NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

ASSESSING THE ESSENCE BIOSURVEILLANCE SYSTEM: RESULTS OF A USER SURVEY

by

Randi M. Korman

March 2011

Thesis Advisor: Ron Fricker
Second Reader: James Eagle

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** March 2011	**3. REPORT TYPE AND DATES COVERED** Master's Thesis	
4. TITLE AND SUBTITLE: Assessing the ESSENCE Biosurveillance System: Results of a User Survey		**5. FUNDING NUMBERS**	
6. AUTHOR(S) Randi M. Korman			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000		**8. PERFORMING ORGANIZATION REPORT NUMBER**	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A		**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number NPS.2011.0001-IR-EP7-A.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited		**12b. DISTRIBUTION CODE**	

13. ABSTRACT

The Navy and Marine Corps use the ESSENCE system for early detection of diseases and other public health threats to the force and for situational awareness on the location and spread of such diseases. In accordance with BUMEDINST 6220.12B, the NMCPHC sponsored a survey to better understand ESSENCE account holders' training on the system, employment of the system, and their perceived value of the system.

The survey was sent to 225 Navy and Marine Crops users with either an active or a disabled ESSENCE account. Ultimately, 143 of the users responded to the survey for a 64 percent response rate.

Survey findings conclude that, overall, nine out of 10 ESSENCE account holders, past and present, favor using the system, find it valuable, and believe the training they received has been adequate. However, users raised four issues: 1) it takes an excessive amount of time to obtain an account, 2) passwords are required to be changed too often, 3) there are too many miscodings leading to excessive false positive signals, and 4) training and training tools are insufficient.

14. SUBJECT TERMS Biosurveillance, ESSENCE, NMPHC, Surveillance System, Survey			**15. NUMBER OF PAGES** 152
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

ASSESSING THE ESSENCE BIOSURVEILLANCE SYSTEM: RESULTS OF A USER SURVEY

Randi M. Korman
Lieutenant, United States Navy
B.A., Boston University, 2002

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN OPERATIONS RESEARCH

from the

NAVAL POSTGRADUATE SCHOOL
March 2011

Author: Randi M. Korman

Approved by: R. D. Fricker, Jr.
Thesis Advisor

James Eagle
Second Reader

Robert Dell
Chair, Department of Operations Research

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

The Navy and Marine Corps use the ESSENCE system for early detection of diseases and other public health threats to the force and for situational awareness on the location and spread of such diseases. In accordance with BUMEDINST 6220.12B, the NMCPHC sponsored a survey to better understand ESSENCE account holders' training on the system, employment of the system, and their perceived value of the system.

The survey was sent to 225 Navy and Marine Crops users with either an active or a disabled ESSENCE account. Ultimately, 143 of the users responded to the survey for a 64 percent response rate.

Survey findings conclude that, overall, nine out of 10 ESSENCE account holders, past and present, favor using the system, find it valuable, and believe the training they received has been adequate. However, users raised four issues: 1) it takes an excessive amount of time to obtain an account, 2) passwords are required to be changed too often, 3) there are too many miscodings, leading to excessive false positive signals, and 4) training and training tools are insufficient.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

AFHSC	Armed Forces Health Surveillance Center
AHLTA	Armed Forces Health Longitudinal Technology Application
BUMED	The Navy Bureau of Medicine and Surgery
BUMEDINST	The Navy Bureau of Medicine and Surgery Instruction
CDC	Center for Disease Control
CHCS	Composite Health Care System
DoD-GEIS	Department of Defense Global Emerging Infections Surveillance and Response System
EARS	Early Aberration Reporting System
EED	Early Event Detection
ESSENCE	Electronic Surveillance System for the Early Notification of Community-Based Epidemics
FHP	Force Health Protection
ICD	International Classification of Diseases
ILI	Influenza-Like-Illness
IRB	Institutional Review Board
ISDS	International Society of Disease Surveillance
JHU/APL	Johns Hopkins University Applied Physics Laboratory
MHS	Military Health System
MTF	Military Treatment Facility
NCR	National Capital Region
NDRSi	Navy Disease Reporting System Internet
NEDSS	National Electronic Disease Surveillance System
NEPMU	Navy Environmental & Preventive Medicine Unit
NH	Naval Hospital
NMC	Naval Medical Center
NMCPHC	The Navy and Marine Corps Public Health Center
NPS	Naval Postgraduate School
OPNAV	Office of the Chief of Naval Operations
OST	Office of Science and Technology

PHI	Personal Health Information
PI	Principle Investigator
PII	Personal Identifying Information
RCS	Report Control Symbol
SA	Situational Awareness
STBL	System Technology Battle Laboratory
U.S.	United States
USG	United States Government

EXECUTIVE SUMMARY

The Navy and Marine Corps use the ESSENCE system for early event detection of diseases and other public health threats to the United States military and for situational awareness on the location and spread of such diseases. BUMEDINST 6220.12B mandated that "health surveillance shall be conducted to enable early intervention and control strategies." Navy ESSENCE monitors are health professionals, including preventive medicine technicians, doctors, nurses, public health professionals, and epidemiologists.

In accordance with the Navy Bureau of Medicine and Surgery (BUMED) mandate, the Navy and Marine Corps Public Health Center (NMCPHC) sponsored a survey of Navy and Marine Corps ESSENCE account holders about their training, employment, and perceived value of the system. This survey differs from previous ESSENCE surveys in a number of important ways. First, it is a survey only of Navy and Marine Corps ESSENCE users. Hence, it is targeted at only those users of interest to NMCPHC, and it focuses on their unique Navy/Marine Corps perspectives and issues. Second, the survey was sent to all existing and known former Navy and Marine Corps users. It targeted all users, not just those who have the resources and ability to attend professional conferences (such as International Society of Disease Surveillance (ISDS)). Thus, it was intended to garner feedback from the full range of Navy and Marine Corps ESSENCE account holders. Third, it focused on areas of particular interest to NMCPHC: how the Navy and Marine Corps monitors used the ESSENCE system, what their perceived value of the system is, and what training they would like to see in the future.

The survey was sent to 225 Navy and Marine Crops users with either an active or a disabled ESSENCE account. Ultimately, 143 of the users responded to the survey for a 64 percent response rate. Survey findings include that, overall, nine out of 10 ESSENCE account holders, past and present, favor using the system, find it valuable, and believe the training they received has been adequate. However, users raised four issues: 1) it takes

an excessive amount of time to obtain an account, 2) passwords are required to be changed too often, 3) there are too many miscodings, leading to excessive false positive signals, and 4) training and training tools are insufficient.

ACKNOWLEDGMENTS

First and foremost, I would like to thank Dr. Ron Fricker. After taking a seminar course involving biosurveillance, I knew that I wanted to work with him on an aspect of this topic. Your dedication to this field of research inspired me to pursue this area myself and assist you in obtaining points of contact for future studies and research. Dr. Fricker, your dedication, mentorship, and above all else, your patience will never be forgotten. It was an honor to be one of your thesis students.

Secondly, I would like to thank Asha Riegodedios for allowing me to work with her on behalf of the Navy and Marine Corps Public Health Center. It was a privilege to work with you. I greatly appreciate the time you have taken to meet with me and speak with me over the phone on numerous occasions to develop the best survey instrument possible. I am confident that you will enjoy reading this document and I hope it answers the questions you and the NMCPHC were seeking.

Eve Zentrich, thank you. I appreciate all the time you have taken out of your busy schedule to read draft chapters for system accuracy and professionalism.

To all the individuals I met with in June/July: Thank You! The time you spent with me was immeasurable and allowed me to write a survey that was honest and true to all ESSENCE account holders.

Finally, I would like to thank Joshua. You are my rock.

THIS PAGE INTENTIONALLY LEFT BLANK

I. BIOSURVEILLANCE AND ESSENCE

After the attacks on 9/11, the United States (U.S.) government sought out ways to protect the nation from future terrorist attacks. One form of a potentially very deadly attack is bioterrorism. These attacks can be in the form of biological weapons, perhaps consisting of an infectious disease or diseases dispersed throughout the country, with the goal of infecting the population and killing members of our society. Examples of bioterrorism agents include anthrax, botulism, and epsilon toxin, to name a few. Details of these agents and other virulent naturally occurring diseases are listed on the Centers for Disease Control and Prevention's (CDC) Website: http://www.bt.cdc.gov/agent/agentlist.asp. To help protect the country against, and mitigate the effects of, a bioterrorist attack, federal, state, and local agencies conduct biosurveillance.

A. WHAT IS BIOSURVEILLANCE?

In October 2007, President George W. Bush issued Homeland Security Presidential Directive 21 (HSPD-21, 2007). It defines *biosurveillance* as

> the process of active data-gathering with appropriate analysis and interpretation of biosphere data that might relate to disease activity and threats to human or animal health—whether infectious, toxic, metabolic, or otherwise, and regardless of intentional or natural origin—in order to achieve early warning of health threats, early detection of health events, and overall situational awareness of disease activity. (HSPD-21, 2007)

One part of biosurveillance, *syndromic surveillance,* "is the surveillance of health-related data that precedes diagnosis to detect a disease outbreak or other health related event that warrants a public response" (Kleiner et al., 2008). Under the umbrella of biosurveillance, syndromic surveillance is intended to provide early event detection of an illness or attack before any particular individual has actually been diagnosed with the specific illness or attack agent. It is also intended to provide situational awareness of the location and spread of the illness or agent so that public health and medical professionals can localize and treat the affected population or community.

In 2003, agencies, such as the CDC and state and local health departments, were estimated to have approximately 100 sites throughout the country that utilize a syndromic surveillance system (Buehler et al., 2003, p. 1197).

> The goal of these systems is to enable earlier detection of epidemics and a more timely public health response, hours or days before disease clusters are recognized clinically, or before specific diagnoses are made and reported to public health authorities. (Buehler et al., 2003, p. 1197)

In order for early event detection to occur, a syndromic surveillance or biosurveillance systems had to be created. On the other hand, a year later, Dena Bravata, MD and other authors synthesized numerous articles and concluded,

> Few surveillance systems have been specifically designed for collecting and analyzing data for the early detection of a bioterrorist event. Because current evaluations of surveillance systems for detecting bioterrorism and emerging infections are insufficient to characterize the timeliness or sensitivity and specificity, clinical and public health decision making based on these systems may be compromised. (Bravata et al., 2004, p. 917)

However, in 2008, Buehler and his team conducted a survey of public health practitioners in which over two-thirds of the survey respondents indicated that they would expand their use of syndromic surveillance within the next two years (Buehler, 2008).

B. THE EARLY NOTIFICATION OF COMMUNITY-BASED EPIDEMICS (ESSENCE) SYSTEM

A number of systems have been produced that are used at the federal, state and local levels. These include the Early Aberration Reporting System (EARS), BioSense, The National Electronic Disease Surveillance System (NEDSS) and the Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE). Various federal, state and local health departments operate and monitor these systems; however, ESSENCE is the only system used by the Department of Defense (DoD).

EARS: “Various city, county, and state public health officials in the United States and abroad currently use EARS on syndromic data from emergency departments, reportable conditions, 911 calls, physician office data, school and business absenteeism, and over-the-counter drug sales. EARS is convenient, easy to use, and available at no cost.” (CDCb, 2010)

BioSense: “In FY 2010, CDC started redesigning the BioSense program based on input and guidance from our local, state, and federal partners. The goal of the redesign effort is to be able to provide nationwide and regional situational awareness for all-hazard health-related threats (beyond bioterrorism) and to support national, state, and local responses to those threats. By integrating local and state-level information, CDC will provide a timely and cohesive picture at the regional (i.e., multistate) and national levels and improve BioSense's utility.” (CDCa, 2010)

NEDSS: “is an initiative that promotes the use of data and information system standards to advance the development of efficient, integrated, and interoperable surveillance systems at federal, state and local levels. The vision of NEDSS is to have integrated surveillance systems that can transfer appropriate public health, laboratory, and clinical data efficiently and securely over the Internet. NEDSS will revolutionize public health by gathering and analyzing information quickly and accurately. This will help to improve the nation's ability to identify and track emerging infectious diseases and potential bioterrorism attacks, as well as to investigate outbreaks and monitor disease trends.” (CDC)

1. The History of ESSENCE

On June 12, 1996, the Clinton Administration released a fact sheet via the White House Office of Science and Technology (OST) stating that

> the National Science and Technology Council [had] determined that the national and international system of infectious disease surveillance, prevention, and response is inadequate to protect the health of U.S. citizens. (OST Policy, 1996)

As described in the fact sheet, the administration's goals were to:

1. “Strengthen the domestic infectious disease surveillance and response system, both at the Federal, State, and local levels and at ports of entry into the United States, in cooperation with the private sector and with public health and medical communities,”

2. “Establish a global infectious disease surveillance and response system, based on regional hubs and linked by modern communications,” and

3. "Expand missions and establish the authority of relevant United States Government agencies to contribute to a worldwide infectious disease surveillance, prevention, and response network." (OST Policy, 1996)

It further stated that the United States Government (USG) roles and responsibilities were to "enhance the surveillance and response components of our domestic and international public health infrastructure [by] strengthen[ing the] federal and state laboratory and epidemiological response capabilities. The CDC will coordinate federal government efforts to strengthen federal, state and local health department[s'] surveillance and response capabilities" (OST Policy, 1996).

Following OST's direction, the Department of Defense created the DoD Global Emerging Infections Surveillance and Response System (DoD-GEIS) in 1997. With a focus on global health surveillance, the DoD-GEIS began with laboratories in countries, such as Peru, Indonesia, Egypt, Thailand, and Kenya (Sueker, 2010). A sponsored program of the DoD-GEIS oversees the Global Influenza Surveillance Program and ESSENCE syndromic surveillance system. "ESSENCE had been [a] developmental program for syndromic surveillance using data from the National Capital Area, but following the events of September 11, 2001, ESSENCE began receiving data from all military medical facilities in DoD" (MacIntosh, 2004). Thus, the first implementation of ESSENCE, ESSENCE I, gathered information from "military personnel and their dependents at all military treatment facilities by using ambulatory records generated for TriCare, the military's health-care system" (Lombardo, 2004).

The next variant, "ESSENCE II was a regional system that supported advanced surveillance within the National Capital Region (NCR) test bed. The system [was] developed by the Johns Hopkins University Applied Physics Laboratory (JHU/APL) in collaboration with the Maryland Department of Health and Mental Hygiene, the District of Columbia Department of Health, and the Virginia Department of Health" (Lombardo, 2004). The DoD-GEIS and JHU/APL also collaborated on creating and updating subsequent variants of the ESSENCE syndromic surveillance system. Primarily, their work focused on the algorithms necessary for the system to detect syndromic groupings before an epidemic has matured into a health catastrophe. What the developers of the

system accomplished was to allow "ESSENCE [to] capture data in multiple formats, parses text strings into syndrome groupings, and applies multiple temporal and spatio-temporal outbreak-detection algorithms. [In a] DARPA evaluation exercise, ESSENCE algorithms detected a set of health events with a median delay of 1 day after the earliest possible detection opportunity" (Lombardo, 2004).

The newest installment of the syndromic surveillance system, ESSENCE IV, is currently under test evaluations and is expected to come online within the next few years.

2. Why Does the DoD and the U.S. Navy Use ESSENCE?

Although civilian health departments use biosurveillance systems, the DoD has also made their use mandatory as well. In 1997, DoD Directive 6490.2—Joint Medical Surveillance, "establishes policy and assigns responsibility for routine joint medical surveillance of all Military Service members during active Federal service, especially military deployments." Then, in 2004, DoD Directive 62004—Force Health Protection (FHP), "assigns responsibility for implementing FHP measures, on behalf of all Military Service members during active and Reserve military service, encompassing the full spectrum of mission, responsibilities, and actions of the DoD Components in establishing, sustaining, restoring, and improving the health of their forces." The August 24, 2009, DoD Directive 6490.2E incorporating change 1, originally written in October 2004, states that "the DoD components shall conduct comprehensive, continuous, and consistent military health surveillance to implement early intervention and control strategies, using joint technologies, practices, and procedures in a manner consistent across the military services. Relevant, timely, actionable, comprehensive health surveillance information shall be collected and maintained to support the Armed Forces." Following this guidance in 2009, the U.S. Navy and the Navy Bureau of Medicine and Surgery (BUMED) mandated that the "monitoring of ESSENCE alerts applies to all Navy medical treatment facilities (MTFs). Health surveillance shall be conducted to enable early intervention and control strategies. Monitoring for and timely reporting of

significant health events that may adversely affect mission accomplishment and shape the commander's decision making is vital military medicine functions" (BUMEDINST 6220.12B 2009).

