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State Office of Public Health Informatics and Epidemiology (OPHIE) Program: Training Materials

The Intelligence Cycle and the Epidemiology Cycle: *Parallels in Process and Product*

OPHIE PROGRAM TRAINING MATERIALS

Handbook for the Intelligence Cycle and Epidemiology Cycle Presentation

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Introduction

1

Welcome to the Online Accessible version of the '*Intelligence Cycle and Epidemiology Cycle*' Presentation

This presentation was originally provided in-person on Friday, April 10, 2015, in the state health emergency operations center (EOC). In an effort to make this information accessible to those who could not attend in-person, an online accessible version was prepared, and disseminated to key partner agencies.

The original idea to create this course was a joint effort between the State Epidemiologist, Mr. Dan Mackie, and the Director of the Joint Staff for the Nevada National Guard, Colonel (Promotable) Jeff Burkett. The concept was derived from a series of conversations between these two men, who are each alumni of the Naval Postgraduate School's (NPS) master's degree program from the U.S. Center for Homeland Defense and Security (CHDS) in Monterey, California.

Note: To learn more about the CHDS program, please play this short five-minute video: https://www.chds.us/m/media/player?id=3119

The CHDS degree program spends a full semester covering the intelligence community (IC), and something called the "*Seven Step Intelligence Cycle*." The parallels between that seven-step process and what epidemiologists at the state and local level do on a daily basis, were a compelling reason to build this presentation.

With travel budgets being cut, the ability to provide the same presentation to a widely dispersed audience is unsustainable. One of the strategies to overcome this challenge was to provide training opportunities and presentation through an online format using an internet-accessible system called **Prezi**.

For those of you who have never heard of Prezi, it is basically a more dynamic version of the old standby: *Microsoft (MS) Power Point*. Rather than transitioning from slide-to-slide like we have in the past on MS Power Point; with Prezi you *'fly'* through the transitions seamlessly. You'll see what that looks like in a few moments. Today's online presentation should take about one hour and five minutes to complete.

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1. *Checking out any prezi from www.Prezi.com/explore to see if it plays back smoothly on your computer.*

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High End Usage: If you would like to play a very large prezi (with many videos, animations, high resolution images, etc.), Prezi uses Adobe Flash technology to render prezis in real time, therefore you can create very high resolution presentations, but your playback performance will rely on the hardware. Here are some hardware recommendations:

1. *Fast processors and lots of memory will help more than a strong graphics card.*

2. *It can help to play a prezi through once, it will play more smoothly the second time (do not restart the prezi).*

Website: The www.Prezi.com website supports all major modern browsers (Internet Explorer 9 and above, Mozilla Firefox 3 and above, Google Chrome, Safari) but for the best experience we recommend using the most standard compliant browsers available (Firefox 3.6+, Chrome 4+, Safari 4+). Flash version 11.1 is required.

Prezi for Windows /Mac: For users who would like to access Prezi through Microsoft Windows:

- *2.33GHz or faster x86-compatible processor, or Intel Atom™ 1.6GHz or faster processor for netbook class devices*

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- *512MB of RAM (1GB recommended)*

For users who would like to access Prezi through a Mac Operating System (OS):

- *Intel® Core™ Duo 1.83GHz of faster processor*

- *Mac OS X v10.6, v10.7, or v10.8*

- *512 MB of RAM (1GB recommended)*

High-Speed Internet Connection: In order to access today's presentation, you will need access to a computer with a high-speed internet connection. We realize that for many of you in our rural counties, such a connection may be an issue. So in an effort to ensure that you can at least read along with what the audio recordings for each transition, we have provided a complete transcript of what those audio recordings cover.

Software Requirements: In addition to this internet connection requirement, we ask that your computer also have *Windows Player* installed. This will allow your personal computer (PC) to run the audio portions of the Prezi presentation.

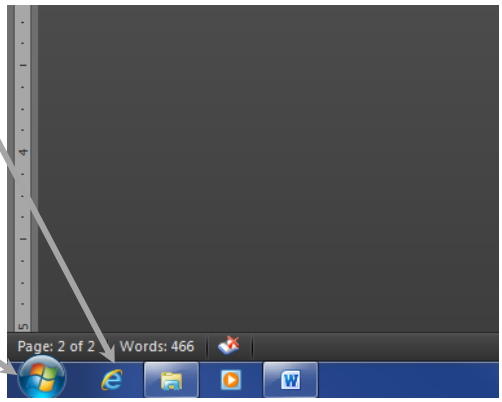
Sound Speaker(s): In order to listen to the presenter's recordings for each transition in today's course, please ensure that your PC has a speaker (or speakers) that are working, and as basic as this sounds: make sure the volume is turned on and up. If your system does not have a speaker, then you can follow along in this course handbook and read through each recording's content.

How to Access, Open and Watch the Prezi Presentation: Open the internet browser for your PC by double clicking on that browser's icon in the bottom-left corner of your screen like this:

If your computer is setup with a shortcut to your browser, like this, then click here:

If your computer does not have that shortcut, then click here:

When that opens, look for the Internet browser and double click on that.



To access today's presentation, you can do so by clicking on this hyperlinked web address provided below, which should open automatically open the Prezi presentation for you. If the hyperlink does not work, then you will need to ensure that each letter/digit/symbol is copied into your computer's internet browser, otherwise the presentation will not open for you.

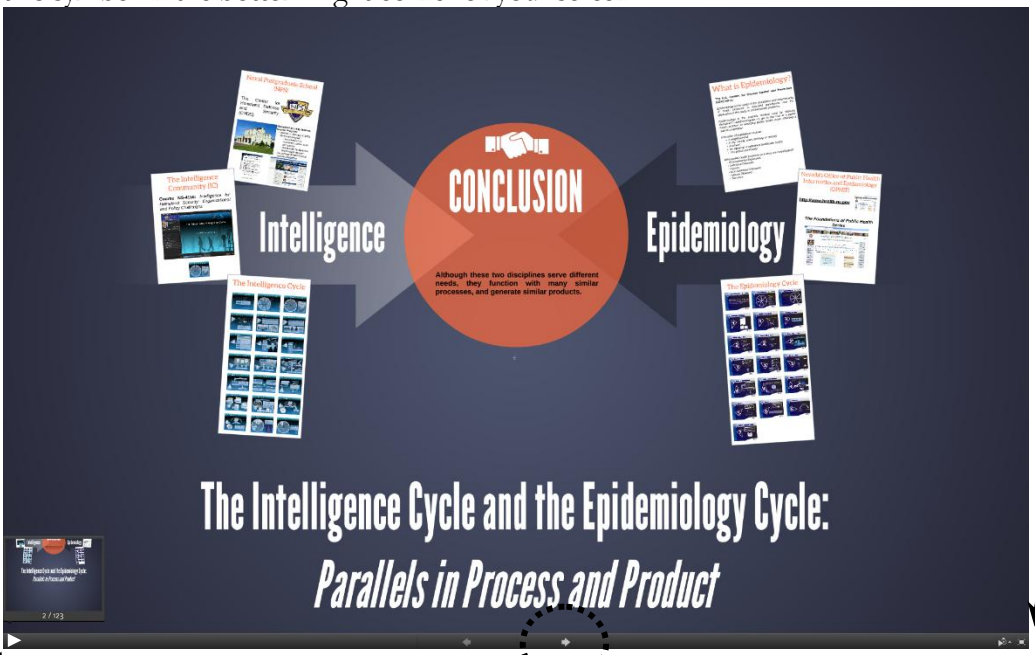
For Part 1 of this presentation, please use this hyperlink:

http://prezi.com/pxgvkvipvxvg/?utm_campaign=share&utm_medium=copy&rc=ex0share

For Part 2, please use this hyperlink:

http://prezi.com/97wi33k-e9sq/?utm_campaign=share&utm_medium=copy&rc=ex0share

Depending on the strength of your computer's internet connection, **this presentation may take a few seconds, to a few minutes, to load**; so please be patient. Once the presentation does load, you can watch the course as it displays, on a portion of your PC's screen; or, you can expand it to fill your computer's entire screen by clicking on this symbol in the bottom-right corner of your screen:



Either way you choose to watch the Prezi presentation, in full screen mode or not, you will be advancing the presentation at your own pace, one transition at a time, by clicking this right-arrow at the bottom of the screen (circled).

If you would rather watch and listen to this presentation like a movie, you can click on this "*Play*" button in the bottom-left corner of the window, as indicated by this arrow.

Note: If you opt to watch the course in the full-screen mode, the software will pop-up a question about "*Allow full screen with keyboard controls?*" Just click on the Allow button.

From that point on, you will watch and listen at your own pace. If you need to go back and redo a previous slide (or as Prezi calls them: Path), then simply click that left-facing arrow at the bottom of your screen. Adjust your PC's volume and enjoy the course.

Chapter 1

Full Transcript for the '*Intelligence Cycle*' Portion of this Presentation

This presentation is broken into two halves, with the transcript in this chapter covering Part One.

This transcript covers everything covered in **Part 1** of today's presentation. If you need to see or hear a portion over again, you can do so by clicking that left-facing arrow in the center of the window where the presentation is positioned on your screen.

Path #1: Before we get going, please adjust your computer's volume control so you can hear the audio component of today's presentation. You can advance this presentation at your own pace by clicking that right-facing arrow at the bottom-center of your screen; or you can watch this presentation like a movie by clicking that triangular "Play" button in the bottom-left corner of your screen.

Path #2: Hello and welcome to today's presentation titled *"The Intelligence Cycle and the Epidemiology Cycle: Parallels in Process and Product."* My name is Dan Mackie and I serve as Nevada's State Epidemiologist. I will be presenting all of today's material for this online accessible presentation. Today's material is intended to familiarize the Intelligence Community (IC) within Nevada, with what epidemiology does, and vice versa. The terminal learning objective for today's presentation is to explain that although these two disciplines serve different needs, they function with many similar processes, and generate similar products.

Path #3: We will be starting with the intelligence side of this parallel, by looking at how our counterparts within the intelligence community utilize something they call the *Seven Step Intelligence Cycle*.

Path #4: Following that half of today's presentation, then we shall transition over to the epidemiology side of the parallel, and compare the

seven step intelligence cycle with a similar cycle that we within epidemiology use in the investigation of disease outbreaks.

Path #5: The original idea to create this course was a joint effort between the Director of the Joint Staff for the Nevada National Guard, Colonel Promotable Jeff Burkett (USAF), and myself. Over a series of conversations between Colonel Burkett and I, we looked at ways we could connect our shared curriculum from an academic degree we earned (with graduations separated by nearly a decade) with what we are seeing and hearing here in Nevada through our respective positions within state and federal government.

Path #6: The academic program to which I am referring to is the Naval Postgraduate School, located in beautiful Monetary, California, about a five hour drive over the Sierra Nevada Mountains from Reno and Carson City.

Path #7: And the specific program within the NPS university system is this: The U.S. Center for Homeland Defense and Security (or CHDS for short). That shield to the right is the emblem to this century-old institution; and that phrase in Latin scrolled across the shield, "*Praestantia per Scientiam*", encapsulates the mission of the university: *Excellence through Knowledge*.

Path #8: The crown-jewel of the NPS campus is this one hundred and thirty-six year old building, Hermann Hall; formerly the historic Hotel Del Monte. The joke amongst CHDS students (and some faculty) is that this should be called *The Mother Ship*.

Path #9: The CHDS master's degree program has been around for more than thirteen years and has produced nearly one thousand graduates. I added these bullet points from the school's website to help give you an idea of what the program entails. It is an eighteen month master's degree program which is broken up into three month long semesters that go year round. Students are flown either into Monterey, or Washington, D.C., for two weeks of in-residence coursework, and are then returned to their home station where they participate in a distance learning format for the remainder of the semester. There are three CHDS cohorts per year, with each cohort being comprised of approximately thirty students; so about ninety students per calendar year go through the program. Those thirty students per cohort are a combination of local, state, tribal and federal leaders. In my cohort, cohort 1203/1204, two thirds of us were state and local, and one third were federal employees.

Path #10: As much attention as the Center draws for its Master's degree program, the CHDS offers a whole range of programs for leaders who want to expand their knowledge and understanding of the Homeland Security enterprise. Those programs are listed here and include: the Executive Leaders Program (or ELP for short), the Executive Education Seminars for Governors/Mayors and Homeland Security leaders (or EES for short), next

there is the Fusion Center Leaders Program (or FCLP), and finally down there at the bottom is the Pacific Executive Leaders Program (or PELP for short).

Path #11: If you are interested in learning more about these opportunities that are provided through the Center for Homeland Defense and Security, here is the Center's web address which will provide you with all the information you may need.

Path #12: And once you access that website, this is an example of what the Center's web page will look like. The programs that I just spoke about (e.g. ELP, FCLP, etc.) can be accessed over to the left.

Path #13: OK, so for today's presentation, I'll be borrowing heavily from an existing lecture about the *Seven-Step Intelligence Cycle* that can accessed online through the Center's website. In order to watch that lecture, you will need to click on the option listed here on the Toolbar: "*Research & Learning Materials*."

Path #14: Once that drop-down menu appears, you will need to click on that second option listed, as shown by that arrow: "*CHDS/Ed Learning Materials*."

