new epidemiologist in her section at the state health department. She's responsible for conducting surveillance for injury and violence related programs, and her supervisor has asked her to take part in this interview panel and help write questions to ask the candidates as the role will work closely with her in monitoring data related to youth traumatic brain injuries. While Krystle has been an interview panelist before, she feels uncertain about how to write questions that will help her understand their relevant experiences.

Krystle wants to be sure that the questions she proposes enable her to determine the candidates' abilities as they relate to the qualifications. Krystle is turning to the **HCC/NNPHI Interview Guide** and **HCC/NNPHI Scoring Template** to support her drafting questions and assessing candidate responses.

- Pain Points (Recruitment): Misalignment between applicant qualifications, position requirements, position description and ATS programming.

Essential Skills
applied in context

Process Intervention: Interview Guide
Product Intervention: Scoring Template

How to Use this Tool: The interview guide on this page has been adapted for use with the County Epidemiologist role. It aligns with the position description, the advertised post, the skills matrix and the scoring matrix. The introduction, closing and evaluation sections of the guide can be used with any position. The interviewing questions are specifically tailored for the County Epidemiologist Role. Each numbered section aligns with the skills identified with the earlier tools. The guide can be used as a template for other roles but specific content with the relevant information for the role you are recruiting will need to be tailored for it to be useable. This is page 1 of the guide, the full guide can be found in Appendix H.

Want a closer look?
Go to Appendix H to see the complete interview guide.

HCC/NNPHI Interview Guide: County Epidemiologist

Introduction:

- Greet the candidate and introduce the interview panel.
- Provide a brief overview of the interview process.
- Explain the role and its importance within the Department of Health.

Interview Questions:

1. Background and Experience:

- Can you briefly describe your educational background and how it has prepared you for a role as a County Epidemiologist?
- What previous positions have you held that are relevant to this role?
- Describe your experience with investigating and managing communicable disease outbreaks.

2. Epidemiological Assessment and Reporting:

- Can you provide an example of a time when you conducted a complex epidemiological assessment? What was the outcome?
- How do you ensure accuracy and timeliness in your investigation and reporting of communicable diseases?
- Describe your experience with using GIS for mapping disease data. How have you used this tool to identify and analyze disease clusters?

3. Data Analysis and Technical Skills:

- What advanced programming techniques have you used in your previous roles? Can you give an example of a specific project where these skills were crucial?
- Explain how you handle and analyze data from multiple sources (e.g., hospital data, school data, laboratory results).
- How do you stay current with new technologies and methods in epidemiology?

4. Mentorship and Training:

- Have you ever mentored students or fellows in public health programs? If so, describe your approach and experience.
- How would you implement and monitor a new syndromic disease surveillance system?

5. Emergency Response:

- Describe a time when you were part of an emergency response team. What was your role, and what challenges did you face?
- How would you coordinate with regional and local agencies during a biological event?

6. Community and Stakeholder Engagement:

- How do you communicate complex epidemiological data to non-experts, such as community members or local officials?
- Provide an example of how you have prepared and delivered presentations or reports to stakeholders.

How to Use this Tool: The scoring template was created to help with the evaluation portion of the interview. This scoring sheet is specific for the County Epidemiologist role and aligns with the interview guide. The rating scale is provided at the top of the template. The questions from the interview guide populate the Questions column. This template allows for a quick glance at how each applicant performed on each question.

Want a closer look? Go to Appendix I to see the complete interview scoring template

HCC/NNPHI Scoring Template

Rating
1: A poor answer that missed the key point of the question
2: An incomplete answer that had good elements but was significantly flawed
3: A basically adequate answer that hits the key points of the question but goes no further.
4: An ideal answer that understood the question and answered it fully while indicating high competence. The answer goes beyond the basic requirements of the question.

No.	Questions	Applicant #1	Applicant #2	Applicant #3
1	Can you briefly describe your educational background and how it has prepared you for a role as a County Epidemiologist?			
2	What previous positions have you held that are relevant to this role?			
3	Describe your experience with investigating and managing communicable disease outbreaks.			
4	Can you provide an example of a time when you conducted a complex epidemiological assessment? What was the outcome?			
5	How do you ensure accuracy and timeliness in your investigation and reporting of communicable diseases?			
6	Describe your experience with using GIS for mapping disease data. How have you used this tool to identify and analyze disease clusters?			
7	What advanced programming techniques have you used in your previous roles? Can you give an example of a specific project where these skills were crucial?			
8	Explain how you handle and analyze data from multiple sources (e.g., hospital data, school data, laboratory results).			
9	How do you stay current with new technologies and methods in epidemiology?			
10	Have you ever mentored students or fellows in public health programs? If so, describe your approach and experience.			
11	How would you implement and monitor a new syndromic disease surveillance system?			

Case 3: Academic Advisor

Jason: Academic Mentor Advisor

For the last six years, Jason has worked as a public health and biological sciences advisor for undergraduate and graduate students in the College of Arts and Sciences at a small liberal arts college. Jason was a marine biologist before joining the College, so he has many connections and pieces of advice for prospective biologists, but has little connection to the field of public health. Given his limited experience and the College's lack of connections to public health organizations in the region, Jason typically advises that students use typical job search engines for their job searches, or find online trainings to build hard skills in public health.

He offers little advice for students as they navigate deciding what organizations fit them best in the course of interviews. Jason notices a dwindling success rate for his public health students, and is searching for alternative to his advising practices. He turns to the **HCC/NNPHI Resilience Checklist** to support students in evaluating potential employers, helping them to take charge of their career journeys.

Pain Points (Career Preparation):

- Lack of career path guidance at academic level
- Lack of standardized process/ information for pursuing career

Lifecycle Context
Skills enabled

People intervention: Resilience checklist

How to Use this Tool: Interviewing is a two-way process, the candidate is presenting their skills to the employer and the employer is presenting their organization to the candidate. This resiliency checklist is to be used by the candidate to understand the working culture of the organization for which they are applying. The candidate can use the checklist to assess if the organization supports a culture of resiliency and if their direct supervisor also adheres to those principles. The last section contains questions that a candidate can posed during the interview or in a follow up email.

HCC/NNPHI Resilience Checklist

Organization Employer

Prepared, adaptable, collaborative, trustworthy and responsibility are traits for a resilient organization. Organizational culture of resilience values flexibility, innovation, and continuous learning allowing the organization to navigate uncertainties and setbacks effectively.

- ☐ Builds flexibility as possible into all employee's schedules.
- ☐ Encourages vacation time.
- ☐ Create opportunities for employees to build connections with each other via workplace relationships that are positive and provide a source of support.
- ☐ Encourages engagement in self-care activities including taking regular rest breaks, maintaining proper water hydration, eating high protein foods, avoiding sugar, caffeine
- ☐ Provides opportunities for behavioral health promotional activities.
- ☐ Has procedures for maintaining workplace normalcy during high stress events or disruptions (e.g. outages, system failures, outbreaks, etc.)
- ☐ Maintains physical security.
- ☐ Maintains digital security.
- ☐ Prioritizes people.
- ☐ Organizational transparency regularly captures what went wrong as a valued and encouraged practices.
- ☐ Practices accountability for identifying and acknowledging where improvements can and should be made within departments.
- ☐ Encourages continuous learning.
- ☐ Regular evaluation of decisions and strategies
- ☐ Values diversity and inclusion
- ☐ Prioritizes and Maintains open communication channels.

Direct Supervisor

- ☐ Checks in regularly with employees to ask about their well-being.
- ☐ Active listening and responding skills.
- ☐ Builds trust and credibility.
- ☐ Creates a safe and supportive environment.
- ☐ Encourages regularly defusing conversations with teammates and peers.
- ☐ Understands the resources and access to employee assistance programs (EAP)

Questions to ask during an interview:

1. Can you describe the company's culture?
2. Help me understand your risk management protocols. When you have a threat or unexpected disruption, what are the company's priorities?
3. How does the company promote diversity and inclusion?
4. What is the company's approach to work-life balance?
5. How do you handle conflicts within teams?
6. How does the team collaborate and communicate?
7. How does the company support continuous learning and skill development?
8. How are performance goals set and evaluated?
9. How does the management team support employees in achieving their goals?
10. Can you describe the physical work environment including physical and digital security measures?
11. How does the company handle change and innovation?
12. How does the organization support employees during periods of change?
13. How does the company measure employee engagement and satisfaction?
14. How frequently does the company seek feedback from employees and how is it used?
15. How does the company support employees' health and well-being?

Case 4: Curriculum Developer

Solemi is coordinating the development of her University's first Bachelor's and Master's in Public Health curricula. In addition to seeking CEPH accreditation, Solemi especially hopes to build improved alignment between the needs of public health professionals in practice and what both undergraduate and graduate students learn from their programs. Her partners in the government public health sector have voiced the importance of collaborating to fill this perceived gap between academics and practice. They have special concern in the area of public health data science and public health data science leadership.

Solemi: Curriculum Developer

She aims to build curricula that includes tangible skills she knows students need, such as those in data science. communication, public speaking, meeting facilitation, and resilience-building. Solemi does not know where to start in this work and turns to the **HCC/NNPHI Curriculum Pyramid** to guide the development of her practice-based curriculum.

Pain Points:

Recruitment: Lack of collaboration between academics and practice for recruitment

Resilience: Lack of training for resilience as it relates to resilience needed for job satisfaction and retention

Essential Skills

Applied in Context

People intervention: Curriculum Pyramid

Tool: HCC/NNPHI Curricular Pyramid

Lack of alignment between academic curriculum and the knowledge and skills required to effectively practice public health in the workplace, ***especially as it relates to new hires and roles in public health data science***, was a theme present across Listening Sessions and projects.

To tackle this challenge, we approached it from both the process and product perspectives.

processes

1. a process to ensure public health practice agencies are clear on the knowledge and skills competencies needed to effectively perform roles and responsibilities within the agency;

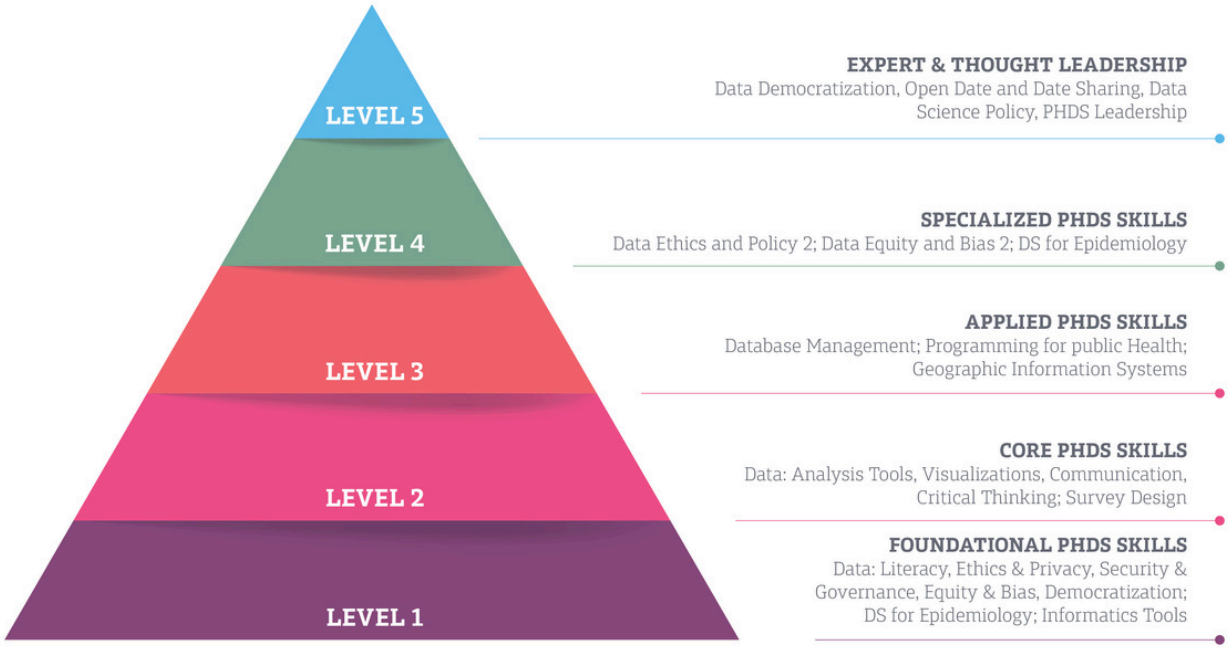
2. a standardized process to collaborate with academic institutions to ensure public health practice skills and knowledge competencies are systematically included in academic curriculum (including course content, capstones, and field experience), and

3. a process for evaluating that the practice-based knowledge and skills have been adequately conveyed prior to graduation, and that they are utilized within the practice setting.

Want a closer look? Go to Appendix J to see the complete process.

products

The product of a curriculum pyramid is helpful as a foundational tool for academic/ practice collaboration to incorporate the relevant skills required into the curriculum. The pyramid on the next page represents an example of the different levels of skills required for public health data scientists within a government public health practice agency such as a county or state health department.



Want a closer look?
Go to Appendix K to see our completed pyramid and the sample skills-based content.

We created this tool to help identify which Public Health Data Skills (PHDS) are needed at each level of career/ academic development

Afterword

As we conclude this workbook, we find ourselves at the forefront of pivotal choices in public health. The challenges facing our workforce are complex and interconnected, demanding innovative approaches and ways of thinking that go beyond the standard solutions and methods. At Health Communications Consultants, Inc., we lead organizations to think differently. With years of experience in improving the public health workforce, we sought to examine workforce development issues from a fresh perspective. Using the topics and themes identified in existing NNPHI-HCC, Inc. collaborative work, we aimed to explore and expand them. Our exploration revealed that each area is much more than just a singular focus within a complex system.

This workbook represents an exploration into new territory. By applying systems thinking to these challenges, we open up new avenues for understanding and action that have the potential to transform not only our approach to the workforce but to the field of public health as well. The appendix of this handbook compiles all the analysis and interpretation of the data within the three projects using systems thinking. The methods described in this handbook show how interdisciplinary critical thinking provides the opportunity to stimulate curiosity, make connections between logical ideas, enhance problem-solving, and see the bigger picture. It helps to find effective, efficient, and innovative solutions to those areas that hinder us from achieving a healthy, vibrant workforce.

Our hope is that this guide will inspire and empower you to chart new paths in addressing your public health workforce issues. Whether you're a seasoned public health leader or new to the field, the methods and models presented here offer a flexible, adaptable, non-linear approach to tackling even the most challenging issues. We encourage you to experiment with these tools. Remember that you're not just solving today's problems – you're to helping to shape the future of public health. The insights you gain and the solutions you develop using these systems thinking approaches have the potential to create ripple effects throughout the entire public health ecosystem. Your work in applying these methods can lead to more resilient health departments, more satisfied and diverse workforces, and ultimately, healthier communities.

Thank you for your dedication to public health and willingness to explore new approaches to longstanding challenges. Together, we can create a public health workforce that is prepared for the challenges of today and also resilient in the face of whatever tomorrow may bring. The journey begins here – let's get started.

Appendix

Appendix Forward

This Appendix serves two main purposes:

1) To be used in conjunction with the Handbook to facilitate use of the Handbook by providing real, practical examples for each of the exercises.

This first path allows those using the Handbook to explore the end result possibilities of our work for guidance, inspiration, and knowledge expansion for their own projects and needed solutions.

2) To be used as a stand-alone tool, separate from the Handbook, to present the scope of the primary products resulting from work related to the HCC, Inc./ NNPHI project described in the Introduction section of the Handbook.

As with the Handbook, at its core this Appendix is about public health challenges in workforce development and the infinite range of solutions that exist when we view those challenges through a systems-thinking lens.

And as with the Handbook, review of this Appendix does not need to be linear. One can jump in at any individual appendix - there is an introduction to each, briefly explaining what it is and how best to use it.

However, to better understand the full process undertaken by the HCC, Inc. team, we encourage you to begin at Appendix A, a summary of the results of the reports used to build this project, and Appendix B, a view of the expansive concept maps with which we began conceptualizing the complex systems surrounding our pain points and potential solutions.

Then, follow through and explore each Appendix through to the final Appendix to K; the curriculum pyramid which reflects the possibilities that exist when public health practice collaborates with public health academics to develop curricula that ensure graduates are ready, prepared, and confident to hit the ground running with their first jobs in public health and remain competent and qualified throughout their long, productive, careers.