3. How Does the ESSENCE System Work and Who Uses It?

The military treatments facilities that use the ESSENCE system capture data from the military health system (MHS), which includes outpatient clinical visits, pharmacy transactions, and laboratory orders. The ESSENCE system then organizes the ICD-9 (International Classification of Diseases 9th Edition) codes[1] input by the doctor, nurse, laboratory technician, or other health professionals, and analyzes and sorts the data into syndromic types that an operator of the system can view. Via the use of statistical algorithms, the system seeks to identify emerging or re-emerging infectious diseases that pose a substantial risk to a commander's mission or the U.S. Navy's mission. The algorithms are intended to allow the user to see increases and decreases in a particular syndrome so they can monitor its activity in their region.

Again, the ESSENCE system is used for Early Event Detection (EED) and location situational awareness (SA). The CDC definition of *EED* is "the ability to detect, at the earliest possible time, events that may signal a public health emergency. EED is comprised of case and suspect case reporting along with statistical analysis of health-related data. Both real-time streaming of data from clinical care facilities, as well as batched data with a short time delay are used to support EED efforts" (CDC, 2008). The definition of *situational awareness* is "the ability to utilize detailed, real-time health data to confirm, refute and to provide an effective response to the existence of an outbreak. It also is used to monitor an outbreaks magnitude, geography, rate of change and life cycle" (CDC, 2008).

Although these terms are similar in definition, they actually provide the monitor with two mechanisms towards understanding how and why the ESSENCE program was

[1] ICD-9 clinical modification codes are defined as "a standardized classification of disease, injuries, and causes of death, by etiology and anatomic localization and codified into a 6-digit number, which allows clinicians, statisticians, politicians, health planners and others to speak a common language, both US and internationally" (The Free Dictionary, 2010).

developed and how to use it properly. EED allows the user to find communicable diseases that are on the rise in their area prior to a doctor diagnosing the event. Because an account holder is able to monitor multiple military treatment facilities at one time, it is possible to observe increases using tools, such as a time-series graph (which will be explained below) and alert status received from the ESSENCE system itself. Situational awareness, on the other hand, gives the monitor the ability to observe multiple MTFs and to understand which already diagnosed illnesses are on the rise and continue to rise, as well as be able to monitor the patients that enter the MTFs via city, state, region, and country.

The Navy ESSENCE monitors are health professionals, including preventive medicine technicians, doctors, nurses, public health professionals, and epidemiologists. The agencies that monitor ESSENCE are the preventive medicine and public health departments of the Navy throughout the world. They are comprised of naval clinics, naval hospitals, and naval medical centers. The Navy Environment Preventive Medicine Units (NEPMU), which are located in San Diego, California, Pearl Harbor, Hawaii, and Norfolk, Virginia, also monitor disease activity using ESSENCE. Finally, the Navy and Marine Corps Public Health Center (NMCPHC) oversees patient syndromic surveillance throughout the Navy as mandated by the BUMEDINST 6220.12B.

C. WHY SURVEY ESSENCE ACCOUNT HOLDERS?

In accordance with their BUMED mandate, the NMCPHC wants to better understand how ESSENCE is being used by surveying Navy and Marine Corps ESSENCE account holders about their training, employment, and perceived value of the system. For example, NMCPHC has noticed that some installations that are supposed to be viewing and using the ESSENCE system on a daily basis are not. Thus, they want to understand the reason why this phenomenon is occurring. In addition, the NMCPHC has little information about whether their users understand how to use the system effectively and efficiently or whether users think the system is providing them with the proper

information they need. Furthermore, the NMCPHC is interested in monitors' training and usage habits of biosurveillance and/or syndromic surveillance.

1. Related Research

In 2007–2008, the International Society for Disease Surveillance (ISDS) and the CDC sponsored a survey of 59 state, territorial, and selected large local jurisdictions in the United States regarding their use of syndromic surveillance. The survey defined syndromic surveillance as systems with all of the following characteristics:

- surveillance for human health-related events or outcomes;
- surveillance for the purpose of early event detection or situational awareness;
- ongoing surveillance as opposed to time-limited, 'drop-in' surveillance around specific high-profile events; and,
- surveillance systems not established primarily to support notifiable disease reporting (Buehler et al., 2008).

The ISDS survey was e-mailed to respondents and telephone notifications made. A remarkably high response rate of 88 percent was achieved, and the responding jurisdictions accounted for 94 percent of the U.S. population. Eighty-three percent of respondents "reported conducting syndromic surveillance for a median of 3.3 years. Emergency data visits were [a] commonly reported information source (84 percent). Seventy-two percent reported reviewing the data from participating hospitals at least daily" (Buehler, 2008). Ninety-three percent reported that syndromic surveillance was "highly useful or somewhat useful" for "monitoring influenza" (Buehler, 2008).

Moreover, syndromic surveillance was concluded to be more useful when tracking and ILI and other larger communicable diseases rather than smaller or rarer diseases. Over two-thirds of the respondents indicated that they would expand their use of syndromic surveillance within the next two years (Buehler, 2008). Buehler and his team of researchers deduced that syndromic surveillance would continue to expand and that it is important to provide future users training and lessons learned on how to monitor their systems correctly.

The Johns Hopkins Applied Physics Laboratory (JHU/APL) conducted another survey in 2009 on behalf of the Armed Forces Health Surveillance Center (AFHSC). Their objective was to "examine the strengths and weaknesses of the current ESSENCE system, by capturing feedback from current DoD ESSENCE users" (JHU/APL, 2009). JHU/APL developed a survey, which they entitled the "DoD ESSENCE User Feedback Tool" and the AFHSC sponsored a workshop during the 2009 Force Health Protection Conference. Thirty-one DoD ESSENCE users participated in the workshop and 17 DoD ESSENCE users responded to their survey. Although the number of monitors was low, they were able to obtain worthy and significant feedback because those who did participate voiced their concerns honestly and openly (JHU/APL, 2009). JHU/APL concluded that the most important issue for ESSENCE is a "need for user training both in how and when to use the functions available in the tool, as well as how to interpret the resulting system displays." They further concluded that the "second most raised issue, with regard to the currently deployed system, was the impact that incorrectly coded information, as well as delays in the coding information has on both the timeless and usefulness of the information displayed and the resulting alters generated by the system" (JHU/APL, 2009).

2. How Is This Survey Different?

This survey, conducted on behalf of the NMCPHC, differs from the JHU/APL survey in a number of important ways. First, only Navy and Marine Corps ESSENCE users were surveyed. Hence, it targeted only those users of interest to NMCPHC and focused on their unique Navy/Marine Corps perspectives and issues. Second, the survey was sent to all existing and known former Navy and Marine Corps users, 225 in all. Therefore, it targeted all users, and not just those with the resources and ability to attend professional conferences, such as ISDS. Thus, it was intended to garner feedback from the full range of Navy and Marine Corps ESSENCE users. Third, it focused on areas of particular interest to NMCPHC: how the Navy and Marine Corps monitors used the ESSENCE system, what their perceived value of the system was, and what training they would like to see in the future.

D. ORGANIZATION OF THIS THESIS

This thesis in organized as follows. Chapter II describes the background research and how the survey instrument was designed. Chapter III describes the survey approval process, how the survey was pretested and fielded, and the survey response rate. Chapter IV presents the survey results. Finally, Chapter V summarizes the findings and provides recommendations for steps the NMCPHC can take towards improving the ESSENCE system.

II. SURVEY DESIGN

This chapter discusses my background research and how the survey instrument was designed. See Appendix A for a copy of the survey instrument.

A. BACKGROUND RESEARCH

To understand fully how monitors utilize the system, I traveled to several MTFs around the country. In Portsmouth, Virginia, I spoke to the (former) ESSENCE Program Officer, who demonstrated the functionalities of the program, such as the alert list, the reportable and syndromic queries, site selections, and the alert e-mails. Moreover, instruction was given on how a monitor should use the system effectively to define syndromes to detect a particular disease early in its maturity and also for the situational awareness of a disease as well. She also identified how miscoded ICD-9's force the monitor to investigate outside sources, such as the Composite Health Care System (CHCS) and Armed Forces Health Longitudinal Technology Application (AHLTA), to discern the proper identifying code for the patient and assess if it contributes to an increase in a communicable disease in a specific area.

Following the visit to Virginia, I created a questionnaire to ask the monitors particular questions during future visits. The questionnaire was comprised of desired responses from my sponsor and questions I knew would help me understand what a monitor does on a daily basis and what can be modified for future ESSENCE use.

I then met with monitors at NEPMU-5, the Naval Hospital (NH) Camp Pendleton, and the Naval Medical Center (NMC) San Diego. First, I began by speaking with the regional monitor at NEPMU-5 and learned that regional monitors use a wider site selection criterion to track the communicable diseases on the rise in their region. The regional monitor stated that the role of a regional monitor is different from local monitors. She does not investigate alerts; however, she does oversee that her region's monitors are accurately investigating alerts and reporting outbreaks up their chain of command.

Next, I visited local monitors from the NH Camp Pendleton and from the NMC San Diego. My last visit was to Jacksonville, Florida, where I met with my sponsor, Mrs. Asha Riegodedios at the NMCPHC. Before the meeting, I spoke on the phone with two local monitors from Naval Air Station Pensacola, Florida. The local MTF users provided similar types of feedback. They also solidified my understanding of how a local sponsor works ESSENCE into their daily routine and what drives them to investigate alerts and the methods used to conduct the investigations. An important note from these monitors is that they were only taught a small amount of what biosurveillance is in C-school, and thus, had to learn the capabilities and functionalities of the system via hands-on training. The one of the most crucial take-aways I received from these users was that they spend a lot of time investigating alerts in ESSENCE by using CHCS and AHLTA. They are required to confirm that an alert is real and if the trend in that particular communicable disease is on the rise.

However, when asked if the various users had ever identified an outbreak by monitoring ESSENCE alerts, half said they did and half said they did not. Those who did identify outbreaks said that this was the very reason they valued the program. By digging through the data details to specify site selections, date intervals, and syndromes, and coordinating their efforts tracking patient history in ALTHA, they could track where the outbreak originated. The value the local MTF monitors have for ESSENCE also varied. A few indicated that it provides excellent situational awareness as a means of detecting rises in communicable diseases. ESSENCE provides them an "X" that marks the spot and through ALTHA and CHCS, they are able to dig down through the data to discover if an actual outbreak is occurring in their community.

On the other hand, some believed the system has tremendous value, but at times alerts appear when they should not, due to either miscodings or routine work done by doctors in a particular hospital specializing in a certain disease. Also, the system considers the days that the hospital or clinic is closed as zero visits that day, which is inaccurate and drives the running average down over the "14-day period, making it problematic as it should be longer for a more accurate baseline."

After speaking with and discussing the system with actual monitors, I concluded that there *are* varied opinions about the utility and value of the ESSENCE program, and therefore, these aspects must be looked addressed in the survey. In particular, how many ESSENCE monitors have these same opinions and how many monitors hold differing opinions? This then became the heart of the research. My meeting with Mrs. Riegodedios consisted of discussing these particular comments that the monitors said about their use and value of the system, and what changes they would like to make. It was then possible to compile a few notes and specific topics that the survey needed to be addressed by the survey.

B. SURVEY INSTRUMENT DESIGN

1. Specifying the Survey Objective

In her paper, "Fundamental of Survey Research Methodology, Priscilla Glasow writes, "survey instrument development must be preceded by certain prerequisites. First, the focus of the study must be carefully defined. Second, the study objectives must be translated into measurable factors that contribute to that focus" (Glasow, 2005, pp. 2–5). It follows that writing the objective of ones' survey first helps to outline the layout and flow of the survey.

Therefore, after I had completed the research travel, I had some idea of what ESSENCE monitors' day-to-day experiences were, of what their training might or might not be comprised of, and what they believed the ESSENCE system provided them. Given this information, and considering the information my sponsor wanted to learn from the survey, as well as what I thought the survey should include, I specified three main survey foci: usage, value, and training. Thus, the survey objective became the following: to assess ESSENCE account holder's usage of, perceived value of, and training of the system.

2. Designing the Survey Instrument

Given the objective, I then began drafting the survey questions. Initially many of the questions were overly wordy, sometimes less than completely coherent, and the

question structures and formats were mixed around. For instance, the questions that pertained to value were preceded by the following: Do you agree or disagree with the following statements regarding the ESSENCE program? This question was subsequently modified because it only allowed a binary response and thereby limited the amount of information a respondent could convey about the system's value. In the final version of the survey, the question read: How much do you agree or disagree with the following statements regarding the ESSENCE program? The subtle difference is in the format of the question, where the final survey allows the respondent to answer naturally on a 5-point Likert scale.

Given a set of draft questions, Professor Don Dillman, a leading expert on survey methodology, says that effort should be "made to order questions in a way that will be logical to the respondent" (Dillman et al. 2008, p. 88). In the first design of the survey, the question structure was found to be confusing to respondents and did not flow properly. Also, the format of the questions that would allow me to assess monitor usage was disheveled and lacked a chronological ordering. For instance, questions about time-series graphs and queries were hidden within the middle of the survey, rather than arranged in the order that respondents found most natural: alert e-mails, queries, investigations, and then data details. The use of time-series graphs, in my opinion, is better asked under the category of perceived value because it has the potential to assist the monitor in identifying outbreaks, and thus, providing situational awareness advertised by the proponents of syndromic surveillance. However, shifting the questions around so they occur in the natural ordering as if someone where to log into ESSENCE and conduct their daily alert and query check, helped guide the respondent in remembering how they use ESSENCE.

Finally, I gave some thought about how to start the survey. As Professor Dillman states, "choose the first question carefully" (Dillman et al., 2008, p. 92). He continues by saying that it should be "easy," "interesting," and "apply to everyone" (Dillman et al., 2008, p. 92). The first question does just that: "On average, how often do you log into

ESSENCE?" From this first question, the survey then flowed through five major categories of questions: monitor usage, perceived value, user training, use of the system, and demographics. The following subsections describe each of these question categories.

a. Assessing Monitor Usage

The background research I gained through traveling and speaking with different monitors throughout the country provided insight as to how this section of the survey must be developed. Understanding their log-in habits and module usage contributed towards assessing monitor usage. For instance, the survey begins with the following question: "On average, how often do you log into ESSENCE?" This first question draws the participant into the survey, it is easy to answer, and it begins with logging into the program. The next set of questions asks the monitors whether they receive e-mail alerts from ESSENCE and if so, if that is the reason they are logging in. The next set of questions ask monitors if they use the alert list, reportable diseases, and syndromic query modules and what they functionalities they use and why they perform them while conducting surveillance and SA in those modules. In the last part of this section, questions were asked to gauge which users investigate alerts and if so, how many use ESSENCE to investigate those alerts and what site selections, data details, external tools, and recording methods do they use. Next, in this section, the survey strives to elicit how monitors use the different modules to view disease activity. The three different modules are the alert list, the reportable diseases query, and the syndromic query.