Path #15: The course we'll be using was published way back in 2008, so to go back that far, you will need to use this "Search" icon, as indicated by that arrow, in the top-right corner of the screen. Once you click on that, a bar listed as "Search form" will drop down from the top of your screen, so if you wanted to watch this course, you would then need to click your PC's mouse in that bar and type "Intelligence Cycle", then hit your 'Return' key.

Path #16: The course we'll be using is the one by Professor Bill Lahneman listed off to the left in this screen shot. If you click on the course title, a brief summary of the course shall appear, and a web address will hyperlink you to the video of the course listed under where it says "Watch."

Path #17: All CHDS students are required to take a three-credit course that covers something referred to as the Intelligence Community (or IC for short). When I was going through the program back in 2012/2013, that course was listed as NS-4156 and was called: *Intelligence for Homeland Security: Organizational and Policy Challenges*.

Path #18: Although there is an entire series of online accessible lectures that we were required to watch during the distance learning, I chose this specific lecture by Professor William Lahneman titled: The Seven-Step Intelligence Cycle. I chose this course because it so closely parallels the topics that we, within the field of epidemiology, use within our day-to-day work. If you decide to watch this lecture on your own through the Center's website, you can do so by clicking that "Play" button in the bottom-center,

as shown in this screen shot. You can see a full transcript of everything the narrator is saying by clicking that "Notes" button in the bottom-right corner of this screen shot. Altogether this lecture will take you about twenty-three minutes and fifty seconds to complete, as indicated in the top left corner of this screen shot, that was taken from the CHDS website.

Path #19: The crux of what professor Lahneman covers in this lecture revolves around the components outlined in this diagram that he uses throughout his presentation, something called the *Seven-Step Intelligence Cycle*. Rather than go through his entire lecture, which would take me nearly fifty-four minutes to accomplish, I'll go through an abbreviated version of Professor Lahneman's lecture and touch upon the high points of his presentation.

Path #20: So in order to accomplish that, I'll be using these screen shots that I've taken from Dr. Lahneman's original course, and use them to cover a condensed version of his lecture, in an effort to save on time.

Path #21: So welcome to a much shorter version of the CHDS lecture that covers *the Intelligence Cycle*.

Path #22: We begin with the most important facet of the cycle, which is: *What the intelligence process is intended to accomplish*. For that we see this succinct definition, provided to us by Professor Lahneman, which informs us that: "*The Intelligence Process provides policymakers with timely, accurate, finished intelligence products.*" Later when I cover the epidemiology side of this parallel, we'll see nearly an identical definition to explain the end result of the epidemiology cycle.

Path #23: As it is explained in his lecture: "*It is useful to express this process as a cycle with seven steps. While this view sometimes oversimplifies what actually occurs, it is a useful construct for understanding the basic functions that any intelligence enterprise must accomplish in order to be successful.*"

Path #24: The narrator goes on to say: "*Whenever there is a problem with intelligence, it is useful to analyze the problem in terms of the intelligence cycle: What step is missed? What step was ineffective? etc. Such an approach invariably identifies important aspects of the problem.*"

Path #25: So in Step One of the intelligence cycle, we look at something called **Requirements**. The challenges facing the modern security landscape cover an entire array of information. As we know from watching national media outlets, the intelligence community cannot cover "every possible threat posed to U.S. security." So we see an intelligence system that is constantly adjusting to new requirements; so as the threat environment changes, with some issue and targets receiving top priority at certain times, while others may only receive peripheral attention, and yet others may even

receive a little attention (if any) from the intelligence community. So the key issue here is: Who sets these requirements?

Path #26: The narrator then goes on to explain how there is a semi-permeable line between the policy makers (for example: The President, the National Security Council, the Department of Defense, etc.) who set intelligence requirements "*in a clear and detailed manner*", and then communicate these to the sixteen intelligence agencies that collectively comprise the Intelligence Community. However, the success or failure of this process (of setting intelligence requirements) hinges on the passage of time and the "*ability of policymakers and their appointed officials to adjust accordingly*." What may have been a requirement during the Cold War, could now (with the passage of enough time) be on the proverbial 'back burner.' Conversely, what was of little importance during the Cold War (for example global terrorism) may now be the issue driving the requirements directed to the Intelligence Community.

Path #27: This section of the lecture concludes with: "*It is only through careful planning and effective communication that these requirements can be properly carried out to ensure the success of all subsequent phases of the intelligence cycle*."

Path #28: So as we transition to Step Two of the intelligence cycle, known as **Collection**, we learn of how the Intelligence Community goes out and compiles all the information sought for a specified subject. So rather than rely upon one or two means of compiling these data, the IC employs a whole host of collection disciplines that altogether give them a more detailed idea of what is going on. So this list is provided to us to help give us an idea of what these intelligence collection disciplines entail. So from top to bottom we have: *Signals Intelligence* (or SIGINT for short) which involves things like phone and radio intercepts, electronic emissions, etc. Next on the list we see *Imagery Intelligence* (or IMINT for short), which involves things such as aerial and satellite digital photography. Think of those black-and-white photos from the Cuban Missile Crisis presented to the United Nations back in October of 1962, and you have the idea what IMINT is. Next we have *Measurement and Signature Intelligence* (aka: MASINT), which involves things such as air sampling for radioactivity, chemicals, etc. That is followed by *Human Intelligence* (or HUMINT for short), this is the classic James Bond 007 type of spying that we are used to seeing in the movies. And finally we see *Open Source Intelligence* (aka: OSINT) which involves unclassified sources of information such as newspapers, radio and television reports, scientific journal articles, etc.

Path #29: As different as these intelligence collection disciplines may appear to us at first, they all share one key component: They are all resource intensive and expensive to maintain. They also come with varying levels of risk, for example: political risk, etc. In addition, they each come with varying levels of quality versus quantity of raw intelligence information.

Path #30: So to help describe this *quality versus quantity* issue, Professor Lahneman uses this metaphor of a vacuum cleaner. Just like the intelligence collection disciplines, the vacuum goes out and sucks up mountains of dirt and dust (aka: data). However, within those mountains of dirt and dust, there may be gems of information; with the challenge being: how do we separate the good stuff from the bad staff?

Path #31: This is what Dr. Lahneman refers to as the *Noise versus Signals* problem. The bits of information that we may be looking for are buried amongst what he calls "extraneous information." Herein lies the irony that although we need to collect lots of raw intelligence, if we in fact collect too much, then useful intelligence become progressively more difficult to locate. So we in effect become buried by our own raw intelligence.

Path #32: So in order for these mountains of raw intelligence to be of any use to the IC, then the next step within the Intelligence Cycle involves what the IC refers to as **Processing and Exploitation**. Not only does the IC need to figure out which tiny fraction of what it collected may be of use, but it must also repackage these materials into accessible intelligence that can contribute later to intelligence reports, thus overcoming that *Noise versus Signals* dilemma that we looked at a few moments ago.