Regardless of the way you choose to approach this document, thank you for approaching it. We hope your thinking, perspective, and view of what is possible in public health workforce solutioning will be as expanded as ours was by creating it.

Appendix A
Results Summary Page

In service of exploring the person-in-environment relationships that impact the public health professional workforce, we reviewed our previous work with an eye towards analyses of commonalities across the focus topics. This review included the *NNPHI Infection Prevention and Control, Healthcare Associated Infections & Antibiotic Resistance Essential Skills, and Training Needs* report, the *NNPHI Public Health LEADS Exploratory Report on Public Health Data Science & Leadership* report, and the *NNPHI Public Health LEADS Exploratory Report on Public Health Data Science & Leadership for Recent Graduates* report to inform the development of the systems approach guide. Core results from each report can be found below.

NNPHI Infection Prevention and Control, Healthcare Associated Infections & Antibiotic Resistance Essential Skills, and Training Needs

- The Essentials are an overlooked, essential component of training for the public health workforce.
- Essential Transferrable Skills, Essential Values/Attitudes, and Essential (role-specific) Performance Objective should be featured in training development, centering emotional intelligence principles with consideration of what certain Essentials require and enable.

NNPHI Public Health LEADS Exploratory Report on Public Health Data Science & Leadership

- In examining connections between data science and leadership in the public health workforce, the terms data science, data literacy, and data-informed leadership were defined distinctly in service of clarifying competencies required in the field.
- Persistent gaps vary by career pathways, but include skills around data storytelling, data collection, and translation or data communication.
- Understanding and addressing these gaps/challenges requires an understanding of the dynamic relationships between the environment in which a professional does their work, and the work itself, particularly in addressing obstacles to equity.

NNPHI Public Health LEADS Exploratory Report on Public Health Data Science & Leadership for Recent Graduates

- Misalignments between new public health professionals' years of experience/skills and entry-level role requirements are a barrier to entry for the field.
- Academic preparation for public health lacks sufficient applied practice in the skills needed on the job, including software skills, data management and analysis, grant writing, program management, community engagement, and more.
- Recruitment and training practices must be reviewed to become increasingly person-centered.

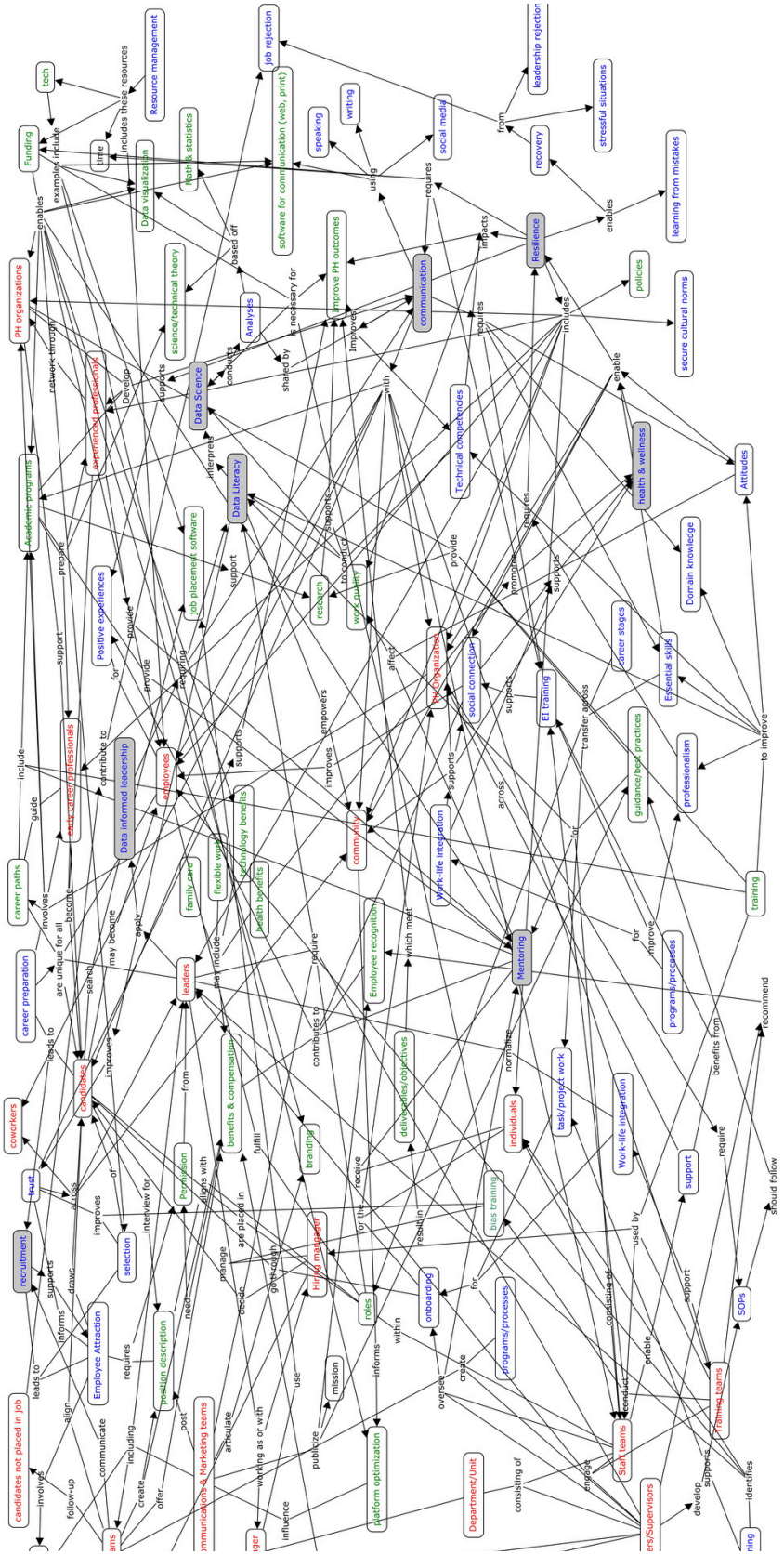
Appendix B - Concept Maps

Broad Concept Map

Concept mapping is both a process and product that reveals relationships across constructs.

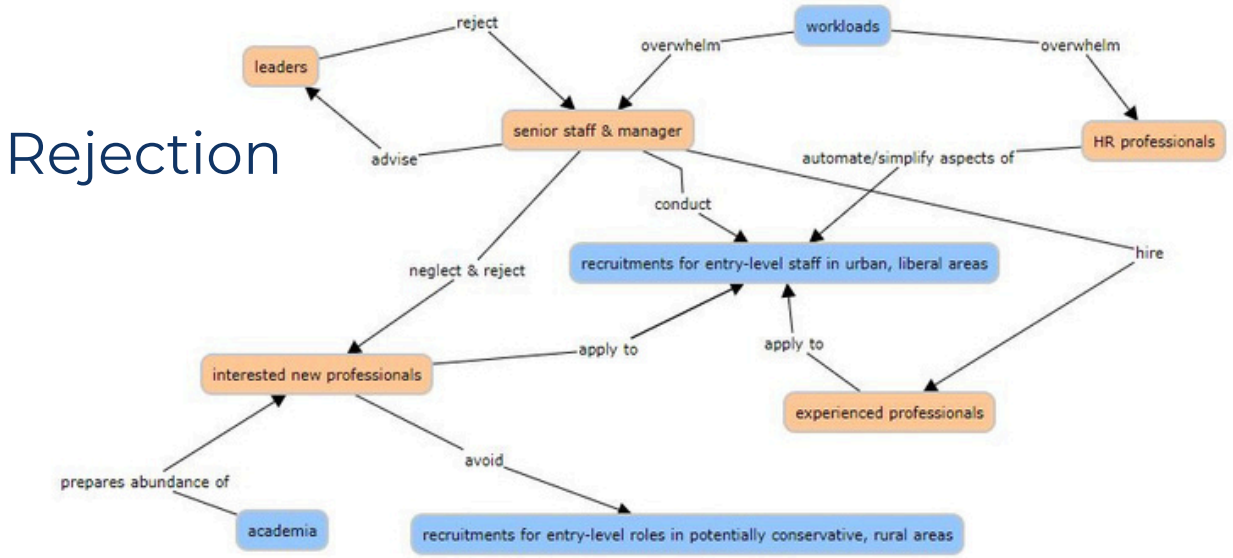
It may seem useful to connect all of the related information in one visualization, but that isn't necessarily so. The map on the right includes over 100 themes; at this size and scope, as a whole it does not provide a large level of utility. The people, processes, and products involved are so interwoven that the map cannot be useful in its current state.

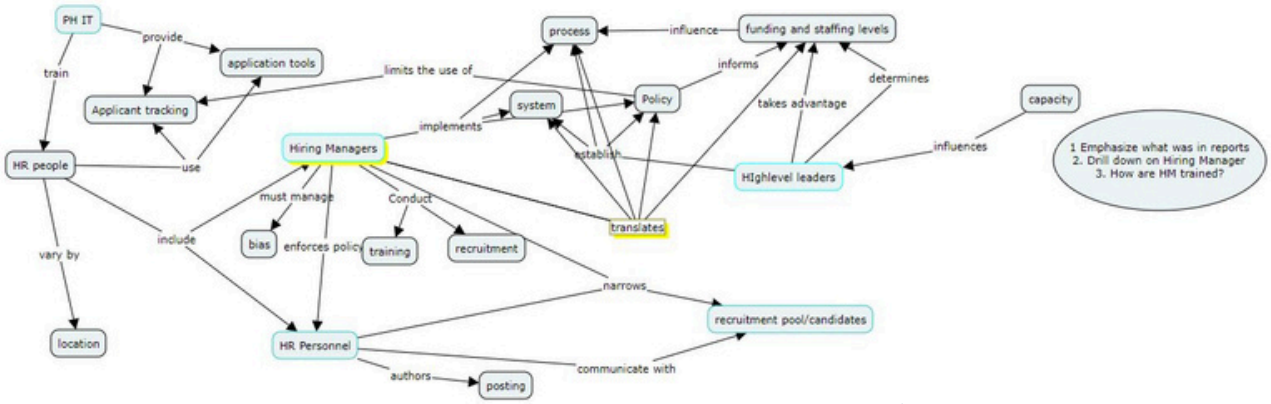
Focusing in on specific sections to view a finer granularity helped identify the most relevant themes and their related issues.



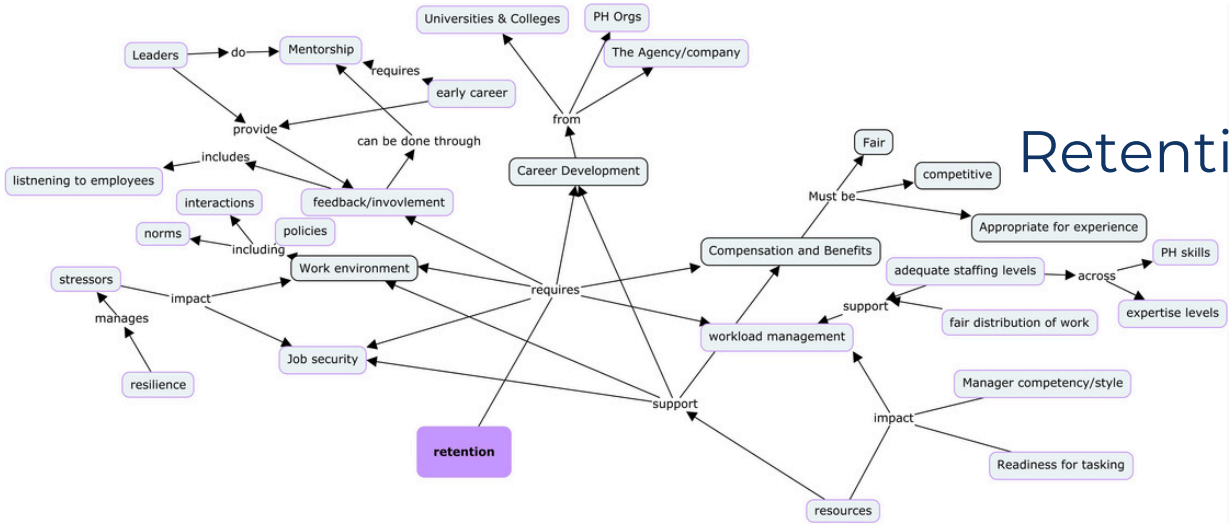
Appendix B, Continued...
Topic-Specific Concept Maps

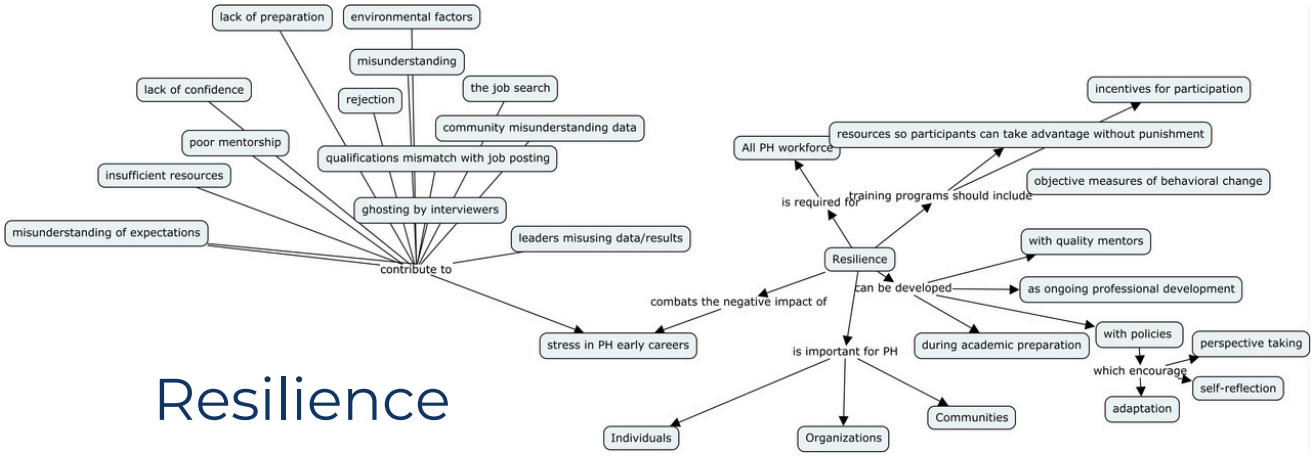
The project aimed to connect four themes (rejection, resilience, recruitment, and retention) from three different data collection efforts. This approach provided a way to assure all team members shared an understanding of the complex problem space. The maps created are not considered static items nor do they capture the full scope of a problem. Rather, they provide a way to clarify connections. The process of concept mapping can be never-ending, so good judgment is needed to identify the point at which a map is sufficient, keeping in mind that it can always be revisited. The following maps are examples of some that our team created from the listening sessions data. The first sets use the key topics identified in the broad concept map (rejection, recruitment, retention, resilience, and communication) and construct associations linked by verbs or prepositions. This is helpful for considering possible causal links.