The goal of this section is to help the NMCPHC understand the usage patterns of the monitor and ascertain how they utilize the different functionalities of the system during their logged in time. Since the alert identifies what syndromic diseases have increased in a particular area, or site selection, then it can be understood if the user wants to see the general disease count in that area. The alert list is perfect for EED queries within a health department. A syndromic query allows the user to view specific diseases within a certain date range and location. By specifying a particular syndrome, for instance the influenza-like-illness (ILI) syndrome, the monitor can visually look at the syndrome's increased and decreased daily count over time for situational awareness

purposes. If the commander of a Naval Medical Center wanted to know when to begin administering flu shots, the preventive medicine technician would need to download the time-series table for the syndrome for their hospital and look at the when the flu increased in outpatient care to give with certainty when the next epidemic of the flu might occur this year. Using past history is a useful way for any MTF to gain SA within their area. Lastly, the reportable diseases query allows the Navy monitor to collaborate with their fellow Navy Disease Reporting System Internet (NDRSi)[2] account holder. This allows the two individuals to confirm that the 24-hour reportable diseases, as well as the diseases that must be reported within 30 days, have been sent up their chain of command via the NDRSi system.

Finally, comprehending who investigates alerts provided the data essential to understanding which monitors' spend time navigating through the program and assessing true outbreak detection or false positives. The question that needs to be asked here is if ESSENCE is used to provide their chain of command with outbreak information or EED information and SA.

It is possible to correlate many of these questions with the demographics of the participants to understand which rank and professional background/position access a particular module. For instance: do preventive medicine technicians, who are on average mid-grade enlisted personnel, regularly use the program compared to, say, a high-ranking officer, such as the commander of the preventive medicine? Furthermore, answers to questions, such as are users with advanced training through the use of ESSENCE rather than those with graduate degrees understand the nuances of the system better and comprehend the backbone of the system better? It is also important to discover what the daily users would like to see changed within the program so that their time spent logged into ESSENCE is efficient and effective.

[2] As per BUMED INST 6220.12B, Medical Event Reporting (MERs) are "required for select diseases and injuries due to their potential to compromise operational readiness, present hazards to the military or civilian community, result in quarantine, or generate inquires to the Chief, BUMED." The preferred method for MER submittal is by using the Web-based NDRSi system.

b. Assessing Perceived Value

Respondents' perceived value of the ESSENCE system is difficult to assess via questions in a survey. If the surveyor asks the respondents outright if they value the system, the response may be different than asking them an array of questions that represent what the system should be doing for the user and if it is providing them with the results for which it was originally intended. As mentioned before, ESSENCE account holders' opinions are varied, and their value in the system to identify outbreaks correctly and provide situational awareness is important to the NMCPHC.

The first iteration of the survey asked whether the account holders value the system and the format of this section was not appropriately positioned. After the final iteration of the survey, the questions were reformatted to explore the respondents' understating of outbreak detection while using ESSENCE, how they handle miscodings, their opinions of the system itself, which were derived from the NMCPHC's Website, which displays the strategy and policy of the ESSENCE system: http://www-nehc.med.navy.mil/Preventive_Medicine/Disease_Surveillance/essence.aspx. The user guidance can be found on this page as well and it also helped to formulate questions that made it possible to understand the opinions of the monitors. Finally, how their experiences in obtaining their current ESSECE are considered.

Thus, in the final survey, a four-question set was written to understand user value. The first asked the respondents if they had discovered an *actual* outbreak using ESSENCE and the next question asked which outbreak types they discovered while using ESSENCE. The next question set asked if monitors observed miscoded ICD-9 codes and what they did to fix them in the future. This was followed by a question that asked monitors if they agreed or disagreed with statements regarding the ESSENCE program. Finally, the last set of questions asked how long it took the monitors to acquire their current ESSENCE account, if they had to apply more than once, and if they had to speak with an ESSENCE helpdesk representative while waiting to access their current account.

The most relevant question set in this entire survey was to ascertain which portion of the population discovered an actual outbreak using ESSENCE. The next question, on the same page, asked the respondent to check all the outbreak types discovered using ESSENCE. After much debate, this question was not skipped if the respondents answered no to the first question, but allowed the individual to answer if they choose to do so. The interesting question that developed was whether the individual would answer no to detecting an actual outbreak and checking the types of outbreaks they discovered using the system. If they answered no, but checked outbreaks, did they find ghost outbreaks or false positives that were not actually there? Did they not fully understand whether the outbreak occurred or not? If account holders were discovering false outbreaks, then perhaps they did not fully understand how the system worked or was system too sensitive for users.

Miscodings were put into the perceived value category because if users were spending too much time deciphering miscodings, then they were not likely to value the system because they were wasting their time eliminating the miscodings from their collected information and must deduct the information in their head, rather than having ESSENCE remove the miscodings itself. This could also lead to false outbreak detections that lower the value of the system and lower the SA and EED of the system as well. Perhaps comments pertaining to how respondents would like to correct these mistakes might be viable to the longevity of the system by its users and the DoD in general.

The monitors' opinions of the ESSENCE system are vital to understanding how they perceive its value. Thus, the respondents were asked if they agreed or disagreed with a set of eight questions with 5-point Likert response scale. If they used the system how the NMCPHC perceived them to use it, then their value in the system was higher than those who disagreed with the set of questions. These questions were reformatted to explore the respondents' opinions of the system, which were derived from the NMCPHC's Website, which displays the strategy and policy of the ESSENCE system

http://www-nehc.med.navy.mil/Preventive_Medicine/Disease_Surveillance/essence.aspx. The user guidance can be found on this page as well and it also helped to formulate questions that allowed me to understand the opinions of the monitors.

Due to the transient nature of the military, if monitors go overseas in support of the Navy's public health and preventive medicine missions, and if they experience hardships to reacquire their accounts, then their value in the system could be diminished and they might not want to waste their busy day trying to access the system. The survey assisted in correlating whether the ease of regaining an account after it had been deactivated would increase the monitor's value of the system and their willingness to use it.

In my opinion, this analysis, we expect to correlate which rank and professional background/position observed an actual outbreak using ESSENCE and who has seen mostly false-positives. If miscodings have been corrected, then monitors should see more value in the system in the future. Furthermore, if the system were being used as originally intended, then ESSENCE would be valued. However, for those who disagree with these statements, who are these monitors and what comments have they made to make ESSENCE more effective and efficient to use?

c. Assessing User Training

In this last major section of the survey, questions were devised to assess user training to understand what has been done in the past and what can be improved upon for future users. The first question asked the monitors where they received their ESSENCE training. The next set of questions ask where, how, and what the user would like to see provided for training in support of current and future users of the ESSENCE system.

The Navy and Marine Corps Public Health Center wants to provide ESSENCE users with the best training possible. First, the questions were formatted to understand what their past training has been, then to ascertain what they would like to see in the future. Knowing where respondents received their training from impacts their value of the system and their ability to use the system effectively and efficiently. If the

NMCPHC can provide the multiple resources to teach future users, the questions within the survey can help direct them towards that goal. Three questions achieve the what, where, why and how aspects for future learning tools, modes, and methods.

I expected to learn that most users had been self-taught on the system and they would like to attend conferences and office meetings to learn about ESSENCE and its functionalities in particular cases, such as outbreak scenarios and how to evaluate alerts properly.

d. Ease and Effective Use of the ESSENCE System

This section was not a major category; however, these open-ended comment fields allowed the respondent to freely explain what they would change if they could and to provide their opinions about what they believed made the system easy to use. Also, a final open-ended comment field allowed the monitors to provide any other information about the ESSENCE system, particularly topics and issues not asked about in the survey, that they felt were important.

e. Demographics

It is common to place demographic questions at the end of a survey because these questions are likely to be the least important. The goal is to minimize the amount and type of information lost should a respondent fail to complete the survey. Although not important, as stated previously, correlations can be made throughout the major categories and demographics to tie the results together and make them clearer during the analysis phase. For example, knowing how many MTFs the user monitors allows the NMCPHC to understand how much time can be spent on ESSENCE by the monitor and how much training they need in the future. Furthermore, their professional backgrounds provide insights into the training the user may have had about syndromic surveillance and what it means for DoD, the Navy, and the command.

III. FIELDING THE SURVEY

This chapter describes the required survey approvals, how the survey was pretested and fielded, and the survey response rate.

A. OBTAINING THE REQUIRED APPROVALS

Prior to conducting any survey, approval must be obtained. For surveys within the confines of NPS, at a minimum, approval must be obtained from the NPS Institutional Review Board (IRB). In addition, since this survey concerns Navy and Marine Corps personnel outside of NPS, approval must be obtained by the appropriate survey authority within the Navy.

1. NPS Institutional Review Board Approval

Before the survey could be administered to the Navy and Marine Corps monitors, approval had to be obtained from the NPS IRB. IRB approval is required for any research effort involving intervention or interaction with individuals part of a systematic investigation and designed to contribute to generalized knowledge. All of these conditions applied to this research where, by definition, a survey is part of a systematic investigation that requires interaction with individuals, and this research is specifically intended to result in generalized knowledge about the ESSENCE system in particular and biosurveillance in general.

The purpose of the IRB is to protect individuals involved in any research to ensure that the research is conducted in an ethical manner, as well as that all individuals participating in the research are fully and correctly informed about the research and consent to participate in said research. Per SECNAVINST 300.39D, "the rights, welfare, interests, privacy, confidentiality, and safety of human subjects shall be held paramount at all times ands all research projects shall be conducted in a manner that avoids all unnecessary physical or mental discomfort, and economic, social or cultural harm."

Furthermore, NAVPGSCOLINST 300.4 outlines the necessity to protect volunteers from undue burden during an experiment or research. Also, the instruction outlines the mandatory documents that must be included in a packet sent to the IRB chair.

The IRB application requested approval to execute the survey. The application describes the study design, including how the data was collected and safeguarded, the risks associated with the research, the steps taken to minimize risks, and to protect the subject's welfare and the potential benefits of this research. NPS IRB approval was obtained on October 22, 2010. See Appendix B for the IRB approval letter, NMCPHC approval letter, and other IRB documents.

2. OPNAV N-1 and BUMED Approval

Since this survey targeted personnel outside of NPS, Navy survey approval was also required. OPNAV Instruction 5300.8C—Coordination and Control of Personnel Surveys defines the approval process and it "applies to all surveys of the Department of the Navy military members. This instruction covers surveys of active duty and reserve Navy sailors…civilian employees, as well as those retired from active duty, reserve or civilian status." Like the instructions for the NPS IRB, this instruction protects Navy personnel from undue influence and excessive survey burdens. The Navy Survey Approval Manager is the Washington, DC liaison, Navy Survey Approval Manager and Director of the Institute for Organizational Assessment for the Navy Personnel Research, Studies, and Technology Department (NPRST/Pers-14). In most cases, to obtain survey approval and receive an OPNAV Report Control Symbol (RCS), the Navy Survey Approval Manager must determine that a survey has never been performed before (i.e., that the proposed survey is not either duplicating a prior effort or that the data being sought is available via other sources), that it is endorsed by SES level sponsors, and that the survey is being conducted in a technically rigorous manner that maximizes the information obtained with minimal respondent burden.

However, because BUMEDINST 6220.12B states, "NMCPHC shall develop methods to improve and facilitate medical surveillance, response, and communication. This includes regular program evaluation to identify areas for process improvement," the

Navy Survey Approval Manager determined that only BUMED approval was required for this survey. Thus, the approval process was delegated to the Forms and Reports Manager for BUMED and the final draft of the survey was submitted to him. "Given [that] the BUMED Instruction [supports this survey], I'm okay with considering this fulfilling a BUMED requirement rather than a Navy-wide personnel survey" (P. Rosenfeld, personal communication, October 6, 2010). Upon completion of the Report Analysis Data form, OPNAV 5214/10, signed by CAPT Clagget, the Director of the Preventive Medicine Department at the NMCPHC, the survey was assigned RCS BUMED 6220-3. To demonstrate that the survey was officially approved, this Report Control System number was displayed to recipients of the notification e-mails via the subject line and it was displayed on the title line of the survey itself.

B. PRETESTING THE SURVEY

Good survey practices dictate that pre-testing a survey helps minimize undue respondent error, which can be done in several ways. "Stage 1: Review by knowledgeable colleagues and analysts" (Dillman et al., 2008, p. 140). First, I had my sponsor, advisor, and the ESSENCE Program Officer review the questions for technical merit and question readability. They also looked at whether all the necessary questions were included. Since pretesting occurred twice during the design/fielding phases, a more suitable and concrete survey was developed as mentioned in the previous chapter.

In the second stage, "interviews to evaluate cognitive and motivational qualifiers" were conducted. I cognitively interviewed two ESSENCE monitors over the phone. Two of the interviews were conducted with health professionals, ranging from a medium-to-highly ranked enlisted health professional, to a medium-to-highly ranked officer. The cognitive interviews allowed me to gauge whether respondents interpreted all the questions in the manner intended, both in the most fundamental sense that they understood all the words, as well as that they understood the broader intent of the question. In addition, cognitive interviews are useful for verifying that "all the questions [are] interpreted similarly by respondents" (Dillman et al., 2008, p. 141), and that the response scales are appropriate, understandable, and correct. One of the most important

results of cognitive interviews is to ascertain if each respondent can answer each question (Dillman et al., 2008, p. 146). As a result of the cognitive interviews, I wrote two different surveys because the first iteration contained some confusing answers and did not fully represent the complete ESSENCE monitor population.

The last stage of pretesting involved asking people who had not participated in the cognitive interview and revision process to take the survey. A complete fielding mock-up the survey was given to them just as it would have been provided to the actual respondents. In this final iteration, the survey was pretested by two Navy ESSENCE users. In particular, they checked to see if I "did something silly," as Dillman so adequately stated (Dillman et al., 2008, p. 147). When working so closely on a project, anyone can loose sight of the goal, and these pretesters provided the sanity check the survey needed before it went into the official fielding phase.

C. WEB-BASED FIELDING

The survey was administered using SurveyMonkey, a commercial Web-based survey software system. The advantages of administering a Web-based survey rather than paper-based survey are that it minimizes cost, as well as the ease of distributing notification e-mails more than once. Web-based surveys also tend to be faster than paper-based survey that must be mailed to respondents and they eliminate data entry. In addition, skip logic can be automated within the Web-based survey, which makes it easier and faster for a participant to take the survey.

Due to the transitory nature of the military, the Navy and Marine Corps monitors asked to participate in this survey may have transferred jobs or billet locations since the last time they registered for an ESSENCE account. Also, since active and disabled account holders were included on this list of possible participants, it would be difficult to track down the location of each member when the survey was administered.

E-mails are the best way to locate service members regardless of their location. Without knowing precisely where monitors could have been working when the survey was open would require a multitude of paper surveys sent all over the world to track down each monitor. The cost of stamps and envelopes would also increase as well.

CAPT Clagett sent out a pre-notification e-mail, discussed below, to notify the monitors that the official survey would be sent the next day. If the survey were paper-based, then the survey would have had to wait another week until it was first delivered. Furthermore, disseminating multiple follow-up letters would have been difficult to accomplish since it could have taken weeks before respondents returned their original survey. The Web-based method made it possible to send four follow-up e-mails, without sending them to personnel who had already responded. The respondents' answers were collected and stored the day they completed the survey, which allowed me to send a follow-up e-mail that included responses from a few open-ended questions.

Lastly, multiple pages of this survey could have been skipped due to the answer the respondents gave. If the survey were administered via paper, then it would have looked too cumbersome and lengthy for the monitor to complete. Also, the ease of having me put the skip logic together, rather than having the participant do it, would have led to confusion resulting in more people not finishing the entire survey.

D. RESPONSE RATES

The survey was sent to 225 Navy and Marine Corps users with either an active or a disabled ESSENCE account. The survey pre-notification e-mail with CAPT Clagget's signature block and return e-mail address was sent on November 8, 2010 to all potential respondents. The first invitation e-mail was sent out the following day, asking the monitors to take the survey. Five follow-up e-mails were subsequently sent to nonrespondents to encourage them to take the survey. The last e-mail was sent on December 6, 2010. Thus, the survey was in the field for eight weeks. See Appendix C for copies of all respondent correspondence.