Path #33: This is the realm of the highly trained and experienced intelligence specialists. These are the unsung heroes of the intelligence cycle who sift through the mountains of data in order to find small details that could ultimately lead to useful intelligence.

Path #34: In the example used here, Professor Lahneman explains to us how hundreds of satellite images may be used by trained imagery professionals who may be able to discern subtle indicators that something within a captured image is important. So these technical specialists collaborate with other intelligence professionals who are specialists within their respective fields, for example: translators, code breakers, weapon experts, weather experts, etc. Together these teams synthesize the work of technical experts such as imagery professionals into a more comprehensive intelligence 'picture.' For all of this to succeed, the technical specialists must be effective communicators of what they found to <u>both</u> policy makers and analysts.

Path #35: In this portion of the lecture, we learn of the divide within the IC between advocates of '*Collect More*' versus advocates of '*Collect Better*' intelligence; the age old conundrum of quantity versus quality. Finding the balance between collecting enough raw intelligence matched with generating enough processed intelligence is an issue that draws a very strong comparison within epidemiology, as we shall learn more about later in my presentation.

Path #36: So even after all of this collected information has gone through a screening process to ensure its relevancy, it is still only considered to be raw intelligence at best. Only after this information has gone through the **Analysis and Production** stage of the intelligence cycle, where all these pieces of information are combined and evaluated, by a series of experts and summarized in a written report, does it actually become a finished intelligence product. Analysis is thus the most important part of the intelligence cycle. The core of the analytical process are the individual analysts who are specifically trained intelligence employees who combine their expertise in a variety of issues, cultures and geographic regions, with their strong analytic capacities, matched with their strong oral and written communication skills. The job of these analysts is to compile many different pieces of collected and processed information, and evaluate this information in terms of their specialized knowledge, consider its implications for national security and policy interests, and incorporate these judgments into both written and oral reports as needed. Their analyses with then be scrutinized by leaders within their own agency, who often cross-examine these analyses with what leaders within other intelligence agencies as seeing as well. Once these reports are vetted and fine-tuned from this interagency process, then these reports are submitted to policy makers in a very concise format. Keep in mind that if any time an analysis is deemed erroneous, irrelevant or otherwise unpalatable, it will <u>not</u> make it before a policymaker. As we will see later, a similar process like this exists for epidemiologists as well.

Path #37: As analysts process the report (or reports) through this long procedure, they must follow these four basic principles of good intelligence. We begin in the top-left corner of this screen shot from Professor Lahneman's lecture where he explains how intelligence must be timely. As you can see below that statement he goes on to explain how: "*Inconclusive data on time is better that more information too late*." For those of you who may be familiar with any of the operational response plans that I wrote from my days back in the state public health preparedness (PHP) program, you may recall that I often begin each plan with a similar quote from U.S. General George S. Patton: "*A decent plan executed violently today is better than the perfect plan next week*." To the top-right we see the clear sense of certainty and uncertainty, which as you will see later, is a key issue

Path #38: I included this screen shot from the CHDS lecture because it mirrors a similar process used in epidemiology: The incorporation of many analyses into a report to help avoid something called "Group Think." As with anyone else, intelligence analysts (as well as epidemiologists) are often influenced by their own biases, their history as well as their experiences; so this idea of having many different sets of expert eyes looking at the same issue helps us to protect against Group Think and/or flawed intelligence.

Path #39: This section begins with a direct quote from the CHDS lecture: "*Despite the best collection and analytical efforts, intelligence does <u>not</u> exist until*

policymakers acknowledge and understand it. The process of distributing finished intelligence to appropriate officials is known as the process of ***Dissemination***." The same findings and recommendations could sound and look differently based on who (or whom) the intended consumer of the intelligence report is. As we see here, intelligence reports within the President's Daily Briefing (or PDB for short) may have his or her preferences in mind and so on. The message is always tailored for who or whom it is being directed to.

Path #40: Key leaders and policymakers are incredibly busy people, so getting them the right intelligence at the right time, is a challenge for all agencies involved within the IC. If these leaders and policymakers are flooded with too much information (or just as bad: too little), then they may not even use the intelligence report provided to them. This back-and-forth process of ensuring that the intelligence product provided fits within the interest and availability of the policymaker is a key point. We shall see later that epidemiologists work at striking a balance like this as well.

Path #41: Just because a solid intelligence product is provided to key leaders and policymakers, does not necessarily mean that they will act upon the intelligence that they have received.

Path #42: As to why these intelligence products may not be acted upon, there are some key examples of why listed here: "preconceived notions to their attachment to old projects", etc.

Path #43: This final stage of the intelligence cycle is often overlooked, but serves a key component of the system because it refines the cycle and keeps the intelligence product relevant in the face of changing priorities and budgets. As we see to the right, policymakers evaluate the IC's performance and make recommendations for improvement.

Path #44: This final stage in the cycle relies on policymakers who are able to clearly articulate what their intelligence requirements are to the IC, and so on. As Dr. Lahneman says in his lecture: "*Feedback renews the intelligence cycle*."

Path #45: OK, so that was a condensed version of the lecture provided by CHDS Professor, William Lahneman, covering the intelligence cycle. With the lessons we learned from this lecture of his, now we will juxtapose those against a parallel system called the epidemiology cycle.

Path #46: These online accessible presentations through Prezi sometimes require more memory than state-issued computers can handle. So I've broken this presentation into two parts to help alleviate that issue. Please close this first half of the presentation, and then use the web address in your course handbook to open and load Part Two of this presentation, thank you.

Chapter 2

Full Transcript for the *'Epidemiology Cycle'* Portion of this Presentation

This presentation is broken into two halves, with the transcript in this chapter covering Part Two.

This transcript covers everything covered in **Part 2** of today's presentation. If you need to see or hear a portion over again, you can do so by clicking that left-facing arrow in the center of the window where the presentation is positioned on your screen.

Path #1: Hello and welcome back. In Part One of this presentation, we looked at a condensed version of an online accessible lecture by Professor Bill Lahneman of the Naval Postgraduate School's Center for Homeland Defense and Security (CHDS). In his lecture, Dr. Lahneman provides us with a description of the components to something called the Seven Step Intelligence Cycle. In this second half of my presentation, we'll take what we learned in Part One and compare it against a similar cycle used by epidemiologists (aka: disease investigators).

Path #2: So in order to proceed with that, we'll need to jump over to this side of today's topic.

Path #3: I'll begin with the basics, because for most of you listening in to my presentation; you may have never heard of epidemiology, and if you did, you may not know what it is. So in an effort to get us all on the same sheet of paper, I'll begin by asking: *What is Epidemiology*?