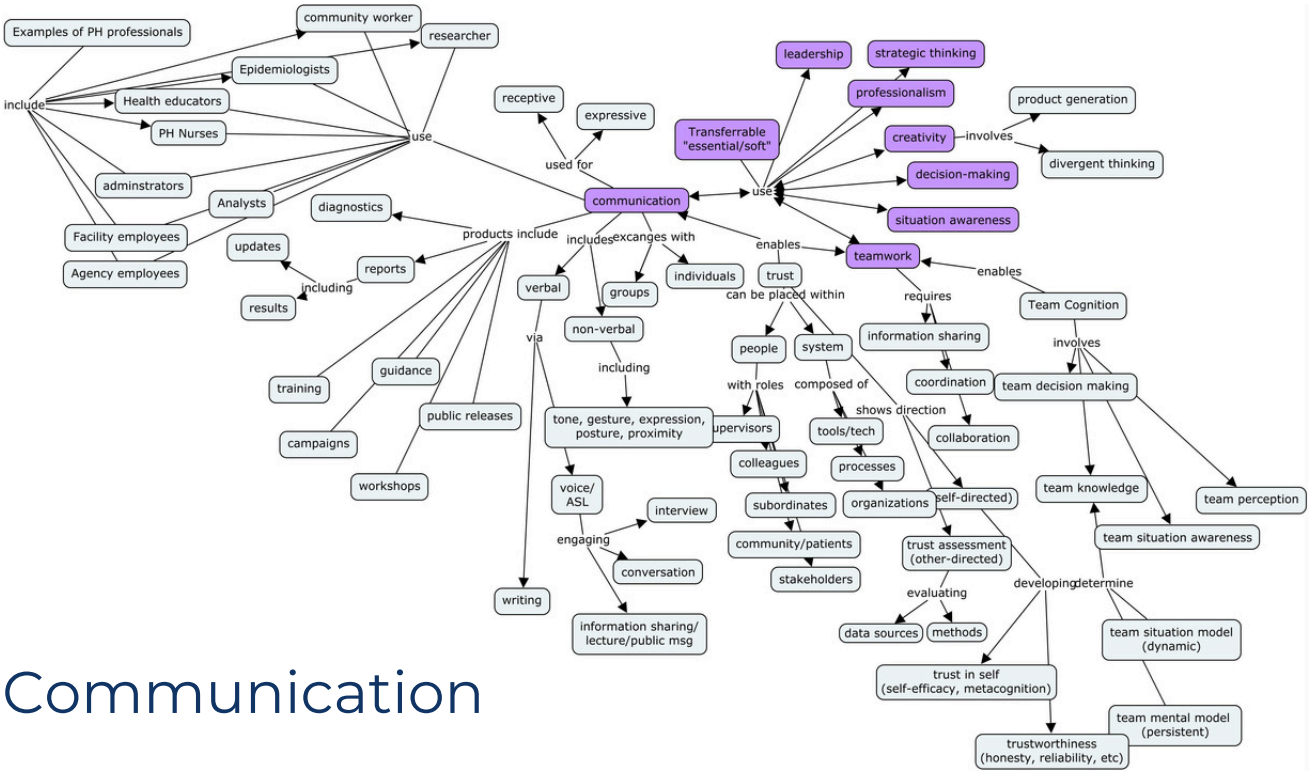


Appendix B, Continued...
Topic Specific Concept Maps





Appendix B, Continued...
Topic Specific Concept Maps



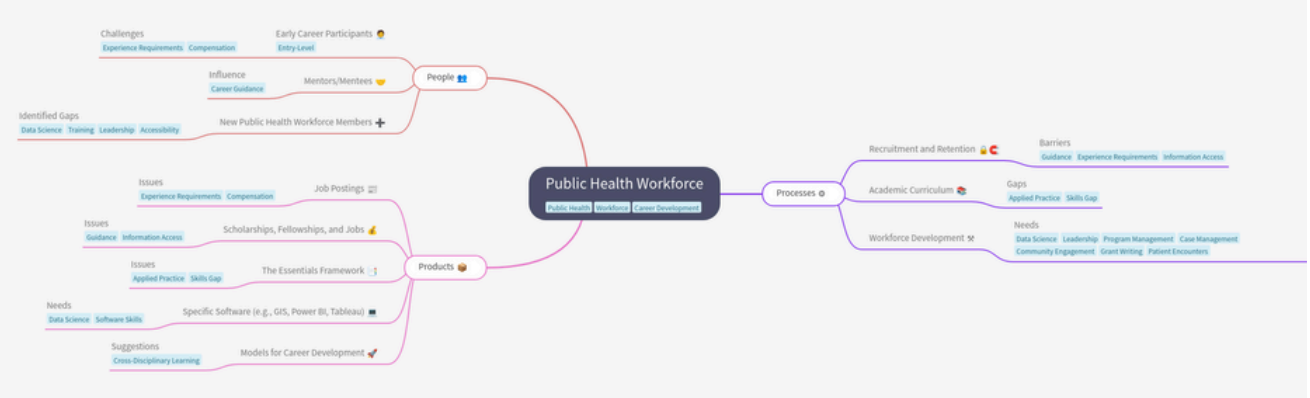
Communication

The following maps show the same information from the listening sessions as those included in the previous maps, but now organized by tiered categories. This kind of mapping can be helpful for visualizing frequencies (like the repeated occurrence of generically tagged things like “issues”), but focus on more helpful clusters describing the more specific types of issues.

This level of concept mapping helps illustrate that *the way that information in a complex system is organized can imply different things in regard to importance*. Applying multiple mapping techniques helps reduce biases that might be found more readily when using a single technique.

Appendix B, Continued...
Tiered Categories-Concept Maps

PH Workforce PPP

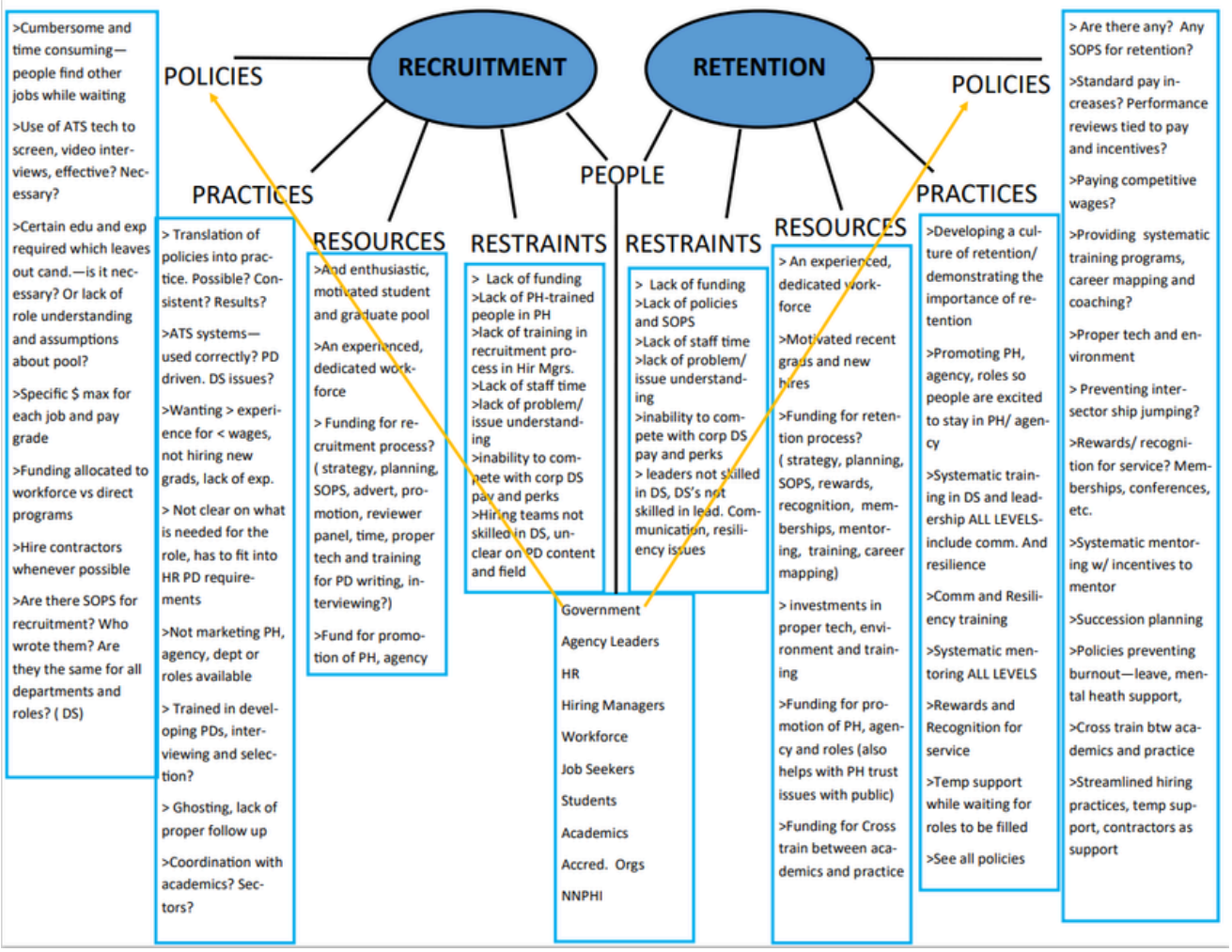


PH Workforce Relationship between Recruitment and Retention

Concept mapping can be done in a hybrid fashion, allowing for the clustering of bulleted or listed items as they are connected to themes. The map on the next page provides one subject matter expert's clustering showing the similar categories as they affect both recruitment and retention.

Appendix B, Continued…
Tiered Categories-Concept Maps

PH Workforce Relationship between Recruitment and Retention



For the present project, the research team applied these varied mapping techniques to:

1. Assure each team member shared understanding of important interconnectedness,
2. Reduce the risk that important items would be missed.

The outcome is a cohesive, thorough, and robust picture connecting the themes relevant to the public health workforce from data extracted during three separate data-collection projects.

Appendix B, Continued...
Concept Maps

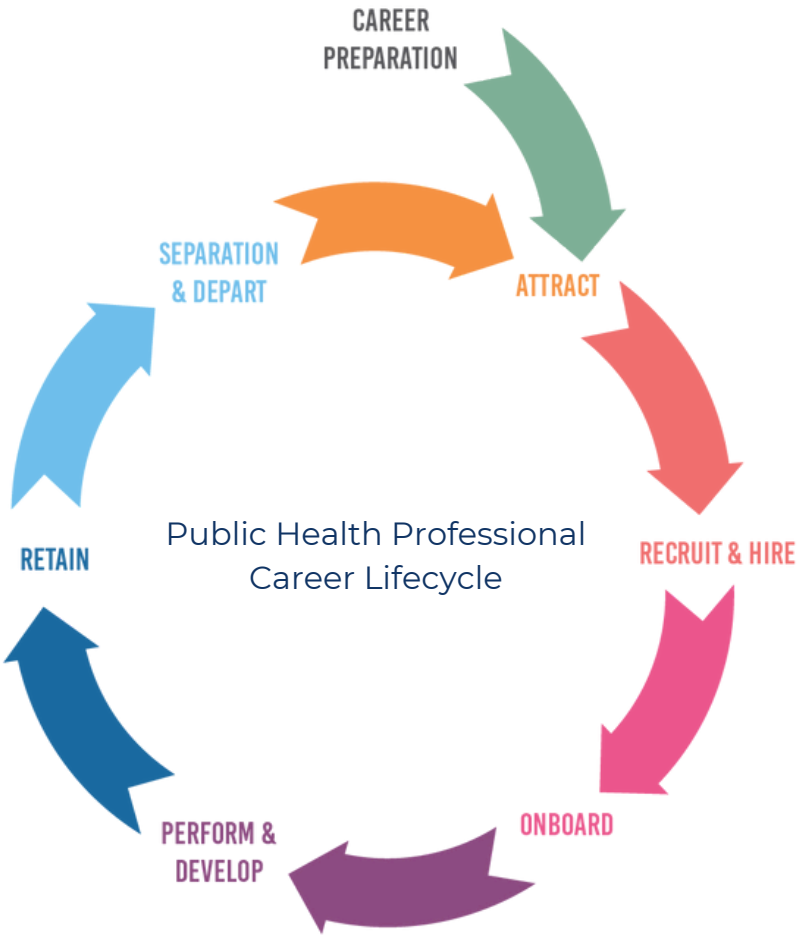
PH Workforce Challenges with Pain Points from 3 Reports

This is the same data as the Case Use/ Paint Points table in Appendix F; it demonstrates the utility of different ways of presenting information.

Appendix C-Lifecycle Model

Lifecycle Phases- Detailed Version

This model organizes experiences of PH professionals by career phases, offering a more nuanced picture of the needs unique to these phases. The public health professionals career lifecycle has 8 distinct phases. The abbreviated version appears in the handbook, an expanded description of each phase with some examples are provided below and on the following pages.



Career Preparation: Process of preparing oneself to enter the workforce. This may include academic preparation, career planning and counseling, developing and practicing (e.g. internships, capstone projects) key skills, preparing for the transition from student to jobseeker to employee (resume-building, networking, relevant knowledge acquisition).

Attract: Attracting the correct number of suitable, talented individuals with the necessary skills and abilities to apply for the job vacancy that is advertised. The process may include proactive identification (e.g. job fairs, marketing, reputation building, academic partnering), assessment, and engagement of individuals who have the potential to fill future roles within an organization.

Recruit & Hire: Recruiting is the process of actively seeking, finding, evaluating, and hiring candidates for a specific position or job. This process may include confirming role specifications, developing and posting job descriptions on sites, social media, internally, etc.; screening prospective candidates; scheduling and preparing for interviewing; evaluating candidates to select a finalist; extending a job offer, informing and debriefing unsuccessful candidates.

Appendix C-Lifecycle Model

Onboard: The process for introducing a newly hired employee into an organization to help the person understand their new position and job requirements. The onboarding process should include team and agency introductions, discussion about the company's culture, training and materials on the company's policies and procedures, tools (software, phones, internet, VPN, etc.) and general administrative tasks (working hours, breaks, timesheets, required paperwork, remote work, field work processes, etc.) , and any mandatory or supportive trainings to enable new employees to apply their skills within their new role.

Perform & Develop: Includes everything that will help the employee mature within the organization, from learning new skills to facilitate their current role to advancing in their career. The Perform phase includes performance management which entails planning, monitoring, developing, rating, and rewarding the employee. Performance is identified, measured and developed to ensure achievement against the assessment of the previously established set goals. This includes planning to set expectations and goals, monitoring by tracking goal progress, developing the employee's ability to perform through training and work assignments, rating and summarizing performance, rewarding good performance, and revising/ re-establishing new goals.

Retain: Systems, processes, and capacity to prevent employee turnover, either voluntarily or involuntarily. Can also refer to reducing the number of people who leave their job in a certain period, either voluntarily or involuntarily. Retention methods can include factors within "Perform and Develop" as well as assessment of employees' turnover intentions and satisfaction.

Separation & Depart: Departure should be a positive experience as past employees become public health ambassadors, may come back in the future, and/or may be referral sources. Agencies may have standard operating procedures in place for maximizing employee and employer satisfaction with the separation-departure process. Activities can include pre-departure debriefing interviews and surveys, agency-wide announcements, providing materials and guidance for future prospective employee referrals, etc.

The lifecycle diagram may not visualize the interconnectedness of the processes at each phase. Thus, a segmented cycle diagram (Lifecycle Wheel) emphasizes the interconnected pieces in the lifecycle and has some of the processes within the phase. These components are interdependent.

Appendix D-Lifecycle Wheel

Lifecycle Wheel

The PH Professional Lifecycle includes tasks that are typically supported by the organization in which the professional is working during a given phase. However, when the organization does not ensure that task is conducted, it may fall to the professionals themselves to have their career needs addressed.

For example, in the career readiness phase, it would fall to a college or university to assure that students are adequately prepared to transition into their roles as new employees. However, when the institution doesn't provide adequate support in this area, students attempt to meet the needs independently, to varying degrees of success. In another example, during the attraction phase, an employer should intentionally be engaging with individuals that they would like to attract to their organization. However, again, it often falls to the job seeker to connect with potential employers.

The list of tasks on the following page are those that appear within each phase of the lifecycle wheel. They reflect tasks that were discussed in the listening sessions as well as tasks that HCC Inc.'s subject matter experts identified as important throughout the lifecycle.

Appendix D, Continued...Lifecycle Wheel

Lifecycle Wheel

Attract:

Proactive identification

Assessment

Engagement

Recruit & Hire:

Posting job descriptions on sites, social media, internally, etc.;

Screening prospective candidates

Scheduling interviewing

Evaluating the merits of the candidates

Extending a job offer;

Inform and debriefing unsuccessful candidates.

Onboard:

Induction

Walkthrough of company's tools

General administrative tasks

Conversation about company's culture.