A total of 143 monitors (64 percent) responded to the survey, and 7 (0.03 percent) opted out of taking the survey. Figure 1 illustrates the percentage of participants who responded per day and the vertical line indicates when the pre-notification, initial notification, and follow-up e-mails were sent.

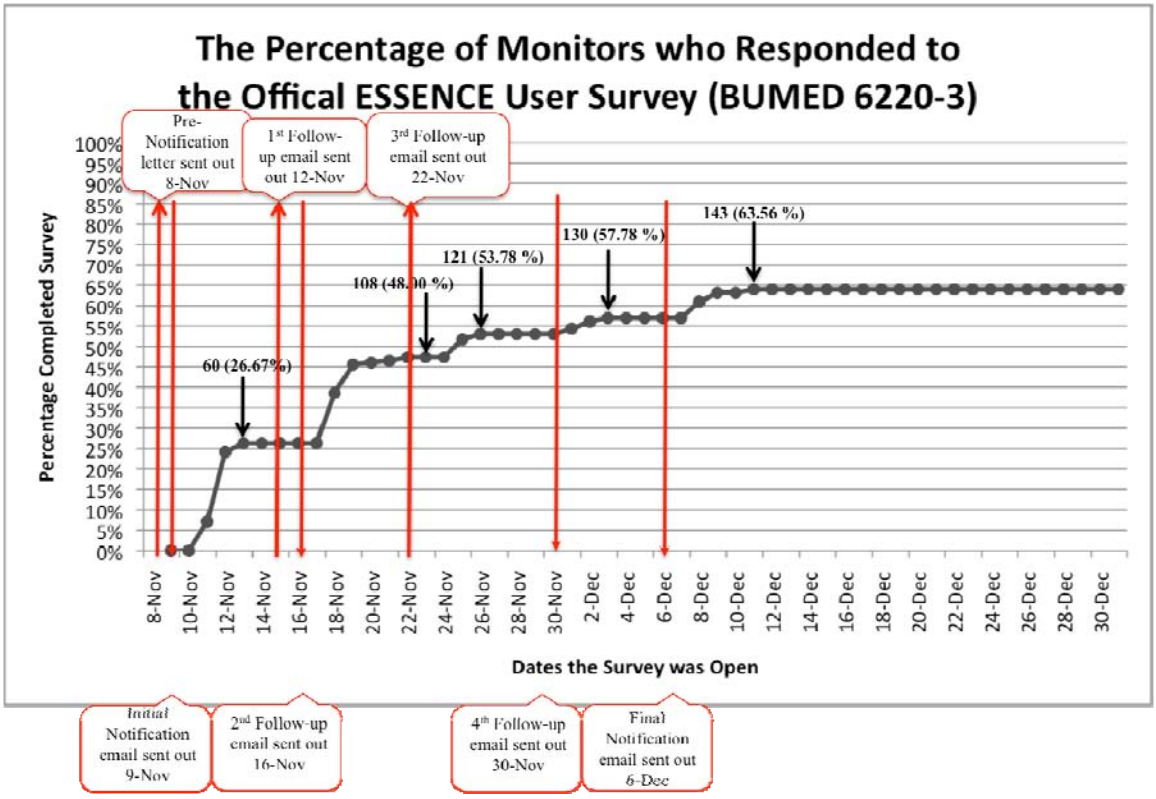


Figure 1. The percentage of respondents who replied to the survey while it was open, from November 8, 2010 until December 30, 2010. The bubbled areas indicated the dates when pre-notification, notification, and follow-up e-mails were sent. The black line shows the response rate over time.

IV. SURVEY RESULTS

This chapter discusses the survey results. Overall, the monitors who responded to the survey were generally quite happy with the current ESSENCE system. A few individuals suggested how to better the system. Furthermore, most of the respondents indicated they use the system as it was intended to be used: for outbreak detection and situational awareness. However, a select group is experiencing or has experienced problems with the system, all of which are discussed in more detail below. Complete survey results, including all open-ended question responses, are contained in Appendix D. Appendix D also includes a complete list of survey respondent suggestions for making the ESSENCE system easier to use and more effective.

A. ASSESSING MONITOR USAGE

The survey begins by asking respondents how often they log into the ESSENCE system. As shown in Figure 2, across all types of users, 57 percent log in routinely (that is, at least a couple of times per week). On the other hand, 6 percent of the respondents said they never log in to ESSENCE. There are no statistically significant differences in login frequency by rank, professional background, support facilities, or user level.

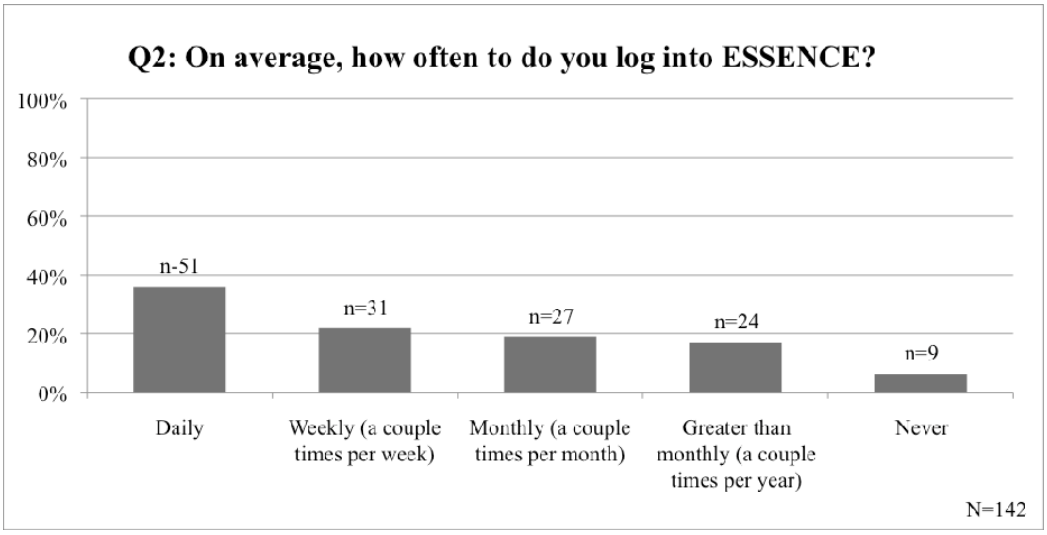


Figure 2. Distribution of how often respondents logged into ESSENCE.

When asked whether they log into ESSENCE only after receiving an e-mail alert, roughly one respondent in six (13.4 percent) said yes. As shown in Figure 3, this type of log in behavior differs by rank ($\chi^2 = 9.075$, $p = 0.0283$),[3] where 100 percent of the contractors said they only logged in after receiving an e-mail alert, followed by 31 percent of the O4–O6s, 15 percent of all enlisted personnel, and none of the O1–O3s or civilians said they logged into the system due to an e-mailed alert. (Caution is warranted when interpreting the E1–E3, E7–E9, and a contractor category as the total number of respondents in each of these is small.) One possible explanation for this result, which cannot be confirmed by the survey data, is that monitors who only log in for e-mail alerts have other tasks that prevent them from logging into ESSENCE more frequently.

Of the 11 respondents who only log in when they receive an e-mail alert, eight (73 percent) rarely log into the system (that is, at the most a few times per month) and when they do log in, it is primarily because they received either a yellow or red alert. Only four respondents (out of the 11) actually utilize the alert module to explore the alerts received in their inbox. Furthermore, eight run syndromic or reportable diseases queries. Only six of the 11 respondents investigate alerts and five use ESSENCE to do so. A possible cause for the lack of ESSENCE use is because nine out of 10 of these respondents have not seen an actual outbreak using ESSENCE. Of the seven respondents who rarely log into the system and have disabled accounts, this could be attributed to ESSENCE not functioning they way they intended: by providing EED and SA.

[3] The chi-squared test was conducted on the cross-tabulation of question 4 with question 49 for rank categories E4–E6, O1–O3, O4–O6, and civilian. The rank categories for E1–E3, E7–E9, and contractor were omitted because each category contained less than 10 respondents, and thus, resulted in multiple cells with 0 counts. All subsequent chi-squared tests involving rank were conducted similarly.

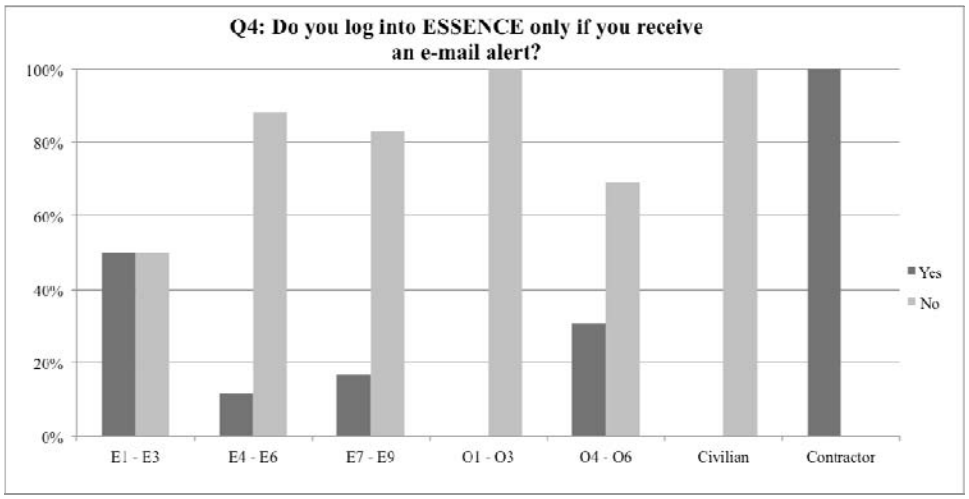


Figure 3. Percentage of respondents who log into ESSENCE only when they receive an e-mail alert by rank category. Overall, roughly 80 percent of the monitors do not log in just because they receive an e-mail alert.

The next set of questions asked the respondents whether they ran reportable disease inquiries while logged into ESSENCE. As shown in Figure 4, greater than one out of two respondents (53 percent) indicated that they ran reportable disease queries routinely (i.e., at least a couple of times a week). As shown in Figure 5, there is a statistically significant difference (χ^2 = 26.876, p = 0.0298) by rank for those who conducted reportable diseased queries, with E1–E3s, O1–O3s, and civilians more likely to run reportable disease inquiries routinely. This is consistent with the fact that reportable diseases are primarily used in conjunction with NDRSi, and to confirm that their departments had submitted their medical reportable events on time, which are tasks not usually done by mid-grade officers in the U.S. Navy and Marine Corps.

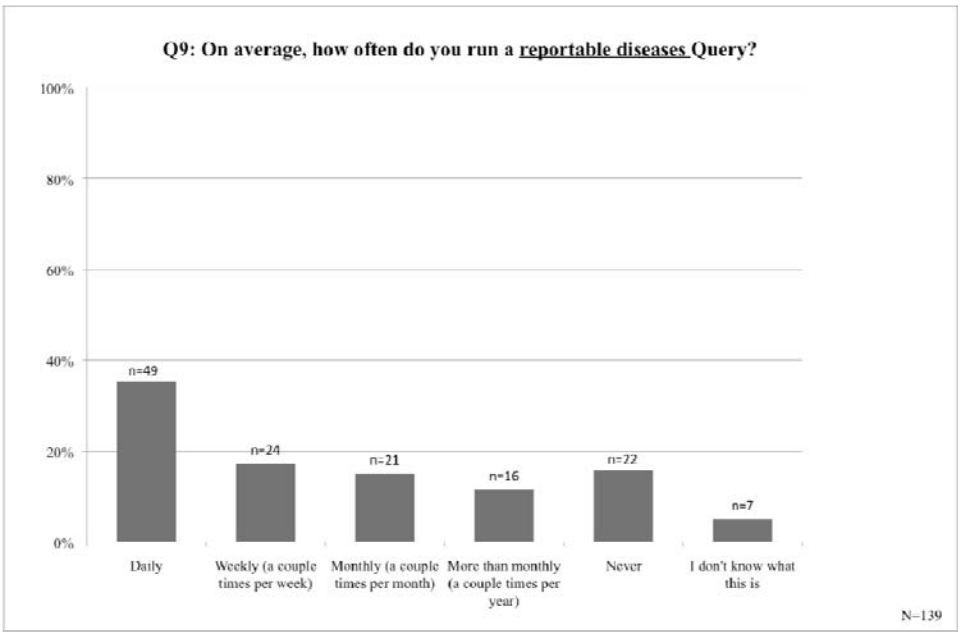


Figure 4. Distribution of how often respondents ran a reportable disease query.

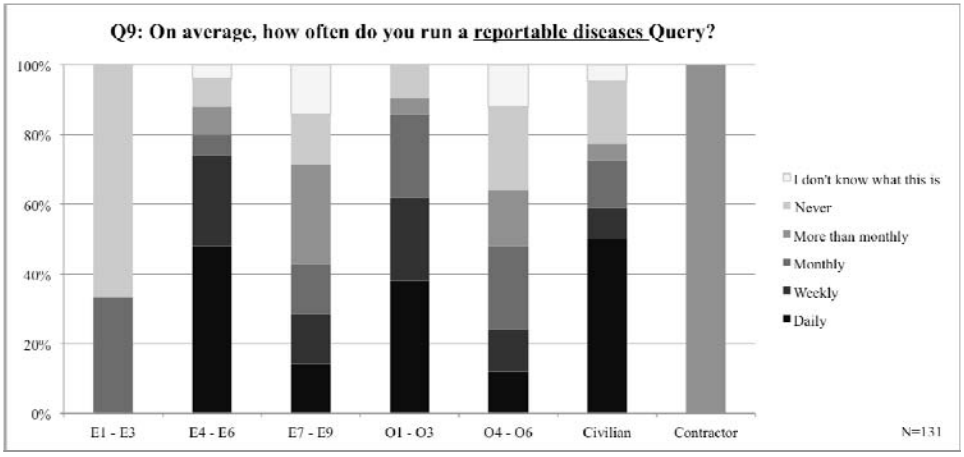


Figure 5. Frequency of how often respondents run reportable disease queries by rank. Across all ranks, 35 percent of the monitors routinely run reportable disease queries.

In addition, there is a statistical difference between the percentage of monitors with an NDRSi account by user level (χ^2 = 6.809, p = 0.0332)[4] and by professional

[4] User levels (question 45) are single MTF, multiple MTF, and NEPMU level monitors.

background (χ^2 = 15.275, p = 0.0016).[5] In Figure 6, 100 percent of the NEPMU level users had an NDRSi account, while 26 percent of the single MTF level users did not. Furthermore, as shown in Figure 7, all of the physicians, and over 70 percent of the nurses, did not have an NDRSi account, while 75 percent or more of the other types of health professionals did have an account. Lastly, these same ESSENCE monitors did not verify the reportable diseases list they saw in ESSENCE with co-workers nor NDRSi because they did not have accounts and did not require them, nor will they in the future (Figure 8).

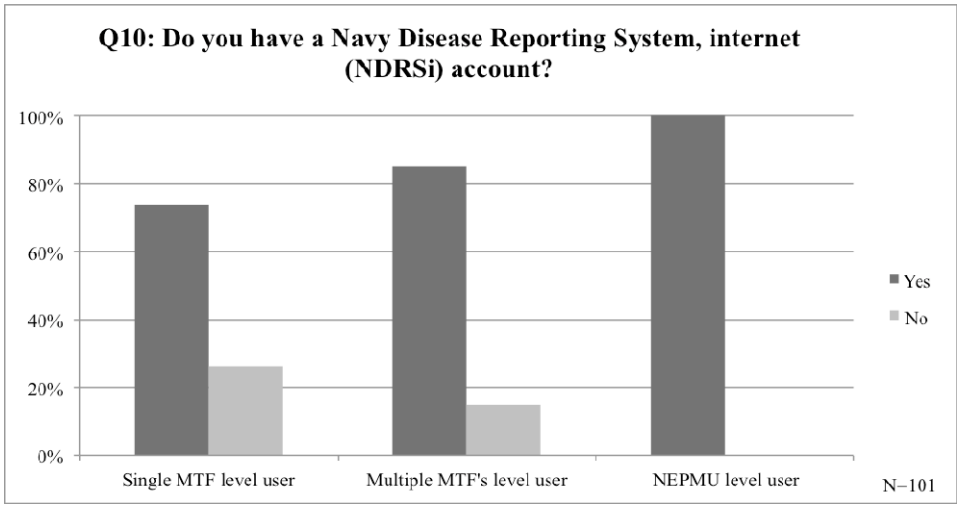


Figure 6. By user level, percentage of respondents who have an NDRSi account.