Path #4: In order to answer that question, I'll default to a definition provided to us by the good folks over at the U.S. Centers for Disease Control and Prevention (or as you know them: The CDC). I took this from their website because it hits on so many of the core components of this branch of science. As you see here: "*Epidemiology is the study of the distribution*

and determinants of health problems in specified populations and the application of this study to control health problems. Epidemiology is the scientific method used by "disease detectives"—epidemiologists—to get to the root of a public health problem or emerging public health event affecting a specific population." You may have noticed that the term "*population*" is used twice. This is important because it helps describe the scale of public health: Whereas clinicians put their fingers on the pulse of an individual patient, epidemiologists place their finger on the pulse of entire populations. As you can see in the examples of populations listed; we are talking about something as small as a neighborhood, to something as large as the global community. Finally we have that list of "public health problems or events" at the bottom. I include this because some of you may be surprised to learn that public health and epidemiology track issues facing our communities such as: non-infectious diseases (e.g. cancers, birth defects, etc.), injuries (road accidents, workplace accidents), natural disasters, and terrorism.

Path #5: So now that we have a common definition of what epidemiology involves, next we will briefly look at how epidemiology is tied into the state's Division of Public and Behavioral Health (or DPBH for short).

Path #6: And for that, we turn to the state's *Office of Public Health Informatics and Epidemiology* (also known as OPHIE). This program has both full time and contract employees spread between offices in Carson City, and in Las Vegas.

Path #7: Information concerning the OPHIE program, as well as the entire division of public and behavioral health can be accessed online through this website: http://dpbh.nv.gov

Path #8: And once you open that webpage, this is an example of what you will find there: the DPBH main page. I invite you to access this page when have some free time, and look through the resources listed therein. For today's presentation, I'll be guiding you to some epidemiology specific resources that will demonstrate how patterns of disease are tracked through our state.

Path #9: So in order to get there, we would need to click on this menu option listed on the DPBH website's Toolbar under "*Programs*."

Path #10: Once that menu option opens, this is what you will see next.

Path #11: The information we're interested in can be accessed by clicking where it says *Office of Public Health Informatics and Epidemiology*, down here in the bottom-left corner of the webpage.

Path #12: Here is the OPHIE program's main page, and the data that I'll be highlighting can be accessed by clicking on that first bullet listed up top, as indicated by the blue arrow.

Path #13: That will finally get you to this page, the OPHIE program's Main Page. A few moments ago I covered the CDC's definition of what it sees as epidemiology. If you recall, at the end of that section, I included bullet points that listed "*What public health problems or events are investigated?"* Well in this screen shot, if you are interested in seeing Nevada-specific publications on what the CDC refers to as public health problems or events, then you can simply click on that item listed as *"Publications"* beneath the *"Resources"* option, as indicated by that arrow.

Path #14: This uncovers a wealth of reports and publications that the state OPHIE program has been compiling for many years. In this screen shot, I would like to point your attention toward that long list of *"Communicable Disease Reports.*" These may not at first appear to be of much interest to you, but you may be surprised to see how helpful these reports can be.

Path #15: If you are interested in outbreak reports concerning specific facilities and/or hospitals, then these reports may be of interest to you as well. My point to all of this is that this state's OPHIE program employees are stewards of an amazing amount of information, involving all sorts of illnesses and conditions. Somewhere along your lifetime, these resources may be invaluable to you, both for family-related decisions, as well as for work-related decisions.

Path #16: So to help build upon that definition of epidemiology from the CDC website, the state's former Chief Medical Officer, Dr. Tracey Green, and I created this series of short online accessible training courses (e.g. 10 to 15 minutes each). We call this the *Foundations of Public Health Series* because it touches on so many of the issues that we are so often asked to speak about with government partners, the general public and the media.

Path #17: These online accessible training courses can also be accessed through the state OPHIE program's website, which we covered a few moments ago: http://dpbh.nv.gov

Path #18: Once you get to that webpage, you will once again need to look toward the bottom-right corner for the *Resources* field, then click on that *Training & Education* bullet, as shown by the blue arrow I've added.

Path #19: Here are some examples of what the state OPHIE program has listed for its training and education courses. As State Epidemiologist, I'm biased toward that first example listed: *Disease Surveillance and Epidemiology*. If you click on the title, that hyperlinks you to the online accessible Prezi presentation (very similar to what you are viewing and listening to now). If you click on where it says "Handbook for the Disease Surveillance Course" then that will bring up a .pdf copy of the course handbook, which includes a word-by-word transcript of what the presenter(s) are saying (just like what you are using with this presentation you are viewing now).

Path #20: Here's an example of what these Foundations of Public Health Series course look like. You can play them like a video, or advance at your own pace. The intent behind these courses is to help make our partners better informed consumers of the public health message. All too often, when we are dealing with partner agencies, the public, the media, etc., the public health terminology or concepts can be somewhat intimidating, so these courses are designed to help bridge that divide.

Path #21: Ok, that's it for the basics of epidemiology. With this information that we just covered fresh in our minds, now we'll turn to the final portion of todays' presentation.

Path #22: And in order to accomplish that, I will try my best to parallel both the content and visuals that Professor Lahneman used to such great effect in his CHDS lecture that we covered in Part 1 of this presentation. Just as he went through what he called the '*Seven Steps of the Intelligence Cycle*', now I will attempt to draw parallels through something called the epidemiology cycle.

Path #23: We too shall begin with the basics, just as Dr. Lahneman did, by defining what the outcome of the epidemiology process should be.

Path #24: To help explain the parallels between these two cycles, you'll notice that I try to follow the same sort of visuals and sequential order that we went through with the CHDS lecture.

Path #25: So as you can see from this overture to the epidemiology cycle, we begin by taking the definition used by Professor Lahneman, but I then re-inserted epidemiology-specific language back into that definition. The most significant change is the fact that for epidemiologists, we report not only to policy makers (or as we see here "*public health leaders*"), but we also report to the general public as well. Within our field the saying goes: the letter 'P' in the term public health is capital for reason, because we serve the entire public. Just as the intelligence community must provide "timely, accurate finished products" to its policy makers; so too must epidemiologists do the same with their leaders and the public.

Path #26: This circular diagram should look familiar from the CHDS lecture, which helped explain how the seven steps of the intelligence cycle all worked in concert with each other. I included that small insert off to the left to help rekindle your memory. I'll try to do the same through a similar diagram that depicts the epidemiology cycle. Just as an intelligence problem initiated the seven step intelligence cycle, now in this diagram, we learn that an epidemiology problem would initiate something very similar called '*The Epidemiology Cycle*.'

Path #27: But, as we see off here to the left, the epidemiology cycle is similar, but different.

Path #28: Whereas the intelligence cycle began with something called **Requirements**, I've added that insert with the phrase *Reportable Diseases*, to try and draw a parallel between what the epidemiology cycle begins with.