Mandatory or supportive trainings

Retain:

Individual development plans

Employee relations

Reward and recognition

Employee Assistance Programs

Employee intentions assessment

Employee Satisfaction

Perform & Develop:

Performance management

Performance evaluation

Capability evaluation

Skill development

Career development

Coaching

Organizational change and development

Employee experience

Individual development

Separation-Depart:

Performance and capability

Positive exit interview

Final administrative processes

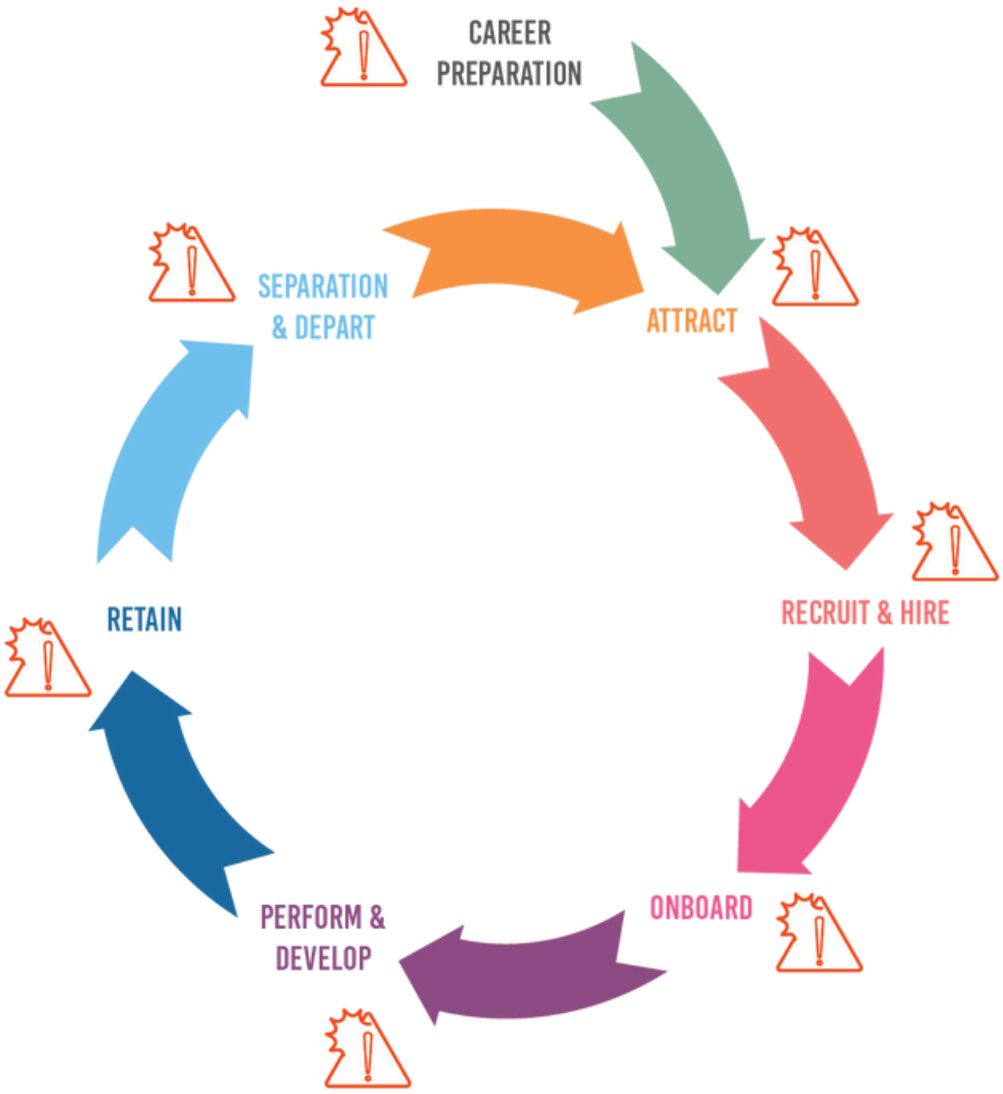
Knowledge Transfer

Exit survey

Appendix D, Continued...Lifecycle with Pain Points

Lifecycle with Pain Points

When these tasks are inadequately completed at any phase, organizations will experience ongoing challenges (which we also refer to as “pain points”). It is considered “ongoing” because of the nature of a cycle; insufficient growth during any one phase can negatively impact the other phases for an individual’s career. Pain Points identified for the themes in the 3 reports are in Appendix F.

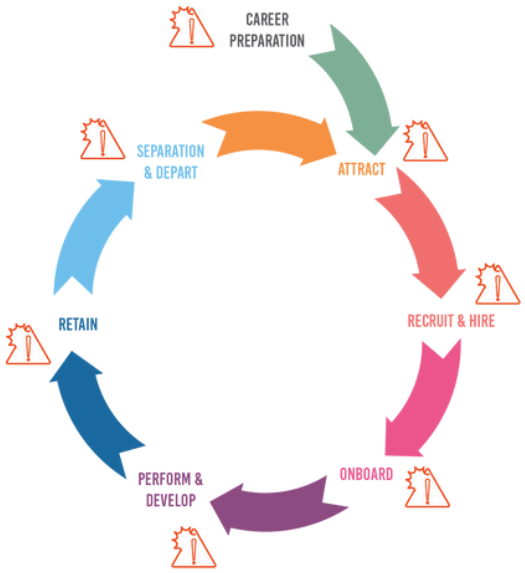


Take, for example, a failure to adequately onboard. This means that the new employee either never learns things that are important for later success, or they must spend time trying to figure things out on their own (a far less efficient and riskier solution). Either way, the employee loses time and risks a lack of knowledge, and those gaps can undermine work as the employee is expected to perform on that knowledge and may even advance into new positions where the gaps are perpetuated through their influence on other personnel.

Appendix D, Continued...Lifecycle Model

Mapping PH professionals to this lifecycle can be very helpful in a number of ways:

- It can be used to identify phases of professional growth that your organization can improve.
- It can be used to better understand what leads to challenges, as sometimes problems in an area like “retention” trace back to previous lifecycle failures.
- It can be used to communicate why you’re advocating for improvements by showing how actions targeting one phase can improve things for workers in various phases.



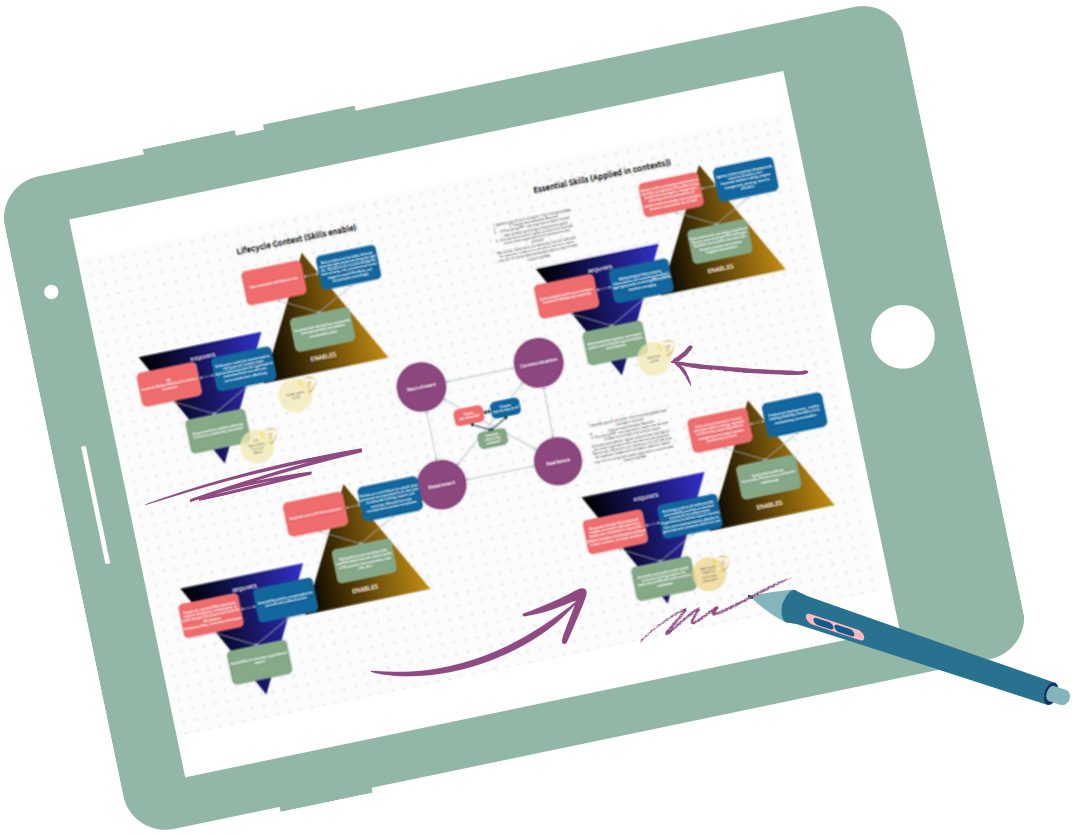
It is also important to understand the limitations of a lifecycle model. The listening sessions’ participants contextualized their experiences not only in the context of their career phases, but also in terms of the people they interacted with, the processes they had to follow, and the products/tools they used to accomplish goals. The following chapter examines how PH workforce challenges can be understood using the people, processes, and products framework.

Appendix E
Triangulation Models

Fitting three models into a big picture

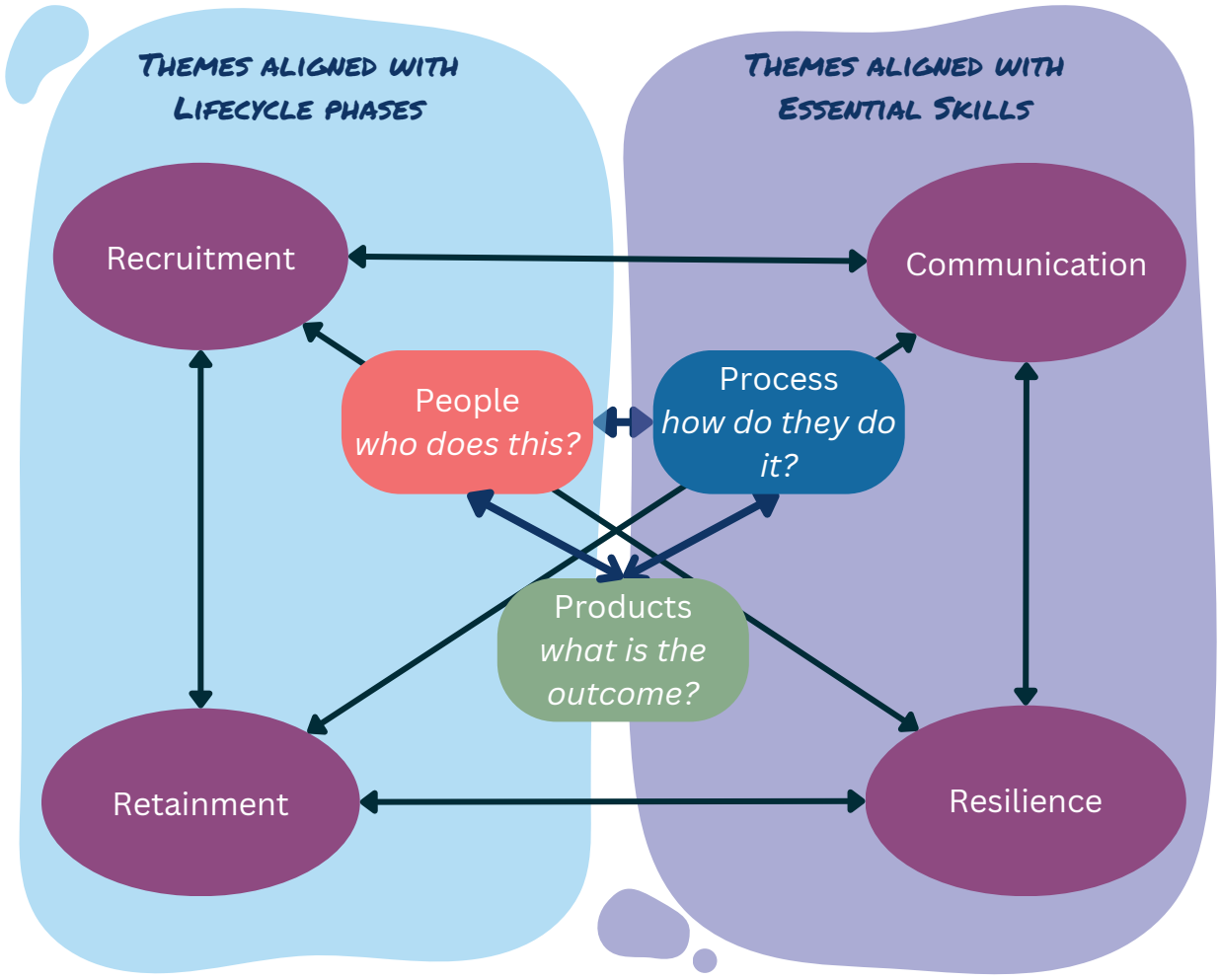
To triangulate the lifecycle model, PPP model, and the *Essentials*, we tried to balance specificity and generality. For example, we focused on specific types of communication (Communicating Data), but recruitment and retention were more general. We followed the steps listed in Chapter 5, using both the data from the listening sessions as well as our team expertise to organize the things "required" and "enabled." Our team considered assumptions (logical propositions) that led to this initial organization.

Our goal was to organize what we heard into a nuanced, but simple framework. This helped us better understand the problem and identify interventions.



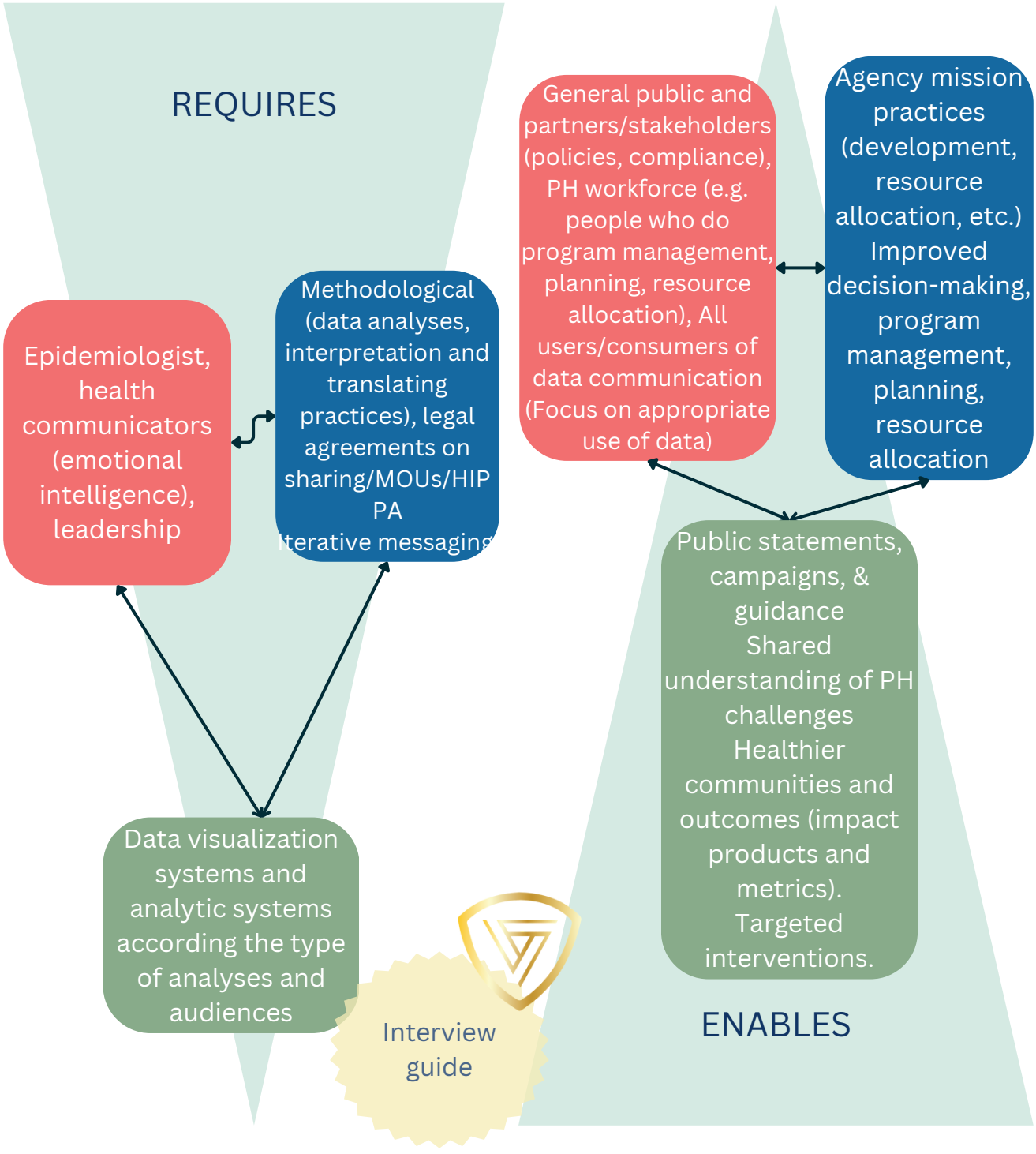
Appendix E, Continued...
Triangulation Models

In our processes, we identified that in our key topics, communication and resilience are Essential Skills while recruitment and retention are parts of the Career Lifecycle. When creating our comprehensive concept map, we observed that these key topics were interconnected, yet functioned in distinct ways. Some elements, such as the lifecycle, provide context while others represent actions that require specific skills. The framework illustrating these relationships is depicted in the graphic below.