[5] Professional background categories (question 48) are preventive medicine technician, environmental health officer, preventive medicine officer, and nurse, corpsman, epidemiologist, and physician. The latter three categories were omitted from the chi-squared test because each category contained less than 10 respondents, and thus, resulted in cells with zero counts. All subsequent chi-squared tests involving the professional background variable were conducted similarly.

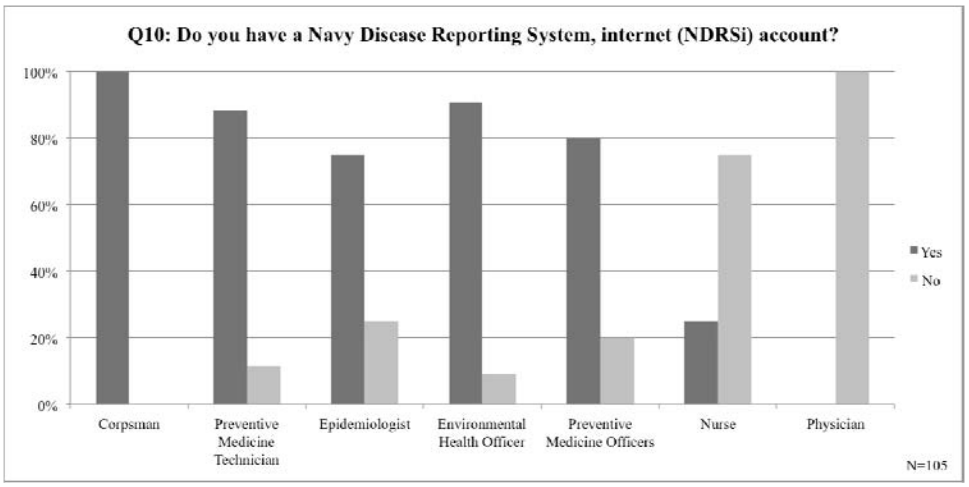


Figure 7. Percent of monitors that have an NDRSi account by professional background. An average of 80 percent of ESSENCE users have an NDRSi account.

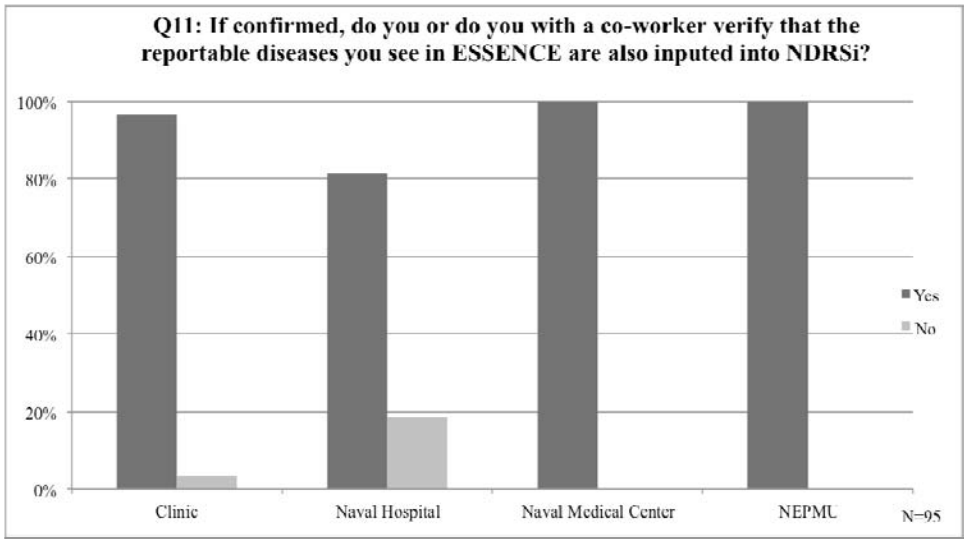


Figure 8. Percent of monitors that have an NDRSi account support facility. An average of 94 percent of ESSENCE users confirm that the reportable diseases that they see in ESSENCE are also put into NDRSi.

As shown in Figure 9, 36 percent of the monitors routinely run syndromic queries, but 19 percent never use the module and 14 percent do not know what it is. Unlike reportable diseases queries, there is no difference in the frequency of syndromic queries by demographic groupings. However, the way the respondents used the data details while

running syndromic queries are statistically different (χ^2 = 26.699, p = 0.0085),[6] namely for the data details parameter "age range" amongst the various rank categories (Figure 10). One possible reason for this result, although not explainable from this survey, is that age range is not always important when narrowing down a clustering communicable disease in a given area. For instance, if an outbreak occurs on a ship, the narrowing down of the patients age range does not help the investigator track the outbreak, while the other parameters do; for instance, the clinics they visit (close to the docked ship) and the patient category (active duty personnel). Moreover, if the monitor deals mostly with active duty patients, age range would not matter, unlike some other monitor who is looking for an outbreak amongst children or the elderly.

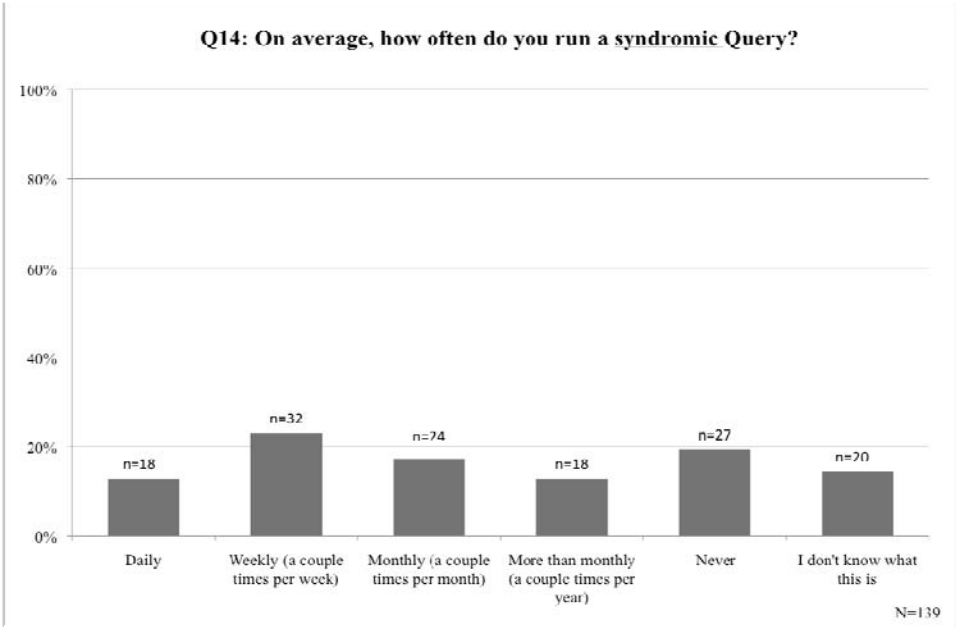


Figure 9. Distribution of how often respondents ran a syndromic query.

[6] The chi-squared test was conducted on the cross-tabulation of question 16 with question 49.

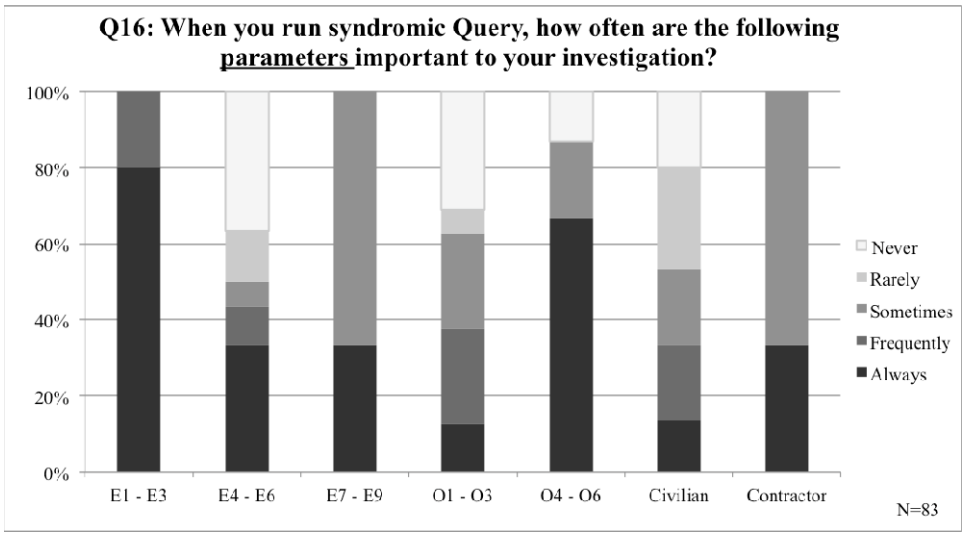


Figure 10. Frequency of how often monitors use the age range parameter during an investigation. An average of 42 percent of the rank categories always use age range while investigation a particular syndrome.

In terms of investigating alerts, 75 percent of the monitors investigate alerts (Figure 11), and approximately nine out of 10 (89 percent) of those use ESSENCE to conduct their investigations (Figure 12). There is a statistically significant difference (χ^2 = 8.875, p = 0.0029)[7] by user level of those who use the system during their investigations. The majority of the multiple MTF level users tend to use ESSENCE, whereas 22 percent of the single MTF level users and 11 percent of the NEPMU level users do not use the system at all (Figure 13). One possible explanation for this phenomenon, which cannot be confirmed by the survey data, is that ESSENCE provides the user with a means to check multiple facilities at one time, even the entire Navy and Marine Corps (given the proper permissions), allowing the user to use one resource vice multiple external tools. ESSENCE gives the account holder the ability to observe alerts or potential outbreaks in a multitude of locations, thereby giving the monitor a starting point for an investigation. Single MTF users are more intimately familiar with the doctors and hospitals within their clinic or hospital and can speak with them more often, where a multiple MTF user does not have the ability to speak with physicians and nurses from all the hospitals as easily during their investigations.

[7] The chi-squared test was conducted on the cross-tabulation of question 20 with question 45.

Figure 11. Distribution of how whether respondents investigate alerts.

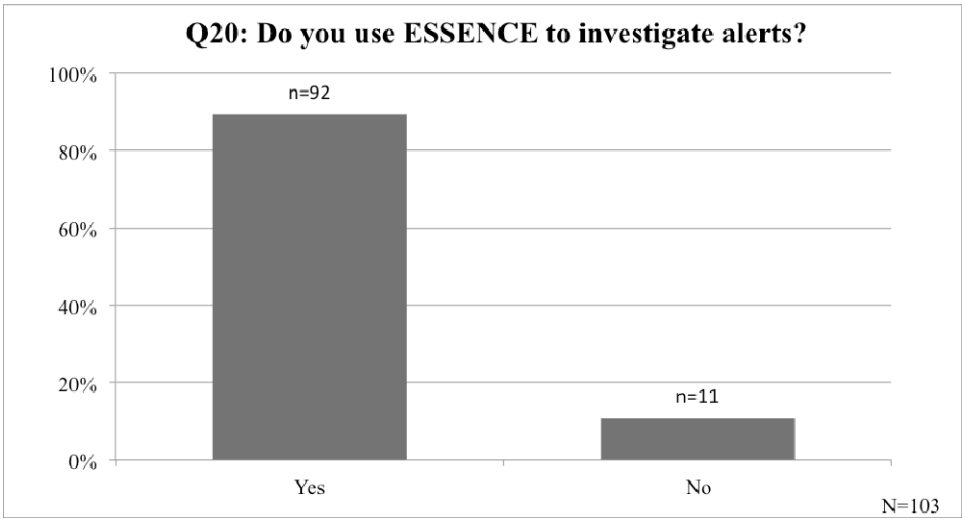


Figure 12. Distribution of whether respondent use ESSENCE to investigate alerts.

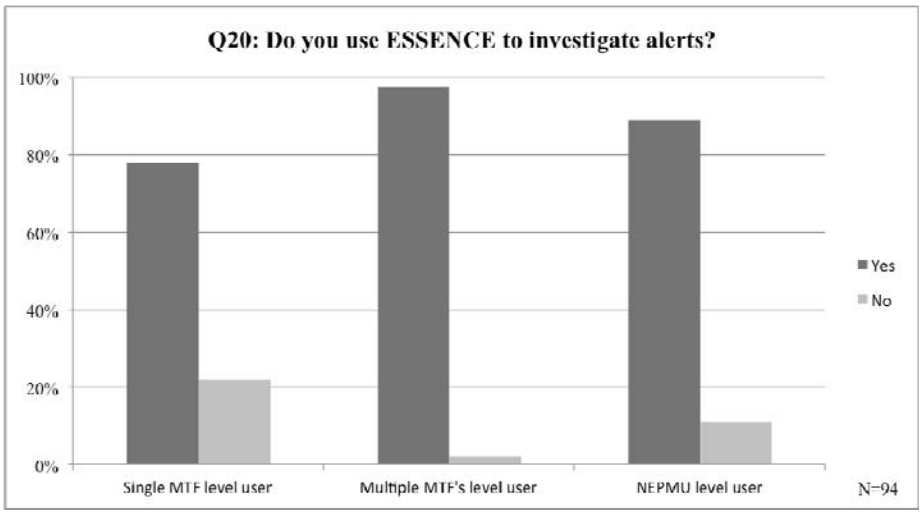


Figure 13. Percentage of respondents who use ESSENCE to conduct investigations about alerts. Overall, roughly 80 percent of the monitors do use ESSENCE to conduct their investigations of a potential outbreak alerted to them via the ESSENCE system.

There is a statistical difference ($\chi^2 = 28.246$, $p = 0.0051$)[8] by support facility for those who use FMP during an investigation. Illustrated in Figure 14, it is more likely that clinic and Naval Medical Center users will always use FMP, while NEPMU users are the least likely to use this data detail when investigating clustering within an alert. Over 60 percent of the E7–E9's and O4–O6's always use FMP.

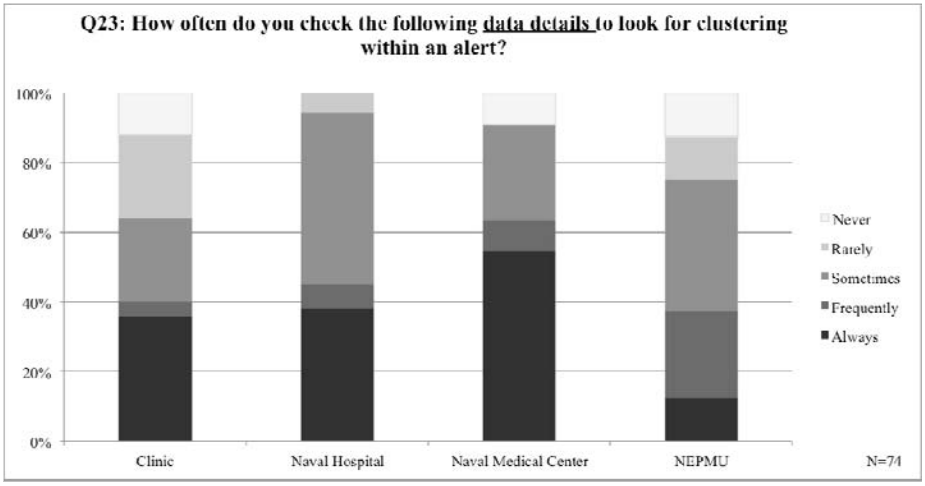


Figure 14. Frequency of how often monitors use the data details, FMP, while investigating clustering within an alert.