Path #29: For Step 2 of the Intelligence Cycle, we learned that the term **Collection** was used. For the parallel within epi, the phrase is *Disease Surveillance* will be used in its place.

Path #30: Over here for Step 3, **Processing and Exploitation** we see that the phrase *Case Definition* is used in parallel.

Path #31: Down here, for Step four, we see that the intelligence community uses the phrase **Analysis and Production**, whereas epidemiologists use the phrase *Outbreak Investigation*.

Path #32: Over here for the intel term **Dissemination**, we learn that epidemiology uses the term *Reporting*.

Path #33: Up here at Step six, the good folks over at intelligence use the phrase **Consumption**, and we see that epidemiology instead calls this step *Relevancy*.

Path #34: And last, but not least, for Step seven, the intelligence community use the term **Feedback**, and the epidemiology community use the term *Outbreak Summary* and/or *After Action Reports*, or AARs for short.

Path #35: So now that we have the basic terminology down for our parallels between the intelligence cycle and the epidemiology cycle, now we'll go through them one at a time in sequential order, just like Dr. Lahneman did.

Path #36: So we begin by looking at Step One of the epidemiology cycle: Reportable Diseases. Just as intelligence cannot cover everything at once, the same limitation applies to epidemiology, where we can't look for all diseases at once. So we within epidemiology turn to national requirements, often produced by national level bodies such as the U.S. Centers for Disease Control and Prevention (CDC), that are published in journals such as this: the MMWR, also known as the CDC's Morbidity and Mortality Weekly Report. In this example from 2012, we see that the CDC published its list of what it calls "Notifiable Diseases" within the United States.

Path #37: And when we open this report, we see a long list in alphabetical order, that goes through all of the diseases that we at the county and state-level health departments must notify the CDC of, if we get suspect and/or confirmed cases within our jurisdiction. Although it's difficult to see, way down there at the bottom, there's a reference to something called the

Council of State and Territorial Epidemiologists (or CSTE for short). This body of county, state and federal epidemiology professionals all work together to come up with updates to this list of Notifiable diseases and we also get vote on what should (and should not) be included on that list. So although this list is published by the CDC, we all get a say in what is included on the list.

Path #38: So with these nationally standardized criteria for notifiable diseases, now we'll explore how that translates into action down here at the state and county-levels of public health.

Path #39: So when we log onto the state health website, http://dpbh.nv.gov, and click on the Programs tab up on that brown-colored Toolbar, we follow that to the Public Health Informatics and Epidemiology (or OPHIE) program page. Once there, this is what we would see, and down there, where that blue arrow is pointing us, is the state's list of '*Reportable Diseases*.'

Path #40: When we scroll down to that portion of the OPHIE webpage, this is what is listed. Just as we saw with the CDC's list of notifiable diseases in alphabetical order, so too are the list of reportable diseases reported in the same way on the Nevada OPHIE webpage. Those blue-colored alphanumeric listings off to the left of each communicable disease, are Nevada Administrative Code (or NAC for short). These are the laws within Nevada that require healthcare providers and public health agencies to properly report cases of these diseases.

Path #41: So just as we learned from Professor Lahneman, the fact that what was once an intelligence priority during the Cold War, may now be on the back burner; and what is a priority now during the Global War on Terrorism may someday no longer be. So too does this apply to epidemiology. I've added some examples to press home this point; although Smallpox was declared by the WHO (World Health Organization) to have been eradicated in 1980 and we haven't seen a case within the U.S. in decades, we keep that agent on the list just in case (it's a bioterrorism related agent). New threats such as West Nile Virus were added in the 1990s, then in the early 2000s we added Severe Acute Respiratory Syndrome (or SARS for short), and most recently we see Chikungunya virus being included on this list as well. In the year since I first gave this presentation, we've seen a little known virus called Zika explode onto the world stage, and it too will soon be added to the list.

Path #42: Obviously I lifted this image straight out of the CHDS lecture because its message so closely mirrors what epidemiology is trying to balance with its reportable diseases (or what we learned were **Requirements** within the intelligence cycle). Careful planning matched with effective communication will help decide which diseases epidemiology will track, thus initiating the epidemiology cycle.

Path #43: In Step Two of the epidemiology cycle, we see that disease surveillance replaces **Collection**. There are basically two components of how public health (or epidemiology specifically) conduct surveillance of diseases: Passive Surveillance, and Active Surveillance.

Path #44: If we zoom in here on Passive Surveillance, we see that there is a subset of this called *Syndromic Surveillance*. The state's syndromic surveillance coordinator, Mr. Brian Parrish, asked that I include those two sub-bullets as a way to help you understand the primary intent behind this branch of passive surveillance. Basically syndromic surveillance provides situational awareness to us, and also provides enough early alert that "*something is going on*." We'll talk more about this is a few moments.

Path #45: So we once again look at passive and active surveillance, I differentiate them like this: basically passive surveillance provides us with a great quantity of epidemiological data, but those data may not be of great detail or quality. Active surveillance is basically the opposite of that, it does not provide us with a great quantity of epidemiological data, but the data it does provide are often of greater quality. These two forms of disease surveillance do not work independently of each other; rather they work in concert with each other.

Path #46: To help give you an idea of how passive surveillance is conducted within a state such as Nevada, here are some examples. Believe it or not, epidemiologists track in near real-time, the numbers of over-the-counter sales (aka: OTC sales) for specific kinds of medications. We can NOT see that person "A" purchased medication "B" from pharmacy "C" at time "D", etc.; but we can see there is a spike in OTC sales for anti diarrheal medications in north-west Reno, or southeast Las Vegas, etc. Although these data don't inform us of a specific agent, they do point us toward a potential problem. With the information we now have alerting us that something is going on, we can pick up the phone and call our sentinel providers (which will explain in a moment), to be on the lookout for patients complaining of gastrointestinal issues (or GI issues), if (and when) those medical providers see patients making those sort of complaints that they are on the lookout for. If they see this, then the medical providers can collect samples for laboratory analysis, which would then point us to a specific pathogen; for example, E. coli. That process is a great way of explaining how passive surveillance helps point the way for active surveillance. In addition to OTC sales, we also look at school absenteeism rates down to the school level, as well as reasons for 9-1-1 calls, and emergency department (or ED) admissions. Again, we can NOT see specifically whom (or whom) is sick, but we can see patterns in near real-time, and altogether these data point public health (and epidemiology specifically) toward potential problem areas. To help give you an idea of the data systems being used, I cite the National Electronic Disease Surveillance System (or NEDSS for short), which is fed by data provided through either electronic lab reports (or ELRs), or faxed lab reports, or morbidity reports.

There is also something called *Trisano* used in Las Vegas that makes great use of the ELRs and faxed reports, as well.