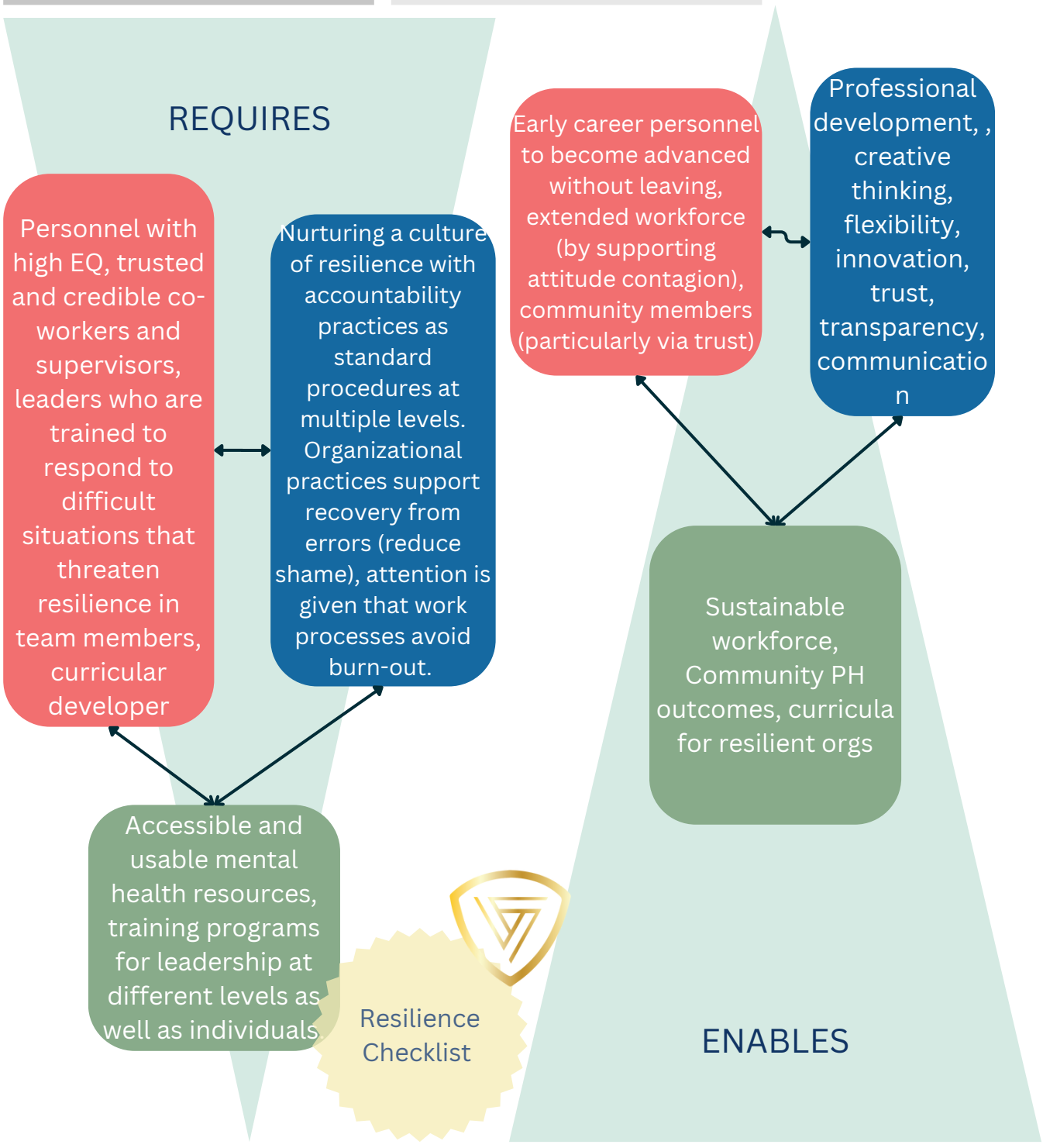
Appendix E, Continued…Triangulation Models

Challenge	Communication
Type	Essential skill

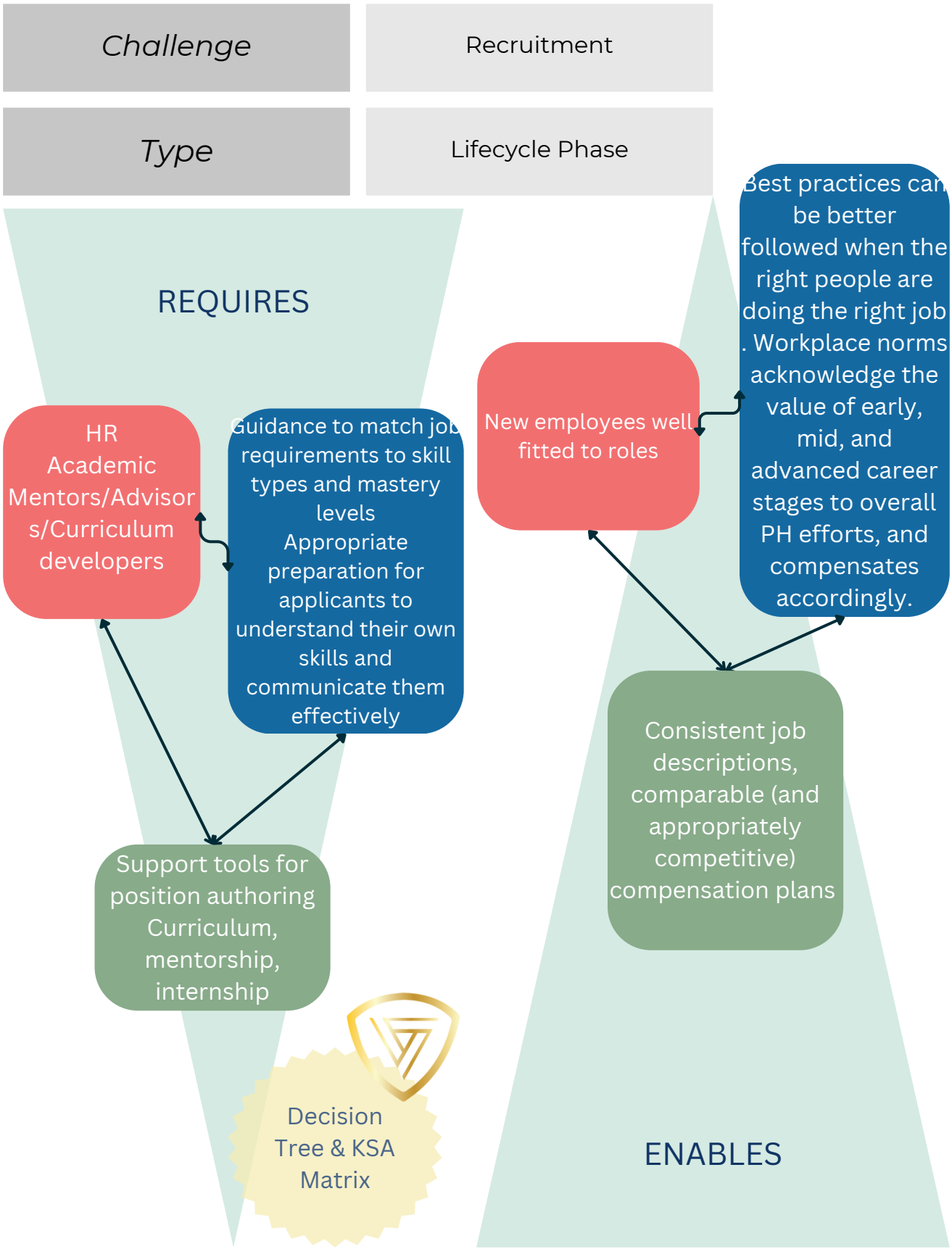


Appendix E, Continued...Triangulation Models

Challenge	Resilience
Type	Essential skill

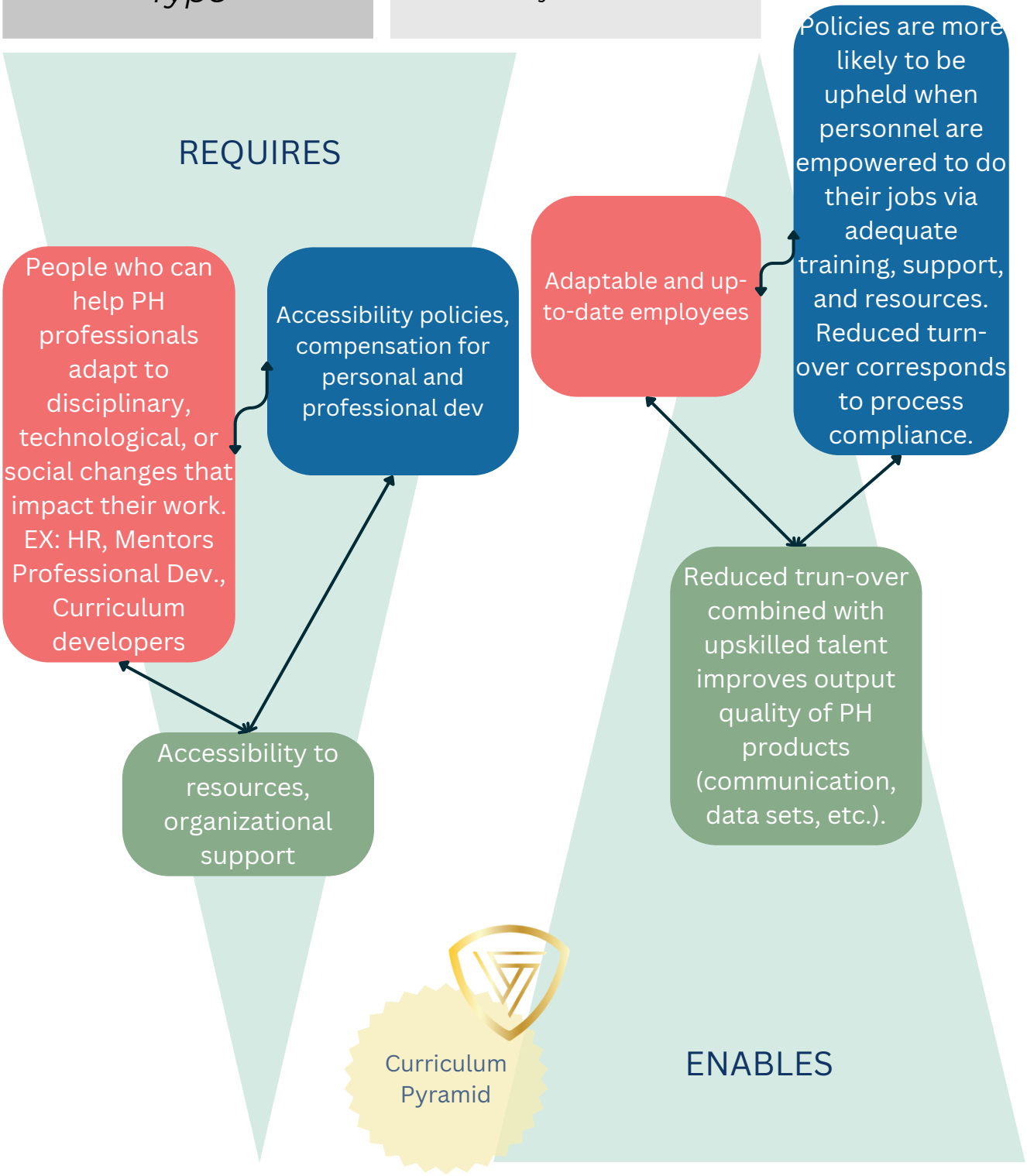


Appendix E, Continued...Triangulation Models



Appendix E, Continued...Triangulation Models

Challenge	Retention
Type	Lifecycle Phase



Appendix F, Results from Thematic Analysis

PH themes across 3 reports	Lay definition	*Why does it matter?*	Training implications for NNPHI	Issues (Pain Points)	Example Products:
Career Preparation (*CP*)	This refers to the education and training necessary to prepare individuals for careers in public health.	Approaching education and training with career in mind and relevant career preparation ensures that individuals are equipped with the necessary skills and knowledge to effectively contribute to public health processes.	How do we measure "effective" training? NNPHI could support training efforts that emphasize programmatic evaluation	1. Lack of standard career paths 2. Lack of career path guidance at academic level 3. Lack of quality/ qualified/ committed career path guidance at academic level 4.Lack of standardized process/ information for pursuing career (from networking and resume writing to interviewing and evaluating offers) 5. Lack of training/ tools for coping with rejection for job seeking. 6. Lack of integrated workforce development path 7.Lack of equitable access to paid early career opportunities to build and test skills	>Collaboratively developed content to train academicians in what to incorporate into academic curriculum to ensure graduates are prepared to practice (with special focus on skills development, field projects and field placement, and assessment). >Collaboratively developed standardized career path guide for students and academic guides
Recruitment (*RC*)	The process of attracting and enrolling individuals into the public health workforce	This highlights that both comprehensive recruitment strategies and the readiness of individuals through systematic, standardized career preparation are essential for building the Public Health workforce.	>How do we develop talented, appropriately-skilled people? >How do we match talented, appropriately skilled people to workforce needs? >How do we accurately assess workforce needs? >How do we accurately capture workforce needs in position descriptions and recruit and interview in alignment with PDs? Talent ACCESS vs talent acquisition. This opens up new work structures (e.g. freelance teams) and drives job descriptions to be designed for accessibility.	1. Lack of alignment between academics and practice 2. Lack of willingness to hire new graduates 3. Lack of alignment between position descriptions and actual role needs 4. High education and experience individuals being recruited for entry level jobs 5. Emphasis on recruiting short term consultants over long term employees 6. Misalignment between applicant quals, position requirements, position description and ATS programming. 7. Wanting greater experience for lower wages, recruiting accordingly 8. Not marketing public health, the agency, or roles available 9. Lack of collaboration between academics and practice for recruitment 10. Lack of funding to pay competitive wages 11. Need for more streamlined processes for hiring people find other jobs 12. Ghosting, unprofessional protocol with applicants	>Collaboratively developed content to train academicians in what to incorporate into academic curriculum to ensure graduates are prepared to practice (with special focus on skills development, field projects and field placement, and assessment). >Practitioner-developed, standardized position descriptions for key Public Health roles. >Training in the process of translating program needs into position requirements that then feed into position descriptions which are utilized for valid and reliable ATS programming which results in high quality, aligned candidates for valid interviews >Guides and standard operating procedures for how Public Health agencies can systematically and effectively market their agencies within academic programs, the student population, and their own workforce (retention).

Appendix F, Continued... Results from Thematic Analysis

PH themes across 3 reports	Lay definition	*Why does it matter?*	Training implications for NNPHI	Issues (Pain Points)	Example Products:
Development (*DV*)	Refers to ongoing formal and informal education, training, and professional growth opportunities for current public health professionals	This underscores the importance of continuous professional development in sustaining and retaining a competent, satisfied, resilient, innovative Public Health workforce.	>How can systematic, continuous, cumulative training become a part of the Public Health Agency culture? >How can funding for base level training and standardized mentorship access become a Public Health practice value? >How can clear expectations of competencies, skills, and training required for both be established? >How can a standardized training and development path be incorporated into public health practice?	1.Career shifts in the same role requiring shifting teams/employees 2. Supervisors without in-depth knowledge or training in workforce development and training. 3. Supervisor/ agency leadership no in depth knowledge or training in the public health field which they are supervising 4. Lack of funding and time for dedicated mentors, lack of consistent mentors as a result 5. Lack of clear expectations around competencies and skills. 6. Lack of role-specific training including communicating data, leadership and rejection of data. 7. Need skill-building in low risk environment. 8. Need to improve training infrastructure-data literacy, plain language communication, usage of public data warehouses 9. Lack of incorporation of DEI principles in training for soft skills 10. Lack of integrated workforce development path	>Integrated workforce development paths with standardized training process and curriculum for key public health roles and agencies >Standard Operating Procedures for valuing, recruiting, training, retaining, supporting, and advocating for funding for public health practice mentors >Developing virtual mentoring programs using hubs of online mentors and/ or AI mentors (using new data assistants)
Succession Planning (*SP*)	The process of identifying and developing concurrent leaders who can be phased in over time to eventually replace leaders who leave, retire, or are no longer able to work in a role	This is crucial for continuity of services, the resilience and stability of the agency and partner relationships, and the long-term sustainability and success of public health efforts and initiatives.	Anticipation of and preparation for succession (by all potential parties involved) should be a core component of job descriptions, hiring agreements, and evaluation.	1. No career paths are identical, making knowledge and skills matches more difficult. 2. Importance of observing others, but lack of mentoring during career and transition 3. Need for clear career pathways with expectation and anticipation of eventual succession. 4. Lack of incorporation of mentors (mentorship program) for skill and career development - used frequently but access is limited.	>Succession planning vision, values, culture and Standard Operating Procedures. >Succession planning gap analysis checklist and process with training and development plan worksheet.