[8] The chi-squared test was conducted on the cross-tabulation of question 23D with question 46. Support facilities are clinics, naval hospitals, naval medical centers, and NEPMUs.

Another data details functionality that was significantly different ($\chi^2 = 17.737$, $p = 0.0383$)[9] by rank is how often monitors use the data details, MTF, while investigating alerts (Figure 15). One possible interpretation, which cannot be confirmed by the survey data, is that most of the rank categories understand how to make a site selection list and use that list when running a query to investigate alerts in their area. Rather than select a particular MTF during the query, they already specified their location by selecting the location through the "site selection" feature that limits their area of search during a syndromic query or within the alert list module.

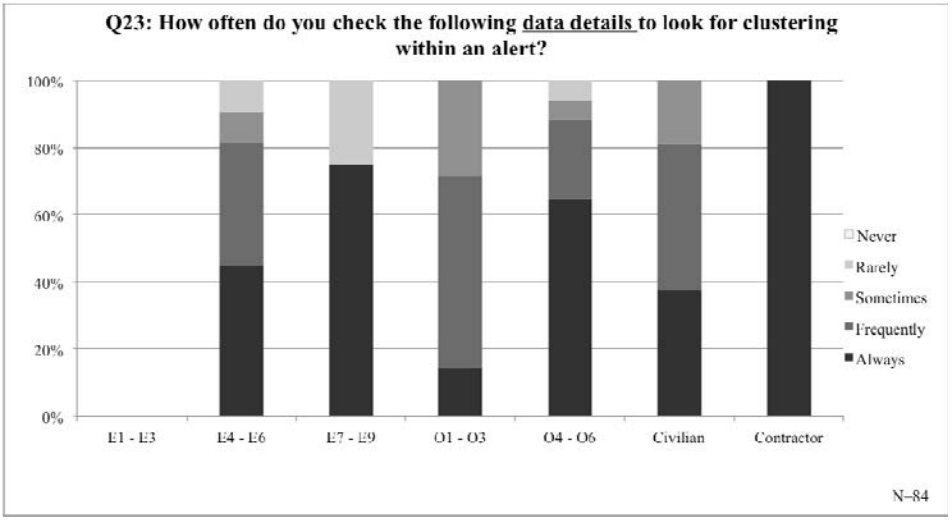


Figure 15. Frequency of how often monitors use the data details MTF when looking for clustering within an alert by rank.

There are also significant differences by user level ($\chi^2 = 33.993$, $p = <0.0001$),[10] support facility ($\chi^2 = 38.181$, $p = <0.0001$),[11] and professional backgrounds ($\chi^2 = 30.278$, $p = 0.0002$)[12] with how often AHLTA is used during an investigation. Approximately three out of five (57 percent) of NEPMU level monitors rarely, if ever, use AHLTA as an external tool to aid them in their alert investigations (Figure 16). Furthermore, an average of two out of three clinic, naval hospital, and naval medical center monitors

[9] The chi-squared test was conducted on the cross-tabulation of question 23H with question 49.

[10] The chi-squared test was conducted on the cross-tabulation of question 24A with question 45.

[11] The chi-squared test was conducted on the cross-tabulation of question 24A with question 46.

[12] The chi-squared test was conducted on the cross-tabulation of question 24A with question 48.

always use AHLTA to assist them in their investigations (Figure 17). One possible explanation for this result is that NEMPU level users and supporters do not have access to AHLTA and do not need it. NEMPU monitors are regional investigators who do not need to examine alerts with extreme detail, unlike the clinics, NH, and NMC users because they are examining their own area and part of their departmental duties, which is overseen by the regional staff members at the NEMPU level. Figure 18 illustrates that 85 percent of the preventive medicine technicians always use ALHTA, while 50 percent of the physicians and environmental health officers do not. Part of preventive medicine technicians' duties is to investigate alerts and use whatever means necessary to do so. AHLTA enables them to obtain the details of patient information and why they have been assigned a specific ICD-9 code. If the ICD-9 is related to their investigation, then they can proceed towards determining if an actual outbreak is occurring. In comparison, corpsman may not have access to AHLTA and physicians may have already assigned a particular ICD-9 code to their patients or have spoken with fellow physicians, and therefore, do not need to verify this information in AHLTA.

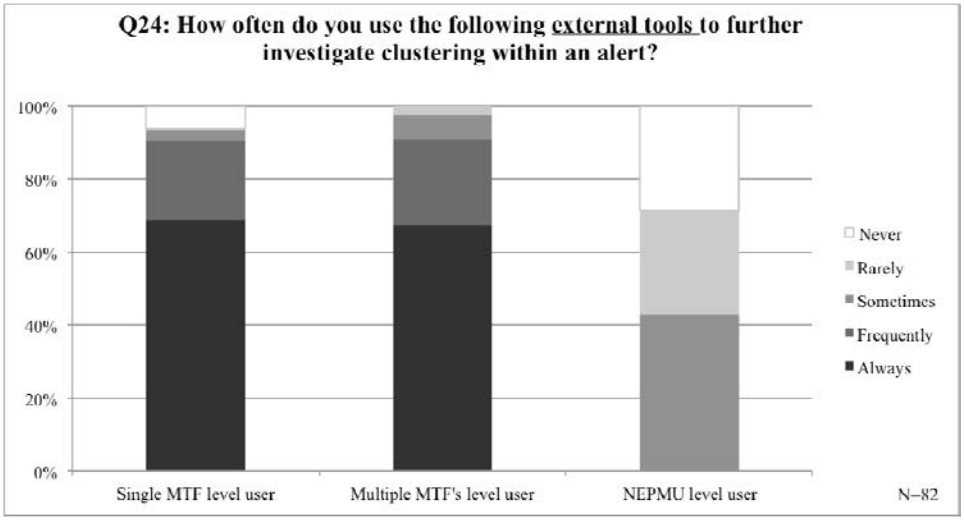


Figure 16. Frequency, by user level, of how often respondents use AHLTA as an external aid while conducting alert investigations.

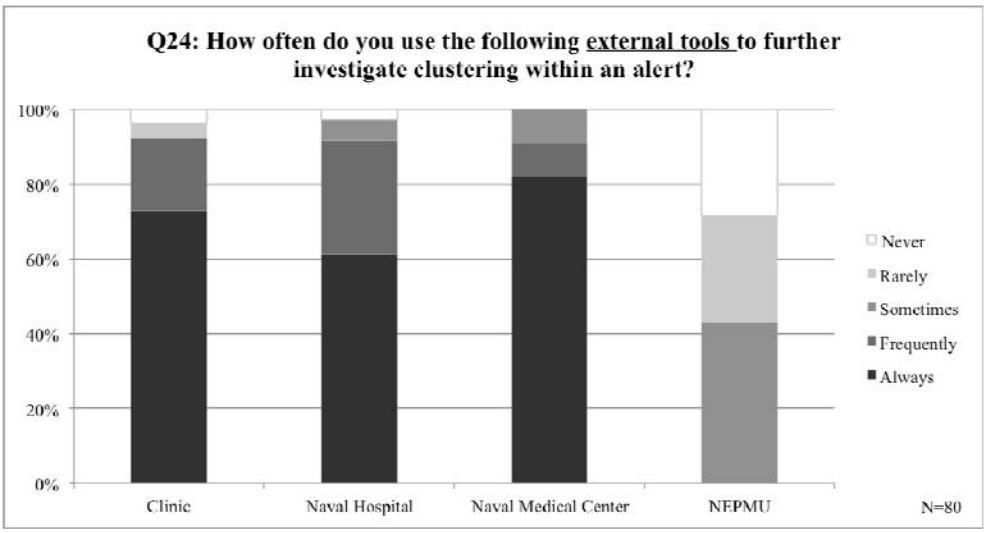


Figure 17. Frequency, by support facility, of how often respondents use AHLTA as an external aid, while conducting alert investigations.

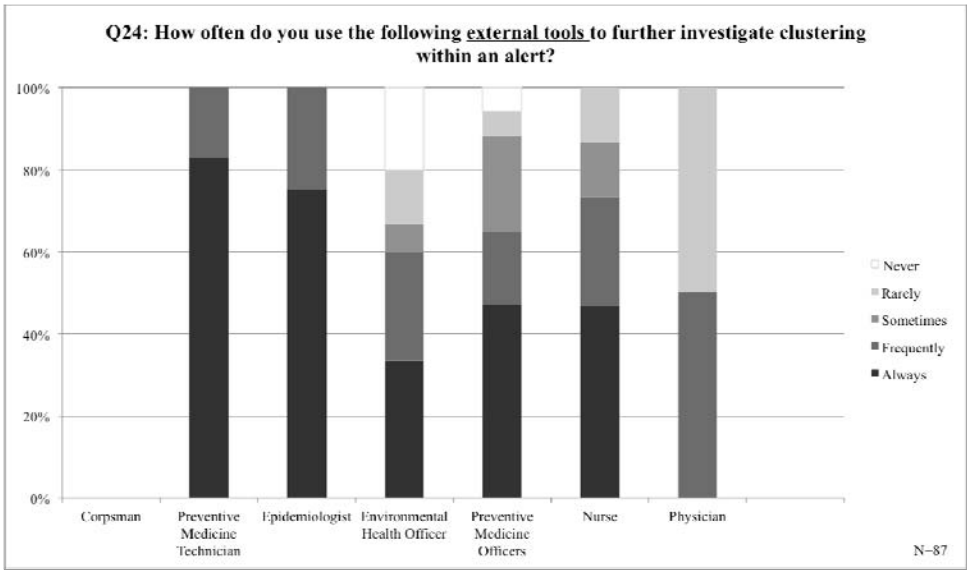


Figure 18. Frequency, by professional background, of how often respondents use AHLTA as an external aid, while conducting alert investigations.

B. ASSESSING PERCEIVED VALUE

I first begin by displaying the results of how often respondents applied for their current ESSENCE account, and how often they spoke with representatives while in the process of obtaining it. This is important due to respondent feedback through the open-ended comments sections of this survey. Distaste for constant password updates and

account requirement are prevalent throughout the comment sections and the distributions of survey results are not statistically different by user level, rank, professional background, and support facility. Due to an increase in operational tempo within the Department of Defense, military members are required to leave their billets often and must reacquire new accounts after 30 days if the program has not been logged into.

In Figures 19–21, questions 35–37 illustrate the distribution of respondents who applied more than once for their current ESSENCE account, had to speak with an ESSENCE help desk representative, and the frequency of phone calls/e-mail needed to acquire the account. About 40 percent of users must apply more than once. On average one out of two (48 percent) had to speak with a help desk representative while waiting to access their current account. Finally, 45 percent contacted the help desk more than three times. In summary, users report what seem to be significant difficulties in acquiring an ESSENCE account; difficulties that surely do not engender feelings of good will toward, nor confidence in, the system.

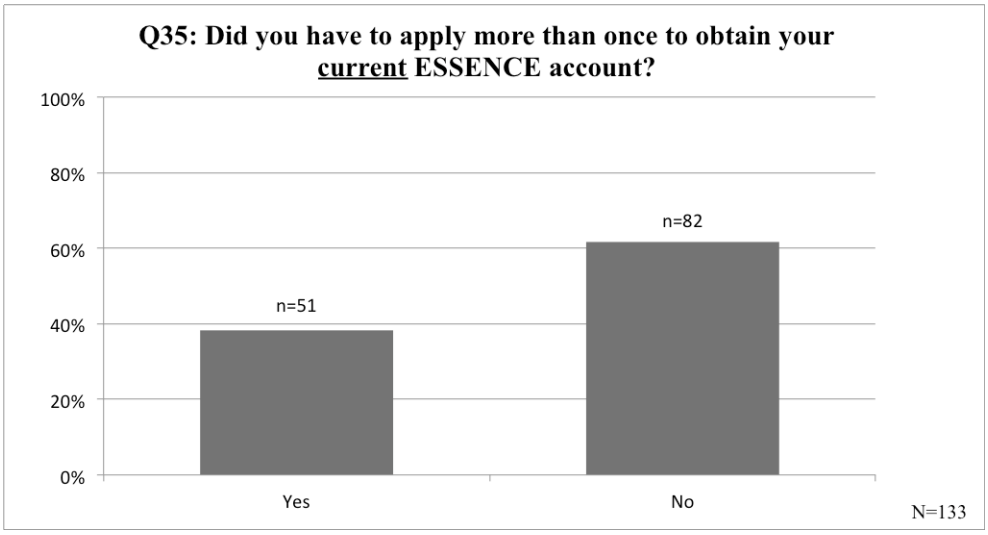


Figure 19. Distribution of respondents who had to apply more than once to obtain their current ESSENCE account.

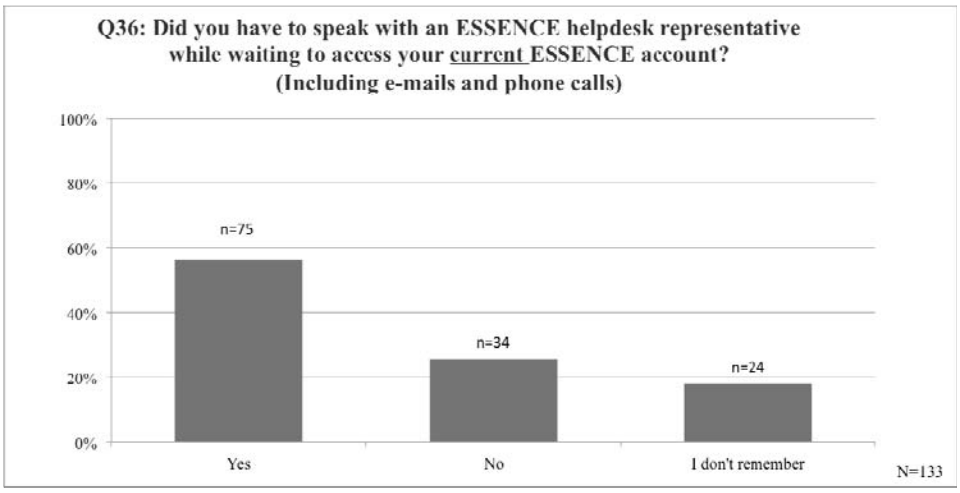


Figure 20. Distribution of respondents who had to speak with an ESSENCE helpdesk representative while waiting to access their current ESSENCE account.

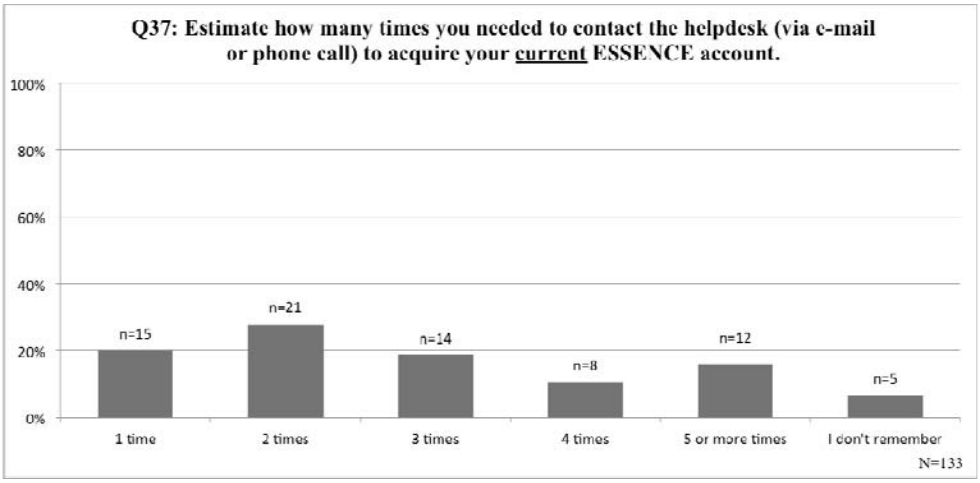


Figure 21. Distribution of how many times respondents had to contact the helpdesk to acquire their current ESSENCE account.