Path #47: Here is a screen shot of the Real-time Outbreak and Disease Surveillance system (or RODS) that is used to track OTC sales throughout our state. If you look closely at those graphs to the right, they are telling us in real time where OTC sales are tracking for remedies such as: anti-diarrheal medications, anti fever medications, bronchial remedies, chest rubs, and so on. You may notice that these medications are also broken down into adult and pediatric versions of those medications. RODS displays these graph data in two ways: un-promoted sales which means these meds are on shelves and people are just coming in to purchase them; and, promoted sales which means that the store is advertising lower prices for these medications (which could show up as a spike in sales because more shoppers are purchasing them because they're simply looking for a bargain) all of which could skew our data if we didn't know about it.

Path #48: Next we have this screen shot from the state's *BioSense2.0* system. That graph shown above depicts the number of visits according to Nevada's emergency departments (or EDs) where "Fever" is listed as the chief complaint. In this example, the data are listed throughout our state for the first day of each month, going back a full calendar year (but you could change that if you wanted to search for something else). Then down below, where we see the map of Nevada, counties colored in blue depict the percentage of ED visits for fever within each of those counties. The different colors indicate the percentages of people reporting to Nevada EDs complaining of fever, out of the number of total ED visits (numerator over denominator). The scale for these percentages is defined in the legend below the map, thus we get an accurate trend pattern analysis that is looking for the chief medical complaint of fever, etc. Although in this example we only see data for fever, the system allows us to look for other medical complaints as well; such as diarrhea, cough, etc.

Path #49: So now that you have an idea of what goes into passive surveillance, next we shall turn to active surveillance and explore some specific examples.

Path #50: We begin with Sentinel Surveillance, which I promised to cover a few moments ago. Since we cannot plug into every healthcare provider spread throughout our state, we instead collaborate with a *representative sample* of providers who agree to feed directly into the state's active surveillance system. For providers who do opt to become sentinel providers, they have their clinical samples sent to state public health laboratories; there's one in the north on the UNR campus, and there's one in Las Vegas near the UMC campus. A great example of an active disease surveillance system, that makes great use of sentinel providers, would be the influenza like illness (or ILI) net. For an example of active surveillance that comes to us from out-of-state, I have also listed the CDC's notifications from its Division of

Global Migration and Quarantine (or DGMQ for short). These alerts go to pre-designated public health officials within our state (at the state level and at the county level) of travelers coming to Nevada who are being monitored for various communicable diseases.

Path #51: Here's a screen shot of an online accessible report that you can find on the state health website under that Publications tab we looked at previously. In the graphs shown here, we see the number of various influenza sub-type strains being seen nationally, as well as here in Nevada: for Type-A Influenzas, and for Type-B Influenzas. These data are represented by calendar week, and go back one full calendar year, so we can see any patterns or trends. During seasonal influenza season, also known as late Fall to Spring, these weekly reports are diligently compiled and compared through the hard work of Mrs. Jennifer Thompson, here at the state OPHIE program.

Path #52: And if you are interested in more granular data from our counterparts at the local health authorities (LHAs), then I snipped this screen shot from a recent example of a weekly influenza surveillance program report, from one of our colleagues with the Washoe County Health District in Reno, Nevada. In this example we see that Mrs. Melissa Bullock is providing us with Washoe County-specific influenza data for Week #12, of the year 2015. In that color-coded graph, Melissa provides us with a snapshot of ILI amongst Washoe County's sentinel providers.

Path #53: Later in this same report, Melissa goes on to detail what specific sub-types of influenza type-A and influenza type-B viruses are circulating throughout Washoe County. Together these data provide us with a rather high resolution for how influenza viruses are trending within our state's second most populated county. I could go on with examples like this from Clark County, Carson City, etc., but I think you get my point.

Path #54: Next I have taken a screen shot of an example of one of those Epi-X notifications that came to my state e-mail account from the CDC's Division of Global Migration and Quarantine (DGMQ). In this example, we see that an international traveler arriving on Royal Air Morocco flight number 200 (as indicated by that acronym RAM), will be coming to Nevada after entering the U.S through one of the federal government's six designated Ebola screening airports. By clicking that hyperlink (as indicated by that blue arrow off to the left), I can then see this traveler's history, medical screening results, their date of birth, their Passport number (and country of origin), their cell phone number (or numbers), e-mails addresses, hotel name and address, etc. With that information at our fingertips, state and local epidemiologists can work together to ensure that this traveler is properly monitored throughout their stay here in Nevada. Although this screen shot is of an example related to Ebola, we see these types of reports for all sorts of other illnesses, for example: Tuberculosis.

Path #55: I like this metaphor that Professor Lahneman used so much, that I incorporated it into my slides as well. Just as the intelligence community struggles with the question of how much collected intelligence is too much, so how do we within the field of epidemiology wrestle with the same challenges: the *"Noise versus Signals"* conundrum. Together, passive surveillance and active surveillance act like a vacuum that picks up everything; but how can we tell when a low grade fever that is caused from a common cold is not the opening symptoms of an infection that is far more serious?

Path #56: Well in order to screen out all the background noise, from what we are actually looking for, epidemiologists turn to something called a *Case Definition*. When illnesses first begin to make themselves known to a person, they often begin with fever, body aches, runny nose, etc. However, how do we accurately discern which patient is sick with an illness that may have symptoms similar to other illnesses, versus the specific illness we need to find? We accomplish that by using case definition to filter out those other illnesses from the one we are actually looking for. In large scale outbreaks, such as the 2013 to 2016 Ebola outbreak, a nationally standardized case definition was posted to the CDC's website and often updated. For other more small scale outbreaks here at the county level or state level, etc., the lead epidemiologist will establish his/her own case definition, depending on what the science is telling him/her.

Path #57: Just as the intelligence community relies on its technical specialists to work in concert with its analysts and report writers, to help synthesize everyone's efforts into a cohesive intelligence product; so too do the clinical professionals need to work in concert with the public health laboratory, epidemiologists and biostatisticians, to synthesize their collective efforts into a cohesive epidemiology product. Once that product is prepared, it also needs to be effectively communicated to <u>both</u> public health leadership <u>and</u> to the public.

Path #58: Remember that slide that Dr. Lahneman used when he was discussing the two camps of thought when it comes to advocates of the '*Collect More'* versus advocates of the *'Collect Better'* intelligence? Remember the age old conundrum of *quantity versus quality*? Well finding the balance between enough raw epidemiology data, matched with generating enough processed epi information is an issue that challenges us here within epidemiology as well. If we are not careful, we could collect too many green flags, then we may be too buried to actually find the one red flag that we need to worry about.

Path #59: So once we have a solid case definition in-hand to help screen out the red flags from the green ones, next we conduct what is called an outbreak investigation.