Appendix F, Continued… Results from Thematic Analysis

PH themes across 3 reports	Lay definition	*Why does it matter?*	Training implications for NNPHI	Issues (Pain Points)	Example Products:
Retention	Maintaining members of the workforce within the field, system, agency, or department. Requires creating an environment where employees feel valued, satisfied, and motivated to stay.	Retention is important for continuity and effectiveness of services, workforce stability, cost savings, quality improvement, and community trust, among others.	>Understanding the key reasons people are leaving their role, department, agency, system, field and how we can retain them should be prioritized in attention and funding at every level. >What types of training will address the reasons for leaving? >How do we convey the urgent nature of retention and encourage a value and culture of retention?	1. Lack of funding for retention (salaries, rewards, recognition, memberships, mentoring, training, career mapping) 2. Lack of funding for proper tech and tools for data science and leadership 3. Lack of SOPS and training for supervisors/ leaders for retention 4. Lack of temp support while roles waiting to be filled 5. Lack of supervisor/ leader understanding of data leads to incorrect translations and assumptions	>Virtual mentoring plan/ program that connect experienced staff with professionals needing mentoring. >Developing training modules for developing career goals, creating career mapping and personalized training pathways aligned with career goals. >Public Health general workforce networking and professional support association (or division of existing association) for non-officers, "emerging leaders" to facilitate commitment and cohesiveness.
Resilience	Outcomes and processes of coping and adaptation in the presence of stress, challenges, misunderstandings, and results other than expected or desired.	Resilience is crucial for job success, satisfaction, motivation and self-efficacy, emotional well-being, and ultimately retention, productivity, quality, and improved outcomes.	>Understanding the patterns of lack of resilience, where the behavior change pain points exist and what is taking place there.	1. Lack of training for resilience as it relates to resilience needed for job satisfaction and retention 2. Lack of tools for relationship building. 3. Lack of training and guidance on coping with job seeking rejection. 4. Lack of training and guidance on coping with rejection of data results.-perception of not being heard, being ignored or data being misinterpreted or manipulated by leadership.	>Public Health general workforce networking and professional support association (or division of existing association) for non-officers, "emerging leaders" to facilitate commitment and cohesiveness. >User-developed training on resilience in public health, encompassing coping with job-seeking and job-related rejection. >Training for all levels in data literacy, translation, interpretation, communication, and use of visuals to convey information simply and effectively

Appendix F, Continued... Results from Thematic Analysis

PH themes across 3 reports	Lay definition	*Why does it matter?*	Training implications for NNPHI	Issues (Pain Points)	Example Products:
Communication	Delivery or exchange of information and the understanding of receipt of that information as intended.	Effective communication is essential for coordinating public health efforts, building trust with the public, and ensuring accurate and timely information dissemination. For this project, the focus is on two areas: 1) effective communication of data and 2) understanding roles and responsibilities in bilateral communication needed for effective task completion.	>What knowledge and skills are needed to communicate data in a way that it can be received, understood and applied by diverse audiences? >What information is needed for public health non-data scientists to have a standardized understanding of basic public health data science? >How to convey to communicators of data that leadership and the public may use data other than as expected? How to address that discord? >How to convey to leadership that communicating data in a way other than it was delivered or expected can cause challenges with and for data scientists? How to address that discord? >What is needed to ensure clear understanding of the bilateral responsibility for communication in effective task completion?	1. Lack of general training in interpreting and communicating data results 2. Lack of responsibility in tasks and communication loop. 3. Need for training in communication specifically persuasive communication, diplomacy, active listening and relationship building, communicating with data, leadership.	>Communication style assessment tool to identify individual communication preferences and areas for improvement. >Training program on effective communication strategies for public health data scientists, including data visualization and storytelling techniques and understanding recipient uses of data results (leadership, the public, media) > Training program in data for non-data scientists for public health leaders, including the role of the leader in communicating accurately and the importance of transparency is use of data results.
Data Science Leadership	The ability to guide and manage teams in the sources, use, analysis, communication, and application of data to understand and address public health challenges	Effective data science leadership is crucial for ensuring that accurate and effective data science is incorporated into agency and field culture and practice, and that data-driven insights are accurately translated into equitable and actionable strategies and policies to improve public health outcomes.	>Understanding the importance and role of knowledgeable, skilled, data science leadership in effective, equitable public health practice and service delivery. >Understanding the importance and role of knowledgeable, skilled, data science leadership in ensuring and retaining a skilled, competent, satisfied data science workforce and adequate data science tools, technology, and training. >Understanding any patterns of ineffective data science leadership, where the behavior change pain points exist, and what is taking place there	1. Lack of leaders trained in data science 2. Lack of training in data science for leaders - interpreting and communicating data 3. Lack of clear communication between data scientists and public health leaders.	>Creation of a data science leadership competency framework to guide recruitment, development, and evaluation of leaders in this field. >Creation of a data science leadership comprehensive training program/ institute/ certificate program to convey the multiple levels of data science leadership knowledge, skills, and attitudes required.

Appendix F, Continued… Results from Thematic Analysis

PH themes across 3 reports	Lay definition	*Why does it matter?*	Training implications for NNPHI	Issues (Pain Points)	Example Products:
Onboarding	The process of integrating a new employee into a public health organization.	Effective onboarding is imperative for ensuring new employees feel welcomed and supported, understand their roles, responsibilities, and expectations, and are properly equipped to contribute to the agency's mission and goals.	> What are the indicators of effective onboarding and does it make a difference in public health workforce satisfaction, success, and retention? >Are there basic elements of onboarding across all public health agencies? >Can we standardize basic onboarding so that it is available for all roles and all levels? > Understanding the patterns of onboarding failure, where the behavior change pain points exist, and what is taking place there	1. Lack of understanding of role and who is responsible for tasks and job duties. 2. Lack of mentors to guide new employees. 3. Lack of formal onboarding process at agency, self taught.	>Checklist of effective onboarding indicators for general public health workforce and separate indicators for key public health roles. >Development of a standardized onboarding program that includes all basic onboarding elements for any agency to use and/ or adapt. >Creation of a "buddy system" separate from ongoing mentoring to pair new employees with agency colleagues who can provide support and basic guidance. (less pressure role, may transform into longer term mentor relationship.)
Financial Support	The availability and provision of funds to support a particular public health recruit, resource, activity, or agency.	Adequate financial support is essential for ensuring public health agencies have the resources they need to carry out their mission, including staffing, retention, equipment, technology, and program implementation.	>Understanding what level of experience public health leaders have in securing funds, budgeting, and effectively spending >How can leaders leverage other resources as well as partner, community and cross-sector resources and funding to achieve goals? >How can the public health workforce incorporate development and securing sources of alternative funding into their culture and operating procedures?	1. Lack of sustainable funding for activities, equipment, technology, recruitment, roles, and retention.	> Templates and training for creation of financial sustainability plans that outline strategies for diversifying funding streams and reducing reliance on government funding. >Training programs in alternative resource development for public health agencies. >Training programs in budgeting and financial management for public health agencies.
Partnerships and collaboration	The act of working with others to achieve common public health goals.	Partnerships and collaboration are essential for leveraging resources, expertise, and community support to address complex public health challenges.	>Understanding the skills needed to identify, engage and maintain strong collaborations and partnerships >Identifying areas within the public health agency's activities which could benefit from collaboration >Identifying possible partners across multiple sectors that are striving for goals similar to, complementary to, or overlapping with public health's goals. >Identifying and exercising public health emergency response partnerships prior to a public health emergency	1. Need for cross-sector collaboration 2. Need to build trusting and credibility partnerships prior to PH emergency	>Skills training workshops in identifying, engaging, and maintaining strong, multisector relationships, partnerships and collaboration. >Development of a partnership toolkit that provides guidance on identifying potential partners, building relationships, and establishing effective collaboration agreements and memorandums of understanding. >Creation of a platform or adaptation of an existing platform for matching public health partners by needs and resources, and facilitating communication, information, and resource-sharing.

Moving between Themes, Pain Points, and Use Cases

The four use cases (job author, local interviewer, academic advisor, and curriculum developer) presented in Part 2 of the Handbook were identified by NNPHI. The goal of that section was to use fictional characters to exemplify real-world problems that NNPHI (and the field of public health) have witnessed PH professionals endure. The four selected use cases were considered by NNPHI as PH professionals whose challenges were top priority for addressing and resolution.

Once the four use cases had been identified, the HCC, Inc. analysts then examined the 11 themes that overlapped across all 3 of the HCC, Inc./ NNPHI listening sessions (Career Preparation, Recruitment, Development, Succession Planning, Retention, Resilience, Communication, Data Science Leadership, Onboarding, Financial Support, and Partnerships & Collaboration), and further reviewed the pain points associated with those 11 themes.

The HCC, Inc. team then returned to the four use cases and examined whether each use case persona would have a *direct* or *indirect* impact on each theme and the associated pain point(s). The results of that exercise are presented in the table on the next page. The resulting information allowed the HCC, Inc. team to more clearly see which themes and their associated pain points should be prioritized and selected to be addressed using the triangulation model discussed in Part 1 of the Handbook.

The use case personas and themes were then applied to the triangulation model to further identify possible solutions/ products. Those solutions/ products are contained here, in Appendices G through K.

Appendix F, Continued… Results from Thematic Analysis

Moving between
Themes, Pain Points, and Use Cases

User Case	Career Preparation (CP)	Recruitment (RC)	Develop (DV)	Succession Planning (SP)	Retention	Resilience	Communication	Data Science Leadership	Onboard	Financial Support	Collaboration & Partnerships
Academic Mentor/ Advisor	3 Direct; 1,4,5,6 Indirect	9 Direct, 1 Indirect				1-4 Indirectly if there apply to academic stru	3- Indirect	1,2 – Indirect if academic			1 Direct and Indirect
Academic	Direct: 2, 4	Direct: 4 Indirect: 1, 6, 8	Direct: 7	Direct: 2, 4	Direct:	Direct: 1, 2, 3	Direct:3	Direct:	Direct:	Direct:	Direct:
Mentor/ Advisor	Indirect: 5,6		Indirect: 6, 7, 8, 9, 10	Indirect: 3	Indirect: 5	Indirect:	Indirect:	Indirect:	Indirect:	Indirect:	Indirect:
Academic Mentor/ Advisor	Direct 2,4	8,9		2,4							
	Ind 1,3,5		4	1	5		2		2		1,2
Local/State PD Author	Direct: 6 Indirect: 1, 4, 7	Direct: 2, 3, 4, 6, 7 Indirect:	Direct: 5 Indirect: 3, 4, 6, 10	Direct: 1, 3 Indirect:	Direct: Indirect:	Direct: Indirect:	Direct: Indirect:	Direct: Indirect:	Direct: 1, 2 Indirect:	Direct: Indirect:	Direct: Indirect:
Local/State PD Author	Direct: 6 Indirect: 1, 4, 7	Direct: 2, 3, 4, 6, 7 Indirect:	Direct: 5 Indirect: 3, 4, 6, 10	Direct: 1, 3 Indirect:	Direct: Indirect:	Direct: Indirect:	Direct: Indirect:	Direct: Indirect:	Direct: 1, 2 Indirect:	Direct: Indirect:	Direct: Indirect:
Local/State PD Author	Direct	3,4,5,6,7,8, 12	5						1,2		
	Ind	9,10,11								1	1, 2
Local/State Interviewer	Direct: 2, 7 Indirect: 1, 4, 6	Direct: 2, 4, 5, 6, 7, 9, 11, 12 Indirect: 1, 2, 3,	Direct: Indirect:	Direct: Indirect: 1	Direct: Indirect: 3, 4	Direct: Indirect:	Direct: Indirect:	Direct: 3 Indirect:	Direct:2 Indirect: 1	Direct: Indirect:	Direct: Indirect: 1, 2
Local/State Interviewer	Direct: 2, 7 Indirect: 1, 4, 6	Direct: 2, 4, 5, 6, 7, 9, 11, 12 Indirect: 1, 2, 3,	Direct: Indirect:	Direct: Indirect: 1	Direct: Indirect: 3, 4	Direct: Indirect:	Direct: Indirect:	Direct: 3 Indirect:	Direct:2 Indirect: 1	Direct: Indirect:	Direct: Indirect: 1, 2
Local/State Interviewer	Direct	2,3,4,5,6,7,8, 12	5						1,2		
	Ind	9,10,11								1	1,2
Academic Curric. Developer	Direct: 2, 3, 4, 5, 7 Indirect: 1, 6	Direct: 1, 11 Indirect: 8	Direct: 6, 7, 8, 9 Indirect: 5, 10	Direct: 1, 2, 4 Indirect: 3	Direct: Indirect:	Direct: 2, 3 Indirect:	Direct:3 Indirect:	Direct: Indirect:	Direct: 2 Indirect:	Direct: Indirect:	Direct: Indirect: 1
Academic Curric. Developer	Direct: 2, 3, 4, 5, 7 Indirect: 1, 6	Direct: 1, 11 Indirect: 8	Direct: 6, 7, 8, 9 Indirect: 5, 10	Direct: 1, 2, 4 Indirect: 3	Direct: Indirect:	Direct: 2, 3 Indirect:	Direct:3 Indirect:	Direct: Indirect:	Direct: 2 Indirect:	Direct: Indirect:	Direct: Indirect: 1
Academic Curric. Developer	Direct 1,2,3, 4,	1, 8		3		1,2,3,4	1,3				
	Ind 5	9	8,9					1,2	2		1,2

Appendix G-KSA Matrix

HCC/NNPHI KSA Summary Matrix
County Epidemiologist Page 1 of 2

How to Use this Tool: For each role of interest, complete the Skills Matrix to match their job tasks identified in the Position Description Decision Tree. Elaborate and expand to reflect the level of KSA mastery required for each, being sure to include the Essential skills. The sample on these pages is a completed KSA Summary Matrix for a County Epidemiologist. The desirable and critical assignment will help to reduce "must have" requirements in the PD which is one strategy to ensure inclusive recruitment strategies.