After examining the data to determine respondents' perceived value of the system, I discovered that overall, the monitors believe that the ESSENCE system performs its situational awareness role well, but they find it lacking in its early event detection role. For example, Figure 22 shows that three out of four respondents have not discovered an actual outbreak using ESSENCE. There is a statistically significant difference (χ^2 = 12.363, p = 0.0062)[13] by rank of monitors who discovered an actual outbreak using the

[13] The chi-squared test was conducted on the cross-tabulation of question 29 with question 48.

biosurveillance system. Over 60 percent of the rank categories except O1–O3s have not used ESSENCE for early event detection (Figure 23). The interpretation is that the majority of the respondents believe they did not see an actual outbreak occur although ESSENCE indicated that one existed. Further proof that respondents tend to see more false positives exists when a cross-tabulation of question 29 was conducted with question 33H, which asks respondents if they agree or disagree with the statement: "I find that the alerts in ESSENCE are often false-positives." Nine out of 10 monitors (Figure 24) who said they have not discovered an actual outbreak said they agree or are neutral to this statement. A few respondents who have not discovered an actual outbreak using ESSENCE said they would like "training and insight into how syndromic alerts are derived" and "how to detect false positives." Another monitor stated that "understanding how the alert functions would be better [to know]. Right now, I feel that the alerts are set to be too sensitive, as we get quite a few of them here. Investigating all of them would take far too much time. When we do investigate them, we never come to a conclusion on the cause (if any) for the increase in patients for that particular syndrome." Finally, one user said that they would like to " have [a] person [who is] doing the [application] screening [to] ask for all the additional info needed at once instead of responding (a week later) after one item has been submitted then asking for something else."

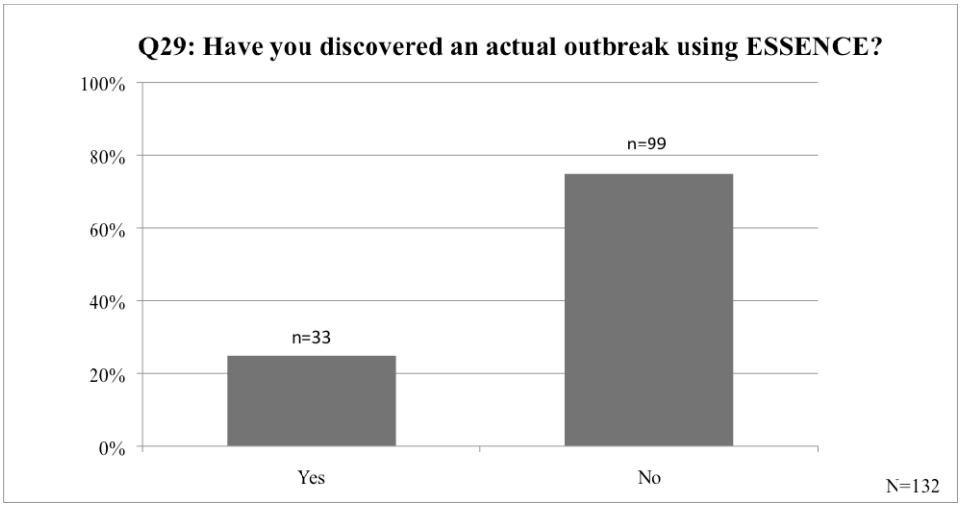


Figure 22. Distribution of respondents who say they have discovered an actual outbreak using ESSENCE.

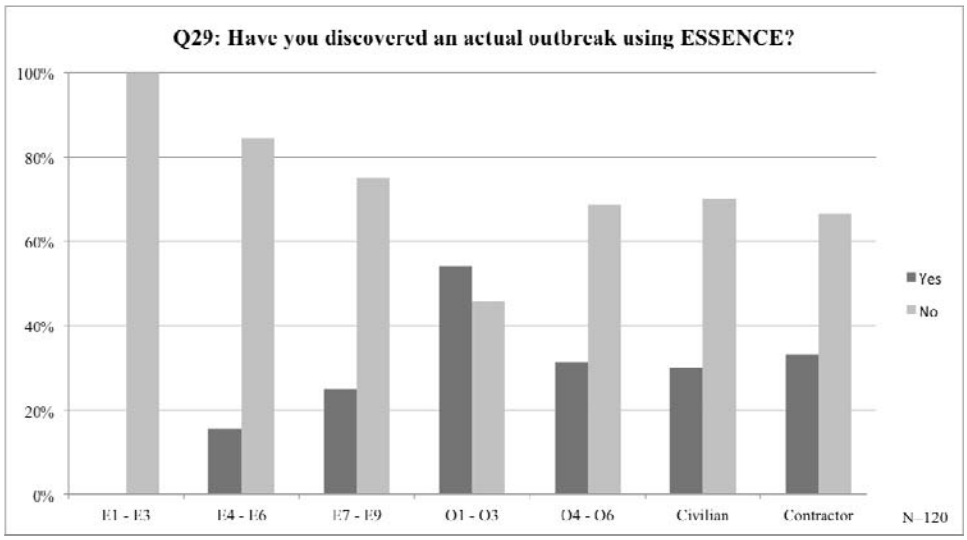


Figure 23. Percentage of monitors, by, rank, who have discovered an actual outbreak using ESSENCE. Roughly 75 percent of the respondents said they have not seen an actual outbreak in ESSENCE.

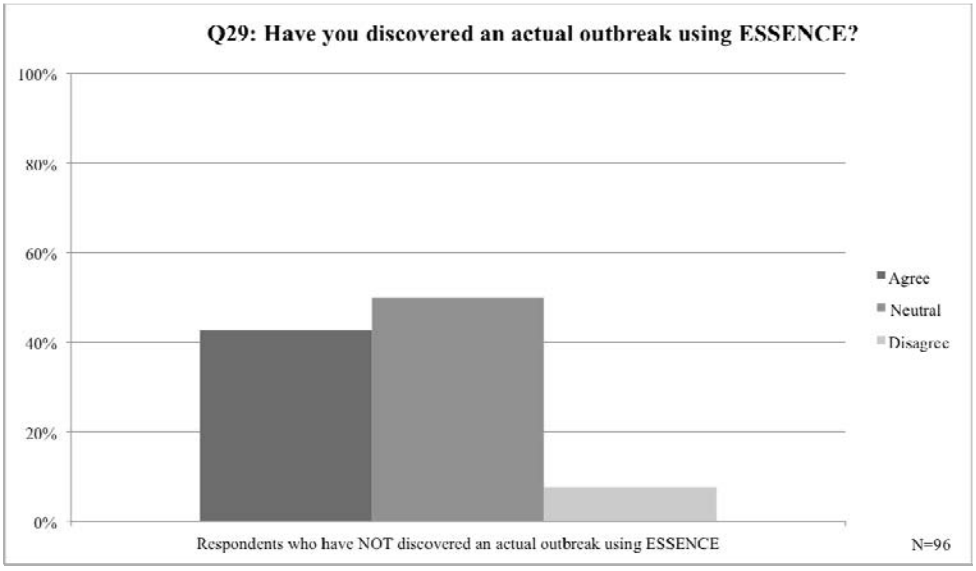


Figure 24. Percentage of monitors who have not discovered an actual outbreak using ESSENCE but who also either are neutral or agree with the statement that they find that ESSENCE alerts are usually false-positives.

Of the 33 respondents who have observed an actual outbreak in ESSENCE, over 20 confirmed actual cases of ILI, GI, and respiratory outbreak types as well, seven have seen heat, febrile, neurological, pertussis, and exposure to chemical/toxins cases.

However, 75 percent of the respondents observe miscoded ICD-9 codes in ESSENCE (Figure 25). Miscoding causes alerts to increase because providers, immunizations representatives, MTF coding representatives, or nurses have input the data incorrectly into the system and currently these mistakes cannot be removed or updated by monitors who have verified the miscodings using AHLTA or CHCS. Of the 100 respondents who witness miscodings, 73 percent agree that it would be easier to use ESSENCE if a patient's final diagnosis was viewed differently in the system, perhaps if bolded. In addition, 95 percent agree that it would be easier to use ESSENCE if a patient's miscoded ICD-9 codes were updated and correctly input into the system. Again, miscodings are a potentially significant cause of the false-positives within the system.

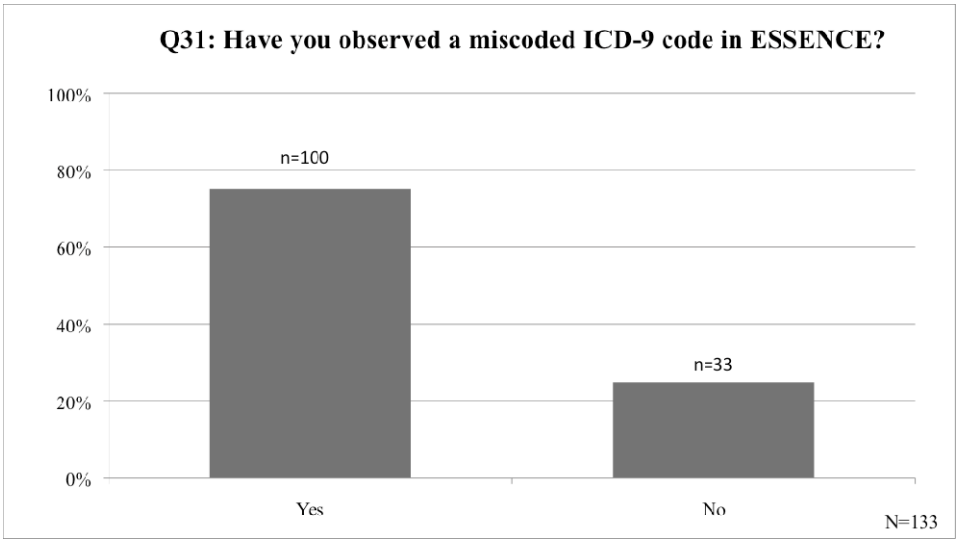


Figure 25. Distribution of respondents who have observed a miscoded ICD-9 code in ESSENCE.

Question 33 asks respondents whether they agree or disagree with eight statements regarding the ESSENCE program, presented in Figure 26. An average of 92 percent of the respondents said they value the system; that is, they tend to strongly agree, agree, or are neutral towards all eight statements. However, it is important to understand why the other 8 percent do not value the system and what can be done in the future to remedy their perceptions, issues, or problems in order to make the system valuable to all future users.

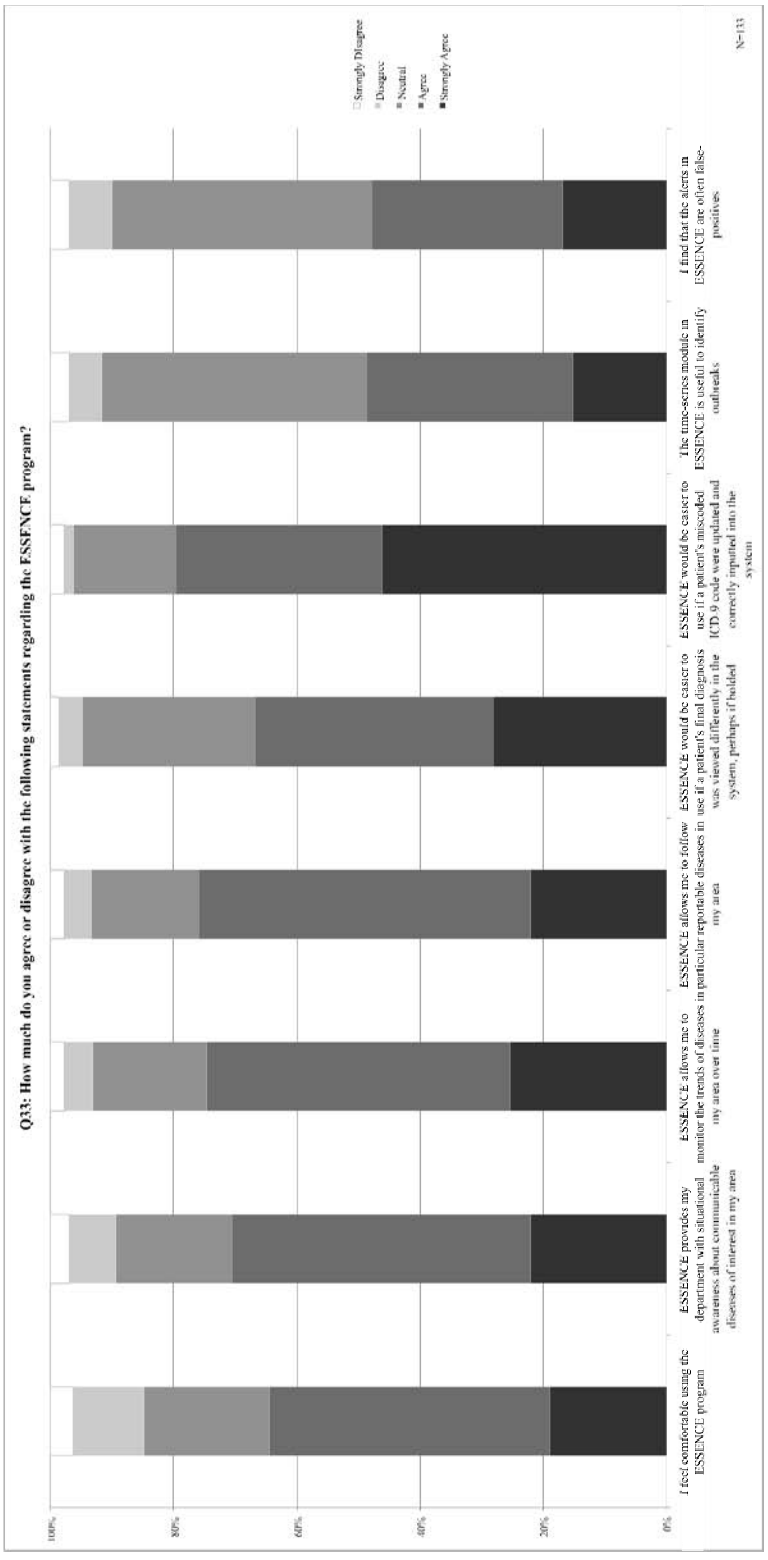


Figure 26. Distribution of responses regarding respondents perceived value of the ESSENCE system.

Roughly 85 percent of the monitors feel comfortable using the ESSENCE program. On the other hand, over half of the 15 percent of respondents who do not feel comfortable with the system believe that ESSENCE does not provide them with SA about communicable diseases in their area and they do not think that bolding a patient's final diagnosis would make ESSENCE easier for them to use. Of these 20 individuals, 70 percent log in rarely (that is, monthly to never), 50 percent are multiple MTF level users, roughly 40 percent are preventive medicine technicians ranging in rank between E4–E9 and are split between having active and disabled ESSENCE accounts.

Figure 27 indicates there is a statistical difference ($\chi^2 = 16.107$, $p = 0.0409$)[14] by user level of those who think ESSENCE provides their department with situational awareness about communicable diseases of interest in their area. Twenty-seven percent of the NEPMU level users disagree with this statement, while 90 percent of the MTF level users agree that ESSENCE provides them with a suitable amount of situational awareness about outbreaks in their area. The chi-squared test conducted on the cross-tabulation between this statement and rank, a statistically significant result ($\chi^2 = 25.873$, $p = 0.0112$) indicates that 24 percent of the O1–O3s and 10 percent of the O4–O6s do not feel that ESSENCE provides their department with situational awareness either, as depicted in Figure 28.