Path #60: Once again there are strong parallels to what the intelligence cycle was doing versus that of the epidemiology cycle. So once more I'll be using the same sort of imagery that Dr. Lahneman used to such good effect for his CHDS intelligence course lecture.

Path #61: Just as intelligence analysts need to filter through mountains of data, we over here in epidemiology outbreak investigations also need to do the same. So we begin with case definition, and then follow-up with cases who fit that definition. For example, were you at restaurant "A" at time "B", and did you order meal "C", that sort of thing for a foodborne outbreak, etc. Over the course of the outbreak investigation, the team will go through many pieces of epidemiological information, for example: laboratory results, pattern of symptoms, contact with existing and/or confirmed cases, etc. They combine those into evaluated and summarized written reports. Once that is complete, then the finished epidemiology product can be shared, which you may recall, often means that they are published as open source information on the state health website under that *Publications* tab we looked at earlier.

Path #62: I recently had a conversation with the state's Medical Epidemiologist Dr. Ihsan Azzam, about the basic construct of an outbreak investigation. I liked how he boiled the focus of an investigation down to establishing these three important facts: an outbreak investigation must delineate which person (or persons) were ill, at what time they were ill, and what place they were ill. Together these data feed into something called an *'Epi Curve'* which you can learn about in that online accessible training course we looked at earlier on the state health website that was done by the state's former Chief Medical Officer: Dr. Tracey Green. In her course titled *"Epidemiology and Disease Surveillance"*, Dr. Green explains how Epi Curves are built, and how their shape helps to distinguish what sort of pathogen is involved in an outbreak investigation.

Path #63: Just as good intelligence must subscribe to these four basic principles, the same applies to good epidemiology. Once more I'll be borrowing from some of the imagery used by Dr. Lahneman to help make my point about parallels with epidemiology. In the top-left we see that good epidemiology must be <u>timely</u>. For example: how effective would we be if we consistently raised the alarm weeks or months after an outbreak subsided, etc. Then next in the top-right corner, we see that epidemiology must have a <u>clear sense of probability</u>. This is where the science of biostatistics comes into play, because biostatisticians often describe the weight (or value) of their calculations and estimates by using things such as Odds Ratios, Risk Ratios, and p-values. That same language is often incorporated into outbreak reports by epidemiologists. In the bottom-right corner we see that epidemiology reports must be <u>tailored</u> to our leadership, and to the public. This segues into that final principle in the bottom-left corner that tells of how epidemiology reports must be <u>useful and understandable</u>. This is something that public health (over the past decade

or so) has really taken to heart: making our reports useful to both the public, and to our leadership.

Path #64: Just as our counterparts within the IC work to avoid something called 'Group Think', the same applies to epidemiologists who collaborate to avoid the same potential flaw within their work. Whereas Professor Lahneman pointed toward the sixteen agencies within the intelligence community all looking at the same issue, here in Nevada we often see the state and county epidemiology teams working together to help reduce the risk of missing a key component within an outbreak. This model works well when we consider the fact that communicable diseases respect no borders between jurisdictions, nor do they respect any sort of class system; so what impacts one may impact all. What may be an issue in one county, could easily spread to other counties in short order (just turn to the 2014 outbreak of measles for a more current example).

Path #65: Once an outbreak investigation is completed, and the findings are compiled into a written report, then how do we report that to our many target audiences? In this slide I have added some bullet points about outbreak investigations here in Nevada that were published across a wide range of audiences. The on the Las Vegas Strip which went out through the CDC to an international audience because so many international tourists were in or near the identified restaurant at the corresponding time, etc., of that outbreak. Then next we see the Fallon cancer cluster which went to a national level audience, due to the fact that this was a rare case of a cancer cluster investigation being conducted while the cluster was happening in real-time, whereas most cancer cluster investigations are normally done years afterward. I've listed more bullets, but I think you get my point here.

Path #66: Just as we learned with the intelligence cycle, epidemiology is also trying to balance reporting too much versus too little, and so on, into our reports.

Path #67: And just as we saw with the CHDS lecture by Dr. Lahneman, when he summarized this point by explaining how this whole process must ensure that the right intelligence is provide to the right people at the right time, etc.; those same principles apply to epidemiology cycle as well.

Path #68: Epi reports must achieve the same type of goal: get the right epidemiology to the right people, at the right time; which is the sum of the whole epidemiology cycle as well.

Path #69: However, therein lies the challenge of relevancy. Just because we succeeded in putting the right epi report into the hands of the right person (or persons), at the right time; does NOT necessarily mean that they will act upon the epidemiological information within the report. People have their own biases, their own opinions and no matter how sound the science may be within our epi reports, this does not mean that our recommendations

may (or will) be acted upon. Look at how many decades it took for Americans to finally click their seatbelts, or how long it took before we saw an appreciable reduction in the number of people who smoke cigarettes, etc. Even though the science reported for those issues was sound, it still took decades before our target audiences '*came around*.'

Path #70: We end the epidemiology cycle in much the same way as Dr. Lahneman ended his lecture, by looking at how feedback is used to refine and improve the cycle; or as I've translated here, though outbreak summaries and/or after action reports (AARs). Once an epi report product is submitted, we get feedback from both our public health leaders and/or the public of what they would like to see more of, and what they would like to see less of. That information is fed back into the cycle and applied to the next set of public health issues or problems that warrant the epidemiology cycle to begin anew.

Path #71: So now that we have looked at these two separate disciplines side-by-side, and compared them to each other by using that CHDS lecture by Professor Lahneman to establish a common method, we arrive at the conclusion of today's presentation.

Path #72: And that key learning objective (to everything that I've covered in this online presentation) revolves around the fact that although these two disciplines may serve different needs, they function with many similar processes, and generate similar products to their respective target audiences. As graduates from the Naval Postgraduate School's Center for Homeland Defense and Security, Brigadier General Burkett and I intended for this presentation to hopefully help bridge the gap between the intelligence community here in Nevada, with state and local efforts involving the epidemiology community here in Nevada. As different as these two communities may (at first) appear to be, if we've done our job with today's presentation, then hopefully you have learned how we have more in common with each other than we do dividing each other.

Path #73: Ok, so if you have any comments, questions or concerns on what I covered today, please do not hesitate to contact me at any of these points-of-contact that are listed here.

Path #74: That concludes this online presentation on the *Intelligence Cycle and the Epidemiology Cycle: Parallels in Process and Product*. On behalf of Brigadier General Burkett of the Nevada National Guard, and the leadership team with the Nevada Division of Public and Behavioral Health, I would like to thank each one of you for taking the time out of your busy schedule to watch and listen to today's presentation. We appreciate all the hard work that you and your colleagues do, to keep both Nevada's citizens and its visitors safe on a daily basis. Thank you!