KSA SUMMARY

CLASS TITLE: _____ POSITION NUMBER: _____ DATE: _____

PREPARED BY: _____ APPROVED BY: _____

DUTIES	PERCENT OF TIME	KSA	DESIRABLE OR CRITICAL	RANK
Epidemiological Assessment and Reporting (60%): Coordinate, investigate, analyze, and control outbreaks of suspected diseases in the community. Provide technical assistance for the required reporting of communicable diseases and conditions in the County and assist neighboring counties as requested. Create reports using internal, external, state, and private data. Utilize GIS to map data for analyzing disease clusters. Conduct health assessments of the county and its sub-populations using epidemiological and biostatistical tools. Analyze data for outbreak and communicable disease surveillance reports using programming techniques (e.g. SAS, R). Monitor and follow up on various state and local data reporting sources, including hospital and clinical data, school data, laboratory results, and zoonotic disease data.	60%	Knowledge of basic epidemiological principles and practices Skill to conduct epidemiological investigative case follow up, Ability to communicate effectively with clients, staff and the community, ability to prepare and deliver presentations to staff and the community. Ability to utilize problem-solving techniques Ability to work independently, Ability to establish and maintain effective working relationships with others Ability to plan, organize and coordinate work assignments Ability to document work products. Knowledge of basic computer skills, office equipment and epidemiology programs. Ability to complete reports.	Critical	1
Mentorship and Training (20%): Serve as a mentor for the distance-learning program for the University of Master of Public Health Program, fellows, and other students. Implement and monitor a new syndromic disease surveillance system. Analyze and provide comparative data and syndromic disease reports from peer counties and national systems. Report significant findings to appropriate staff and agencies, including the Sheriff's office regarding homeland security issues.	20%	Skilled in ESSENCE or other syndromic surveillance systems Ability to communicate effectively both orally and in writing Skilled in data analysis and interpretation	Desirable	4

Appendix G, Continued...KSA Matrix

HCC/NNPHI KSA Summary Matrix
County Epidemiologist Page 2 of 2

Emergency Response (10%): Participate as an active member of the Epidemiology Strike Team. Respond to biological events within an incident command structure under an emergency support function. Coordinate activities with regional and local agencies in biological training and events. Participate in rotational on-call activities, including the use of radio/telephone contact systems with the County Health Department (CHD) and medical community.	10%	Understanding of medical-related emergency response needs and capabilities Understanding of epidemiological principles and practice.	Desirable	5
Community and Stakeholder Engagement (5%): Assist the Manager in formulating responses to the community regarding communicable disease outbreaks. Summarize and report assessment information in compliance with reportable disease requirements to in-house stakeholders. Coordinate the preparation of grant proposals and other documentation required for securing funds for program needs. Attend and/or facilitate meetings, conferences, and public engagements representing the department. Prepare statements for communication media concerning disease and monitoring information of public concern.	5%	Ability to perform in public speaking Ability to create and implement community presentations Ability to communicate effectively both orally and in writing	Critical	3
Policy Development and Strategic Planning (5%): Assist health department management in developing policies to address health improvements in target groups or other problems identified in the assessment stages. Conduct extensive studies in the community on the incidence of hepatitis and compliance rates for completion of hepatitis vaccination series. Assist in the development of strategic plans and multi-year plans for the health department.	5%	Ability to formulate policies and procedure Ability to communicate effectively both orally and in writing Skilled in data analysis and interpretation	Critical	2

Appendix G, Continued...Scoring Matrix

HCC/NNPHI Scoring Matrix
Example - County Epidemiologist

Names of Applicants for Potential Interviews

County Epidemiologist
Position #123456
Total Possible Score = 37 points

Scoring Categories identified within the Position Description and the Job Advertisement

Name of Applicant	Education	Computer Skills	Public Contact	Bi-lingual	Emergency Response	Epidemiology	Policy Dev & Strategic Plan	Veteran	Score

Legend contains scoring categories with point system

Legend:

EDUCATION
SELECT ONE

AA	1 pts
BA/BS	2 pts
Master	3 pts

COMPUTER SKILLS
MULTIPLE SELECT

MS Word	1 pt
MS Excel	1 pt
MS PowerPoint	1 pt
MS Outlook	1 pt
Disease Surveillance	2 pt
Electronic Health	1 pt
Syndromic Surveillance	2 pt
GIS Mapping	2pt
Other Computer	1 pt

PUBLIC CONTACT
MULTIPLE SELECT

Public Speaking	3 pts
Outreach	2 pts
Marketing	1 pts
Health Education	2 pts
Team Building/Motivation	1 pt
Training Implementation	1 pt
Mentorship	1 pt
Community Engagement	1 pt

BILINGUAL

Spoken proficiency 2 pts

Bilingual points are not included in the total possible points scores. It is considered a preferred qualification.

EMERGENCY RESPONSE
SELECT ONE

0 – 1 year	1 pt
2 – 4 years	2 pts
5 – 7 years	3 pts
8+ years	4 pts

EPIDEMIOLOGY
SELECT ONE

0 – 1 year	1 pt
2 – 4 years	2 pts
5 – 7 years	3 pts
8+ years	4 pts

POLICY DEV & STRATEGIC
MULTIPLE SELECT

Develops and Updates Epi Plans	2 pts
Data analysis and reconciliation	2 pts
Develops, Coordinate & conducts trainings	1pt
Policy & Procedure development & revision	1pt

VETERAN PREFERENCE
SELECT ONE IF APPLICABLE

1 – 2 on application = 1.85 (5% of total possible score)	
3 – 5 on application = 3.7 (10% of total possible score)	

Veteran preference is required for governmental jobs. Check with organization for the appropriate scoring.

Appendix G, Continued...
Sample Position Description for County Epidemiologist
Page 1 of 2

Position Title: County Epidemiologist

Position Overview: The County Epidemiologist is responsible for conducting associative statistical assessments of community health data to prioritize and direct public health resources effectively. This role ensures timely and accurate investigation and follow-up of reportable communicable diseases and conditions under the Department of Health, impacting multiple communities.

Key Responsibilities:

- **Epidemiological Assessment and Reporting (60%):**
  - Coordinate, investigate, analyze, and control outbreaks of suspected diseases in the community.
  - Provide technical assistance for the required reporting of communicable diseases and conditions in the County and assist neighboring counties as requested.
  - Create reports using internal, external, state, and private data.
  - Utilize GIS to map data for analyzing disease clusters.
  - Conduct health assessments of the county and its sub-populations using epidemiological and biostatistical tools.
  - Analyze data for outbreak and communicable disease surveillance reports using programming techniques (e.g. SAS, R).
  - Monitor and follow up on various state and local data reporting sources, including hospital and clinical data, school data, laboratory results, and zoonotic disease data.
- **Mentorship and Training (20%):**
  - Serve as a mentor for the distance-learning program for the University of Master of Public Health Program, fellows, and other students.
  - Implement and monitor a new syndromic disease surveillance system.
  - Analyze and provide comparative data and syndromic disease reports from peer counties and national systems.
  - Report significant findings to appropriate staff and agencies, including the Sheriff's office regarding homeland security issues.
- **Emergency Response (10%):**
  - Participate as an active member of the Epidemiology Strike Team.
  - Respond to biological events within an incident command structure under an emergency support function.
  - Coordinate activities with regional and local agencies in biological training and events.
  - Participate in rotational on-call activities, including the use of radio/telephone contact systems with the County Health Department (CHD) and medical community.
- **Community and Stakeholder Engagement (5%):**
  - Assist the Manager in formulating responses to the community regarding communicable disease outbreaks.
  - Summarize and report assessment information in compliance with reportable disease requirements to in-house stakeholders.
  - Coordinate the preparation of grant proposals and other documentation required for securing funds for program needs.
  - Attend and/or facilitate meetings, conferences, and public engagements representing the department.
  - Prepare statements for communication media concerning disease and monitoring information of public concern.
- **Policy Development and Strategic Planning (5%):**
  - Assist health department management in developing policies to address health improvements in target groups or other problems identified in the assessment stages.
  - Conduct extensive studies in the community on the incidence of hepatitis and compliance rates for completion of hepatitis vaccination series.

Appendix G. Continued...
Sample Position Description for County Epidemiologist Page 2 of 2

- Assist in the development of strategic plans and multi-year plans for the health department.

Knowledge, Skills, and Abilities:

- Knowledge of basic epidemiological principles and practices.
- Skill in conducting investigative case follow-up.
- Effective communication with clients, staff, and the community.
- Ability to prepare and deliver presentations to staff and the community.
- Proficient in problem-solving techniques and working independently.
- Ability to establish and maintain effective working relationships.
- Proficiency in planning, organizing, and coordinating work assignments.
- Competence in documenting work products.
- Knowledge of basic computer skills and epidemiology programs, including Windows, Outlook, Publisher, MS Word, Excel, PowerPoint, Electronic Health Records, Employee activity reporting, Reportable disease surveillance systems, Epi6 and Epi 2000, Vaccine Registry, ArcView 9.2 GIS mapping, and syndromic surveillance systems.

Licensure/Certification Requirements:

- Driver's License

Other Job-Related Requirements:

- Required to participate in emergency activities, such as sheltering, natural disasters, and bioterrorism-related events.

Working Hours:

- Daily from 8:00 AM to 5:00 PM
- Total hours in the workweek: 40
- Participation in rotational on-call activities and emergency response duties as necessary.

Note: The job description aims to provide an overview of the primary duties and responsibilities of the position and is not an exhaustive list of all tasks and expectations.

Appendix G. Continued...
Sample Job Advertisement for County Epidemiologist
Page 1 of 2

Job Title: County Epidemiologist

Location: County, State

Employment Type: Full-Time

Working Hours: 8:00 AM - 5:00 PM, Monday to Friday (40 hours/week) with rotational on-call activities and emergency response duties as necessary

About Us: The Department of Health is dedicated to protecting, promoting, and improving the health of all people in the State. We are seeking a highly skilled and motivated County Epidemiologist to join our dynamic team. This position offers an exciting opportunity to make a significant impact on public health across multiple communities.

Position Overview: As the County Epidemiologist, you will conduct statistical assessments of community health data to prioritize and direct public health resources effectively. You will ensure timely and accurate investigation and follow-up of reportable communicable diseases and conditions, impacting multiple communities within the County and neighboring areas. This role includes mentoring, emergency response, community engagement, and strategic planning.

Key Responsibilities:

- **Epidemiological Assessment and Reporting (60%):**
  - Investigate, analyze, and control outbreaks of suspected diseases.
  - Provide technical assistance for reporting communicable diseases.
  - Create reports using various data sources and GIS mapping.
  - Conduct health assessments using epidemiological and biostatistical tools.
  - Analyze data using advanced SAS programming techniques.
- **Mentorship and Training (20%):**
  - Mentor students and fellows from local schools.
  - Implement and monitor a syndromic disease surveillance system.
  - Provide comparative data and reports from peer counties and national systems.
- **Emergency Response (10%):**
  - Participate as a member of the Epidemiology Strike Team.
  - Respond to biological events and coordinate with regional and local agencies.
  - Participate in rotational on-call activities and emergency response duties.
- **Community and Stakeholder Engagement (5%):**
  - Formulate responses to communicable disease outbreaks.
  - Summarize and report assessment information to stakeholders.
  - Prepare grant proposals and secure funding for program needs.
  - Represent the department at meetings, conferences, and public engagements.
- **Policy Development and Strategic Planning (5%):**
  - Assist in developing policies to address health improvements.
  - Conduct community studies on the incidence of hepatitis and vaccination compliance.
  - Develop strategic plans and multi-year plans for the health department.

Qualifications:

- Knowledge of basic epidemiological principles and practices.
- Skill in conducting investigative case follow-up.
- Effective communication and presentation skills.
- Proficient in problem-solving techniques and working independently.
- Ability to establish and maintain effective working relationships.
- Proficiency in planning, organizing, and coordinating work assignments.
- Competence in documenting work products.
- Knowledge of basic computer skills and epidemiology programs (Windows, Outlook, Publisher, MS Word, Excel, PowerPoint, Electronic Health Records, Employee Activity Reporting, Disease Surveillance Software, Epi6 and Epi 2000, Vaccine Registration, ArcView 9.2 GIS mapping, and syndromic surveillance systems).

Licensure/Certification Requirements:

- Driver's License

Other Requirements:

- Participation in emergency activities, including sheltering, natural disasters, and bioterrorism-related events.

How to Apply: If you are passionate about public health and possess the required skills and qualifications, we encourage you to apply for this exciting opportunity. Please submit your resume and cover letter to this application link.

Equal Opportunity Employer: The Department of Health is an equal opportunity employer and values diversity in the workplace. We encourage all qualified individuals to apply, regardless of race, color, religion, gender, sexual orientation, national origin, age, disability, or veteran status.

Join us in making a difference in the health and well-being of our communities!

Appendix H - Interview Guide
County Epidemiologist Page 1 of 2

How to Use this Tool: The interview guide on these next pages has been adapted for use with the County Epidemiologist role. It aligns with the position description, the advertised post, the skills matrix and the scoring matrix. The introduction, closing and evaluation sections of the guide can be used with any position. The interviewing questions are specifically tailored for the County Epidemiologist Role. Each numbered section aligns with the skills identified with the earlier tools. The guide can be used as a template for other roles but specific content with the relevant information for the role you are recruiting will need to be tailored for it to be useable.

HCC/NNPHI Interview Guide: County Epidemiologist

Introduction:

- Greet the candidate and introduce the interview panel.
- Provide a brief overview of the interview process.
- Explain the role and its importance within the Department of Health.

Interview Questions:

1. Background and Experience:

- Can you briefly describe your educational background and how it has prepared you for a role as a County Epidemiologist?
- What previous positions have you held that are relevant to this role?
- Describe your experience with investigating and managing communicable disease outbreaks.

2. Epidemiological Assessment and Reporting:

- Can you provide an example of a time when you conducted a complex epidemiological assessment? What was the outcome?
- How do you ensure accuracy and timeliness in your investigation and reporting of communicable diseases?
- Describe your experience with using GIS for mapping disease data. How have you used this tool to identify and analyze disease clusters?

3. Data Analysis and Technical Skills:

- What advanced programming techniques have you used in your previous roles? Can you give an example of a specific project where these skills were crucial?
- Explain how you handle and analyze data from multiple sources (e.g., hospital data, school data, laboratory results).
- How do you stay current with new technologies and methods in epidemiology?

4. Mentorship and Training:

- Have you ever mentored students or fellows in public health programs? If so, describe your approach and experience.
- How would you implement and monitor a new syndromic disease surveillance system?

5. Emergency Response:

- Describe a time when you were part of an emergency response team. What was your role, and what challenges did you face?
- How would you coordinate with regional and local agencies during a biological event?

6. Community and Stakeholder Engagement:

- How do you communicate complex epidemiological data to non-experts, such as community members or local officials?
- Provide an example of how you have prepared and delivered presentations or reports to stakeholders.

Appendix H, Continued...
Interview Guide-County Epidemiologist Page 2 of 2

7. Policy Development and Strategic Planning:

- Can you discuss a policy or strategic plan you helped develop to address a public health issue? What were the key components and outcomes?
- How do you conduct extensive community studies, such as those on hepatitis incidence and vaccination compliance?

8. Additional Skills and Abilities:

- What are your methods for ensuring effective communication within your team and with external partners?
- Describe your experience with computer programs and epidemiology tools listed in the job description (e.g., MS Word, Excel, PowerPoint, ArcView GIS, syndromic surveillance systems).

9. Scenario-Based Questions:

- Imagine you receive a report of a potential outbreak in a local school. What steps would you take to investigate and manage this situation?
- How would you handle conflicting data sources when investigating a communicable disease outbreak?

10. Job-Specific Requirements:

- Are you able and willing to participate in rotational on-call activities and emergency response duties?
- How do you manage the demands of working independently while ensuring timely and accurate reporting?

Closing:

- Do you have any questions for us about the role or the Department of Health?
- Provide an overview of the next steps in the hiring process.
- Thank the candidate for their time and interest in the position.

Evaluation:

- Use the standardized scoring system to evaluate each candidate's responses from 1-4.
    - 1: A poor answer that missed the key point of the question
    - 2: An incomplete answer that had good elements but was significantly flawed
    - 3: A convincing but flawed answer that falls short because of problems with either the content or breadth of the answer
    - 4: An ideal answer that understood the question and answered it fully while indicating high competence
- Take notes on the candidate's qualifications, experience, and overall fit for the role.
- Discuss the candidate's performance with the interview panel after the interview.

This guide ensures a comprehensive assessment of the candidate's suitability for the County Epidemiologist position and helps identify individuals who possess the necessary skills, experience, and qualities to excel in this critical role.

Appendix I - Interview Scoring Template

How to Use this Tool: The scoring template was created to help with the evaluation portion of the interview. This scoring sheet is specific for the County Epidemiologist role and aligns with the interview guide. The rating scale is provided at the top of the template. The questions from the interview guide populate the Questions column. This template allows for a quick glance at how each applicant performed on each question.

HCC/NNPHI Scoring Template

Rating
1: A poor answer that missed the key point of the question
2: An incomplete answer that had good elements but was significantly flawed
3: A basically adequate answer that hits the key points of the question but goes no further.
4: An ideal answer that understood the question and answered it fully while indicating high competence. The answer goes beyond the basic requirements of the question.

No.	Questions	Applicant #1	Applicant #2	Applicant #3
1	Can you briefly describe your educational background and how it has prepared you for a role as a County Epidemiologist?			
2	What previous positions have you held that are relevant to this role?			
3	Describe your experience with investigating and managing communicable disease outbreaks.			
4	Can you provide an example of a time when you conducted a complex epidemiological assessment? What was the outcome?			
5	How do you ensure accuracy and timeliness in your investigation and reporting of communicable diseases?			
6	Describe your experience with using GIS for mapping disease data. How have you used this tool to identify and analyze disease clusters?			
7	What advanced programming techniques have you used in your previous roles? Can you give an example of a specific project where these skills were crucial?			
8	Explain how you handle and analyze data from multiple sources (e.g., hospital data, school data, laboratory results).			
9	How do you stay current with new technologies and methods in epidemiology?			
10	Have you ever mentored students or fellows in public health programs? If so, describe your approach and experience.			
11	How would you implement and monitor a new syndromic disease surveillance system?			

Appendix I, Continued... Interview Scoring Template

12	Describe a time when you were part of an emergency response team. What was your role, and what challenges did you face?			
13	How would you coordinate with regional and local agencies during a biological event?			
14	How do you communicate complex epidemiological data to non-experts, such as community members or local officials?			
15	Provide an example of how you have prepared and delivered presentations or reports to stakeholders.			
16	Can you discuss a policy or strategic plan you helped develop to address a public health issue? What were the key components and outcomes?			
17	How do you conduct extensive community studies, such as those on hepatitis incidence and vaccination compliance?			
18	What are your methods for ensuring effective communication within your team and with external partners?			
19	Describe your experience with computer programs and epidemiology tools listed in the job description (e.g., MS Word, Excel, PowerPoint, ArcView GIS, syndromic surveillance systems).			
20	Imagine you receive a report of a potential outbreak in a local school. What steps would you take to investigate and manage this situation?			
21	How would you handle conflicting data sources when investigating a communicable disease outbreak?			
22	Are you able and willing to participate in rotational on-call activities and emergency response duties?			
23	How do you manage the demands of working independently while ensuring timely and accurate reporting?			

Appendix J-Collaborative Academic/ Practice Process

The process outlined below is the expanded version of the "Process" component of the Curricular Pyramid summarized in Use Case #4, Solemi, "Curriculum Developer". This process is based on the NNPHI/ HCC project findings that new public health graduates, entry-level public health employees, public health agency hiring managers, and public health agency supervisors perceive a gap between public health academics and public health practice. More specifically, a gap between student learning at the academic level and the skills that are required to practice public health data science at government public health agencies such as local health departments. Listening Session participants shared their perception that new graduates show up for interviews and their new jobs underprepared to practice public health.

The scope of these projects did not allow for us to further investigate whether the lack of ability to "practice public health" is truly because of a lack of academic preparation, or whether it is driven by human resources-level issues, for example, a misalignment between position descriptions, candidates, interview questions and actual roles. A combination of these factors may be at play as well.

The following process assumes that the perception of a gap between academics and practice is accurate. As a response, we have outlined the basic steps needed to identify and address the top priority gaps. This involves engaging both public health academicians and public health practitioners in a collaborative effort to identify those gaps and then develop curriculum and activities to effectively fill them.

If there is uncertainty as to whether the assumptions upon which the processes are based are accurate, additional research should be conducted, including secondary data reviews, environmental scans, best practice reviews, key informant interviews, surveys, and/ or focus groups, to ascertain why recent graduates seem to be ill-equipped for the role they are filling.

Steps 1-11: Identification of Academic/ Practice Gaps

*Note: Steps 1 and 2 can be skipped if the practice agency already has a list of existing, current, and accepted public health practice core competencies.

1) Identify the basic to advanced skills required for public health data science workers to be effective in the field of public health data science at a government public health agency.

a. These general skills lists and competencies are to be developed by a diverse group of government agency public health practitioners, experienced in the area in which skills need to be developed.

Appendix J, Continued…Collaborative Academic/ Practice Process

2) Prioritize the resulting list of skills, ranking them from the most critical to public health effectiveness to least critical ("nice to have").

a. Once a draft list of skills is established, circulate the list among other experienced public health workers in various settings to gain additional insights, feedback, and improvements.

3) Once the draft list from the practitioners is finalized, engage, convene, and collaborate with academic public health curriculum developers from an established, accredited school of public health.

4) Evaluate each of the core concepts and skills listed in the practice-based list, in priority order, to determine:

a. Which concepts are already included in the academic public health curriculum, and
b. Which concepts represent gaps in the academic curriculum.

5) For those public health concepts which already appear in the academic curriculum, collaboratively review each concept to understand how the relevant skills are being:

a. Conveyed,
b. Demonstrated, and
c. Evaluated within the academic program, and
d. At what level(s) of competency.

6) After the assessment exercise, divide the working list into:

a. Those skills that are adequately addressed within the academic curriculum, and
b. Those skills which are not adequately addressed within the academic curriculum.

7) Combine the list of those skills which are not adequately addressed within the academic curriculum with the items from step 3.b. that represent concept gaps in the academic curriculum.

Appendix J, Continued…Collaborative Academic/ Practice Process

8) Use the resulting list as the basis for subsequent collaborative academic/ practice planning sessions. The purpose of the sessions will be to:

- Add any missing concepts to the academic public health curriculum list.
- Define the relevant skill sets required for each concept.
- Identify how those skills are demonstrated.
- Identify the different levels of competency for each skill.
- Identify the indicators and metrics for each skill at each competency level.
- Identify methods for evaluating the indicators and metrics.
- Identify different methods for teaching/ conveying the skills in an academic setting (in the classroom or online) or through an academic setting (via academic practice collaborative projects, structured field placements, internships, etc.)

9) Discuss and define how the resulting list of concepts/ skills could be incorporated into an academic public health curriculum.

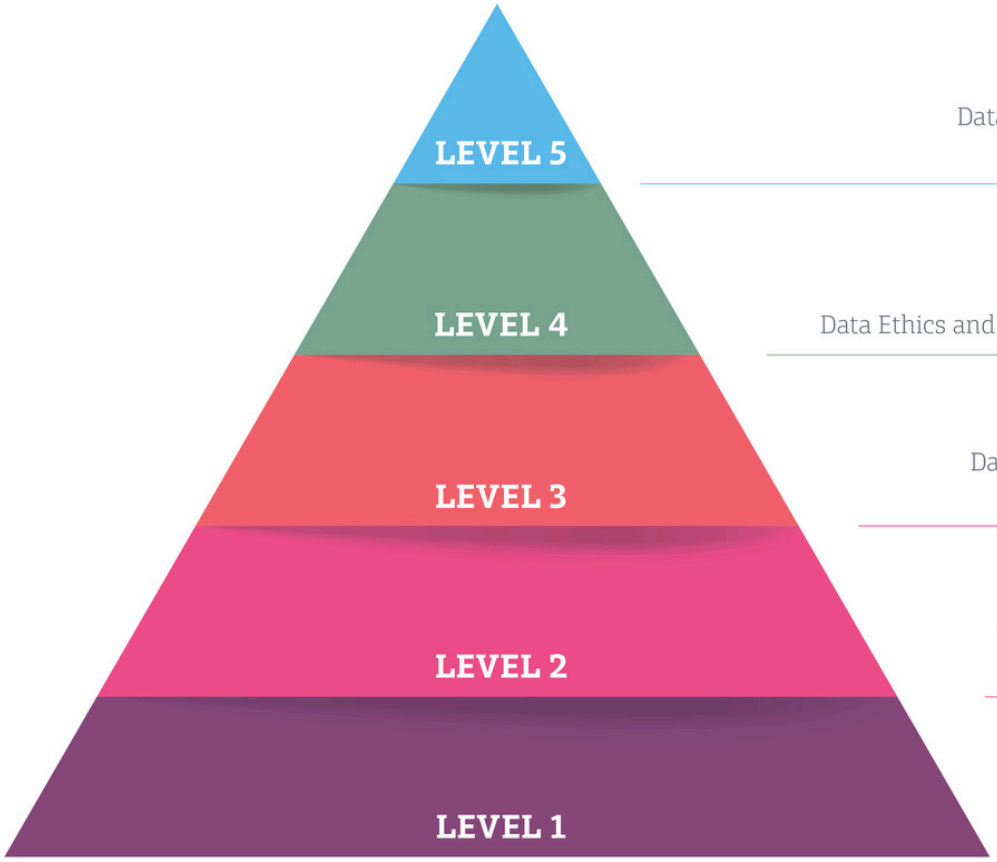
a. Depending on time and resources, consider conducting this exercise for the top priority public health practice skills only.

10) Depending on the results of #9, work with the academic institution to systematically and collaboratively develop the curriculum and evaluation required, and any academic practice collaboratives needed to convey, demonstrate, and evaluate the skills within the academic program.

a. Consider developing a pilot course or workshop in one of the critical skills areas, delivering and evaluating.

11) Review evaluation results to reassess and make any revisions and quality improvements.

Appendix K
Sample Pyramid for PH Data-Science-Focused Curriculum



EXPERT & THOUGHT LEADERSHIP
Data Democratization, Open Date and Date Sharing, Data Science Policy, PHDS Leadership

SPECIALIZED PHDS SKILLS
Data Ethics and Policy 2; Data Equity and Bias 2; DS for Epidemiology

APPLIED PHDS SKILLS
Database Management; Programming for public Health; Geographic Information Systems

CORE PHDS SKILLS
Data: Analysis Tools, Visualizations, Communication, Critical Thinking; Survey Design

FOUNDATIONAL PHDS SKILLS
Data: Literacy, Ethics & Privacy, Security & Governance, Equity & Bias, Democratization; DS for Epidemiology; Informatics Tools

Appendix K
Sample Pyramid for PH Data-Science-Focused Curriculum

The content outlined on these pages is the expanded version of the "Product" component of the Curricular Pyramid summarized in Use Case #4, Solemi, "Curriculum Developer". The example we have chosen to apply here is Public Health Data Science. For each level of public health data science reflected in the pyramid, we have outlined the proposed knowledge and skills required by the government public health workforce. Please note this is not comprehensive and is only a starting point for validation, revision, and development via public health practice curriculum discussions, as indicated in Step 1 of the "Process" component.

Level 1: Foundational Knowledge and Skills

1a. Data Literacy: A basic understanding of data types, sources, and uses in public health, introducing concepts like data cleaning and basic data visualization.

Skill: Identify different types of public health data (e.g., categorical, numerical, ordinal) and their sources (e.g., surveys, registries, vital statistics).
Skill: Explain how different data types are used to answer public health questions and inform decision-making.
Skill: Perform basic data cleaning tasks (e.g., identifying and correcting errors, handling missing values).
Skill: Create simple data visualizations (e.g., bar charts, pie charts) to summarize and communicate data.

1b. Informatics Tools: Familiarity with basic spreadsheet software, data entry, and common online public health data resources.

Skill: Enter and organize data into spreadsheets accurately.
Skill: Navigate online public health data repositories (e.g., Florida CHARTS, CDC Wonder, WHO databases) to find relevant data.
Skill: Use basic spreadsheet functions (e.g., sorting, filtering, calculations) to explore data.

1c. Data Ethics and Privacy: Discussion of ethical issues related to data collection, storage, analysis, and sharing in public health.

Skill: Assess the ethical implications of data collection, storage, analysis, and sharing in public health.

1d. Data Security and Governance: Understanding the importance of protecting sensitive health data and complying with regulations like HIPAA (Health Insurance Portability and Accountability Act).

1e. Data Equity and Bias: Recognizing the potential for bias in data collection, analysis, and interpretation.

1f. Data Democratization: Making data accessible, understandable, and usable for everyone within an organization or community, regardless of their technical expertise, to empower informed decisions and positive change.

Level 2: Core Public Health Data Science Skills

2a. Data Analysis Tools: Introduce statistical software (e.g., R, SAS, Power BI) for basic data analysis.

Skill: Import data into statistical software and perform basic descriptive statistics (e.g., frequencies, measures of central tendency and dispersion).
Skill: Conduct basic inferential statistics (e.g., t-tests, chi-square tests) to test hypotheses.
Skill: Interpret statistical output and communicate results in clear, non-technical language.

2b. Data Visualization: Training on creating informative graphs, charts, and maps to effectively communicate public health data

Skill: Choose appropriate chart types for different data types and research questions.
Skill: Create clear, visually appealing charts and graphs that effectively communicate key messages.
Skill: Incorporate data visualizations into reports and presentations.

2c. Data Communication: Skills necessary to translate and communicate data results to different audiences using different methods. This could be a separate track to include concepts and skills such as:

- Audience Analysis:
  - ***Skill***: Identify the intended audience's background knowledge, interests, and information needs.
  - ***Skill***: Tailor communication style, language, and message placement to match the audience's understanding and preferences.

- Data Storytelling:
  - ***Skill***: Craft a compelling narrative that connects data findings to a larger public health context and highlights their relevance.
  - ***Skill***: Use anecdotes, examples, and metaphors to make data relatable and engaging.
  - ***Skill***: Develop a clear storyline with a beginning, middle, and end that leads the audience through the data and its implications.

- Data Visualization:
  - ***Skill***: Choose appropriate chart types (e.g., bar graphs, line graphs, maps) to communicate different types of data and highlight key findings.
  - ***Skill***: Design visually appealing and informative graphs, charts, and infographics that are easy to understand and interpret.

- Written Communication

- Verbal Communication

- Digital Communication

- Cultural Humility

2d. Critical Thinking (Core Skills): The ability to evaluate data sources, question assumptions, identify potential biases, and draw valid conclusions. This could include:

- **Data Source Evaluation:**
  - ***Skill***: Assess the credibility and reliability of data sources by examining their origin, methodology, sample size, and potential conflicts of interest.
  - ***Skill***: Compare and contrast different data sources to identify discrepancies and potential biases.
  - ***Skill***: Distinguish between primary and secondary data sources and understand the implications for data interpretation.
- **Bias Detection and Mitigation:**
  - ***Skill***: Identify potential sources of bias in data, such as selection bias, measurement bias, and confounding.
  - ***Skill***: Assess the impact of bias on the validity and generalizability of findings.
- **Evidence-Based Decision Making**:
  - ***Skill***: Use a systematic approach to evaluate the quality and relevance of evidence from different sources.

2e. Survey Design: Basic principles of questionnaire development and sampling methods.

- ***Skill***: Develop research questions and hypotheses for survey research.
- ***Skill***: Design questionnaires with clear, unbiased questions and appropriate response options.
- ***Skill***: Select appropriate sampling methods (e.g., random sampling, stratified sampling, convenience sampling) for different populations.

Appendix K, Continued...
Sample Pyramid for PH Data-Science-Focused Curriculum

Level 3: Applied Public Health Data Science

3a. Database Management: Understanding of relational databases used in public health systems, and basic querying skills.

3b. Programming for Public Health: Introduction to scripting languages (e.g., Python or R) for automating tasks and data wrangling.

3c. Geographic Information Systems (GIS): Basic spatial analysis and mapping techniques for visualizing health data geographically.

Level 4: Specialized Public Health Skills

4a. Data Ethics and Privacy: Discussion of ethical issues related to data collection, storage, analysis, and sharing in public health.

Skill: Develop and implement data governance policies to protect privacy and ensure ethical data use.
Skill: Communicate ethical considerations to stakeholders and the public.

4b. Data Equity and Bias: Taking steps to mitigate bias to ensure equitable outcomes

4c. Data Science in Epidemiology: Concepts and applications in public health (e.g., predicting disease outbreaks or identifying risk factors). This would likely be a separate program at this level, but some of the following concepts could also be provided at a more basic level and could be included in level 2 of the pyramid:

Skill: Study Design
Skill:Outbreak Investigation
Skill: Disease Surveillance
Skill: Risk Assessment
Skill: Evidence Synthesis

Level 5: Expert and Thought Leadership

5a. Data Democratization: Make data accessible, understandable, and usable for everyone within an organization or community, regardless of their technical expertise, to empower informed decisions and positive change.

5b. Open Data and Data Sharing: Explore the importance and challenges of open data and data sharing initiatives in public health. Discuss strategies for promoting data sharing and addressing privacy and security concerns.

5c. Data Science for Policy: Understanding, directing, and using data science efforts to inform policy decisions and evaluate program effectiveness.

5d. Public Health Data Science Leadership: Advocating for, championing, guiding and enabling the use of data science knowledge, skills, tools, and technology within public health organizations and systems.

5e. Public Health Data Science Leadership: Advocating for, championing, guiding and enabling the use of data science knowledge, skills, tools, and technology within public health organizations and systems.

Skill: Identify, develop, and implement strategies for integrating public health data science into public health practice.
Skill: Build and manage effective public health data science teams.
Skill: Foster a culture of "data for good," data science solutioning, and data-driven decision-making within public health organizations.

WHY DO YOU NEED THIS BOOK?

This handbook is for public health personnel who are connected with the herculean task of improving the public health workforce. Whether the challenge is recruiting excellent talent, keeping them, or anything in between, PH organizations must stretch already over-extended resources to address the many related difficulties that compromise and limit public health practice and community efforts. The practical guidance in this handbook can help you better understand your challenges and find solutions.