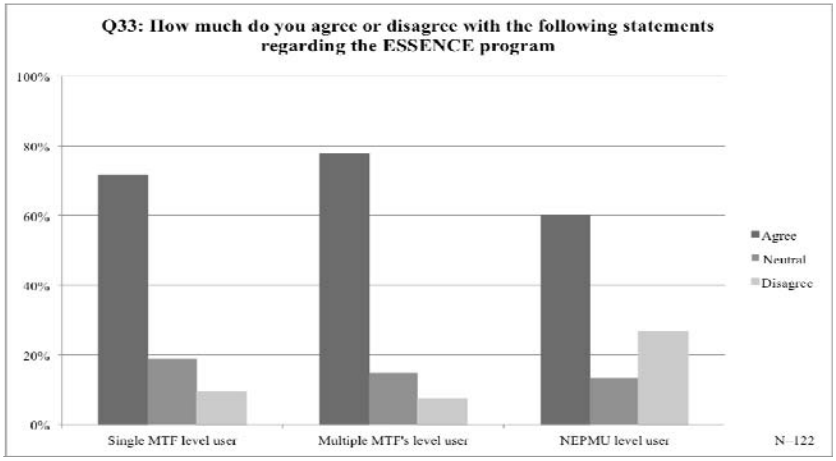


Figure 27. Percentage of monitors by user level who agreed, was neutral, or disagreed with the statement that ESSENCE provides their department with situational awareness about communicable diseases of interest in their area.

[14] The chi-squared test was conducted on the cross-tabulation of question 33B with question 45.

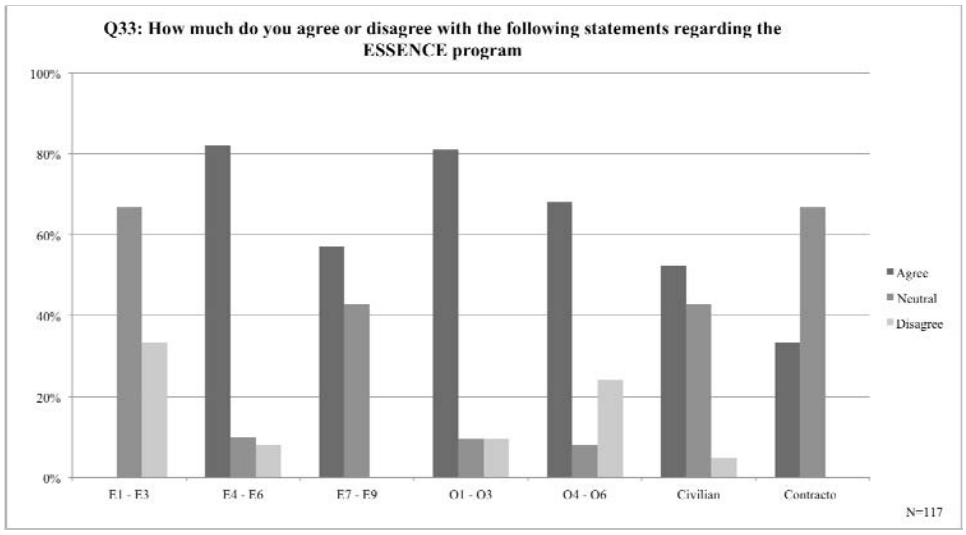


Figure 28. Percentage of monitors by rank who agreed, was neutral, or disagreed with the statement that ESSENCE provides their department with situational awareness about communicable diseases of interest in their area.

Similarly, monitoring trends of diseases in a certain location over time allows a monitor to track and perhaps understand the local trends in the diseases. There is a statistically significant difference by support facility ($\chi^2 = 29.292$, $p = 0.0036$)[15] and rank ($\chi^2 = 26.887$, $p = 0.0081$)[16] of those who do not believe that ESSENCE allows them to monitor trends of diseases over time, which provides the situational awareness that is a key role for ESSENCE. Similar to the results in Figure 27, Figure 29 shows that 20 percent of the NEPMU support facilities do not think ESSENCE allows them to monitor the trends of diseases in their area over time. Furthermore, 17 percent of the O4–O6s and small number of O1–O3s and civilians believe that this ability is lacking within the program (Figure 30). On the other hand, seven out of 10 users think ESSENCE is useful for recognizing trends over time, and believe SA is being provided to them.

[15] The chi-squared test was conducted on the cross-tabulation of question 33C with question 46.

[16] The chi-squared test was conducted on the cross-tabulation of question 33C with question 49.

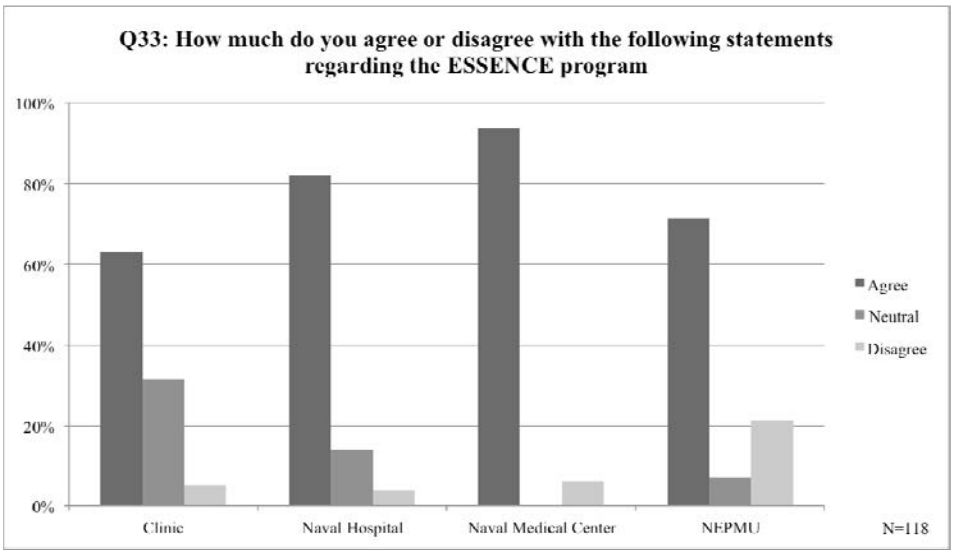


Figure 29. Percentage of monitors by support facility who agreed, were neutral, or disagreed with the statement that ESSENCE allows them to monitor the trends of diseases in their area over time.

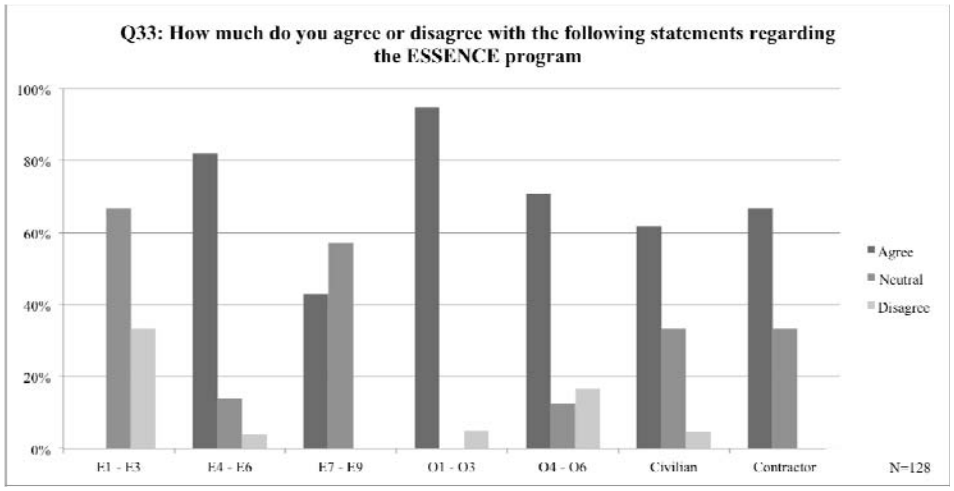


Figure 30. Percentage of monitors by rank who agreed, was neutral, or disagreed with the statement that ESSENCE allows them to monitor the trends of diseases in their area over time.

In addition, there was a statistical difference ($\chi^2 = 16.569$, $p = 0.0349$)[17] by user level or those who believe that ESSENCE allows them to follow particular reportable diseases in their area. Once more, NEMPU level users disagree that they are able to follow reportable diseases in their area (Figure 31).

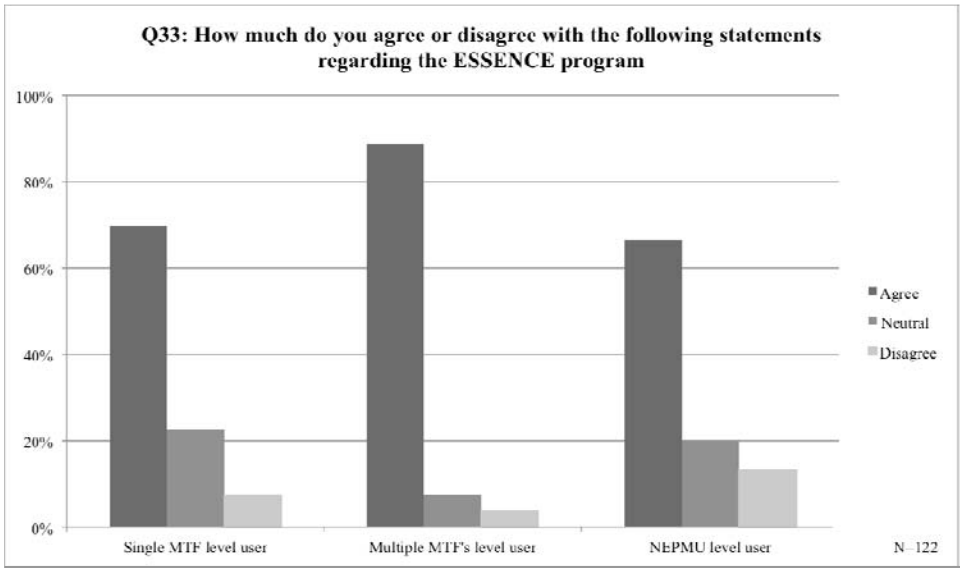


Figure 31. Percentage of monitors by user level who believe that ESSENCE allows them to follow particular reportable diseases in their area.

Through exhaustive research of the data, two questions in this question that identify outbreaks and false-positives are the most important. Inherently, ESSENCE is an outbreak detection tool, mostly for EED, and without collaborating programs, false-positives are time consuming for monitors to investigate. Of the 11 respondents who do not think that the time-series module is useful for identifying outbreaks, each one did not see an actual outbreak in ESSENCE. Roughly 70 percent of these monitors are routine users of the program, 54 percent routinely use the reportable diseases query module and 27 percent routinely use the syndromic query module as well. Six respondents use ESSENCE to investigate alerts and about 50 percent perceive the system to be ineffective and not valuable. Some reported that they use "AHLTA, CHCS, and labs" more often than ESSENCE, and their biggest headache comes from gaining "access" to the program

[17] The chi-squared test was conducted on the cross-tabulation of question 33D with question 45.

in the first place. They would prefer that "ESSENCE communicate with programs, such as AHLTA and CHCS," so they would not have to investigate false-positives and one monitor did not have "access to Personal Health Information (PHI) information," although access was requested multiple times. Finally, users reported that they could use ESSENCE for "situational awareness, but not for outbreak detection" and it was "not useful during the H1N1 outbreak."

Lastly, 62 respondents said they find that alerts in ESSENCE have a propensity to be false-positives. Sixty-six percent are routine login users, 62 percent run reportable diseases queries and 50 percent run syndromic queries. Approximately 77 percent use ESSENCE to investigate alerts, but only 33 percent has detected an actual outbreak using the system. A few have requested "more training," primarily "hands on training that provides practical use in one's department," such as "describing how [the] alert function works," outbreak scenarios and times-series module analysis. Some respondents recalled that ESSENCE "times out too quickly" and constant password updating makes the account holder spend more time speaking with ESSENCE help desk representatives, rather than logging in and checking for alerts. Finally, some feel that the "daily requirement to check ESSENCE seems to be a bit much." One respondent commented,

> I find that many times the alerts are false alerts and that the "syndrome" parameters are so wide that sometimes the alert doesn't seem credible. (i.e., a rash in two infants will trigger an alert and so will ptosis of the eyelid diagnosed in the optometry clinic.) I will check ESSENCE and then check the AHLTA encounter and contact the providers or clinics to [obtain] "ground truth" the data to see if what I see in ESSENCE is truly what is happening in the clinics. I do use ESSENCE to see how we are doing with regard to trends in coding for certain things like ILI, Resp, and GI syndromes. I share this with providers as appropriate. I also check the reportable disease section and use this as a "safety net" to catch any reportable diseases that weren't consulted to Prev Med or didn't show up as a positive lab in our box in the Laboratory. We follow up on each reportable disease that shows up in ESSENCE. At times we will find STDs and other reportable diseases this way.

In conclusion, at least nine out of 10 respondents value ESSENCE, but the 8 percent who do not value the system have important recommendations and reasons why they do not favor the system. Most of them center on better and specific training,

constant password renewal, false-positives that decrease actual outbreak detection, miscodings, and compatibility with other external systems, such as AHLTA and CHCS, to view patient information while logged in.

C. ASSESSING USER TRAINING

A series of questions were developed to examine how ESSENCE monitors were trained to use the system and what they would like to see in the future. There are no statistically significant differences in how the respondents where trained by user level, support facility, professional background. Seventy percent of the respondents were self-taught, followed by 34 percent who were trained by their processors or downloaded the ESSENCE training modules and tutorials, and 21 percent were taught by their bosses (Figure 32).[18]

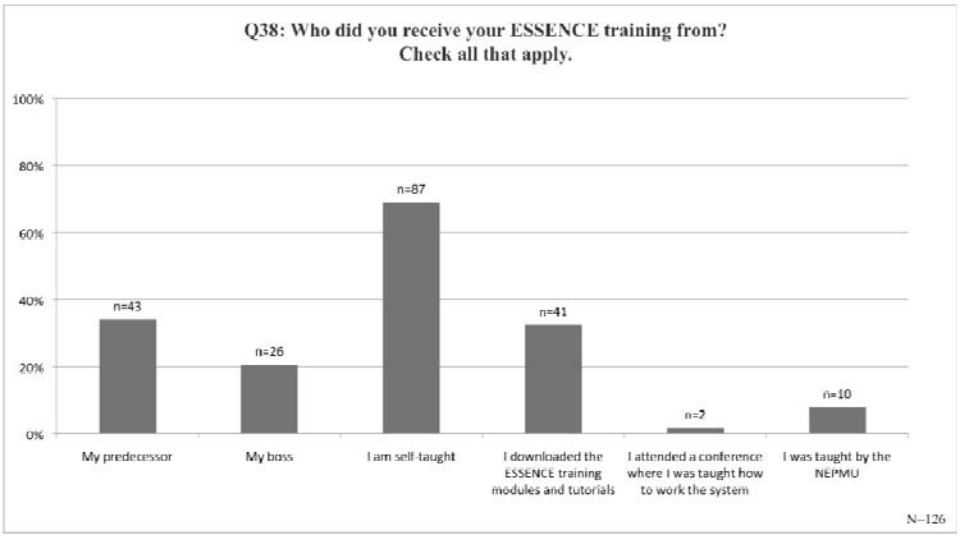


Figure 32. Distribution of where respondents received their ESSENCE training.

With no statistical difference (by rank, user level, professional background, and support facility), the majority of the monitors would like to see future training provided to them at their desks, in public health conferences, in hospital/clinic meetings, "C" school, NEPMU, and CME training. However, 30 percent do not want to have meetings

[18] Percentages add up to more than 100 percent because respondents could select more than one response.

at the hospitals/clinic meetings, indicating (not verifiable through survey data) that meetings during working hours are not conducive to ESSENCE training and should be conducted elsewhere. Fewer than 20 percent of users do not want to see training at their desks or in health conferences, which is evidence enough that these would be better venues for ESSENCE training.

Ninety-seven percent of the respondents reported that they would prefer hands-on training. There were no significant differences by rank, professional background, user level, or support facility. Furthermore, at least nine out of 10 monitors would like to receive initial ESSENCE user training, including training for site selection set up, how to evaluate alerts, query module applications, and outbreak scenarios. A few individuals also wrote that they would like to learn how to "detect probable false positives," "use the matrix function," and "time-series explanation and 14-day incidence explanations."

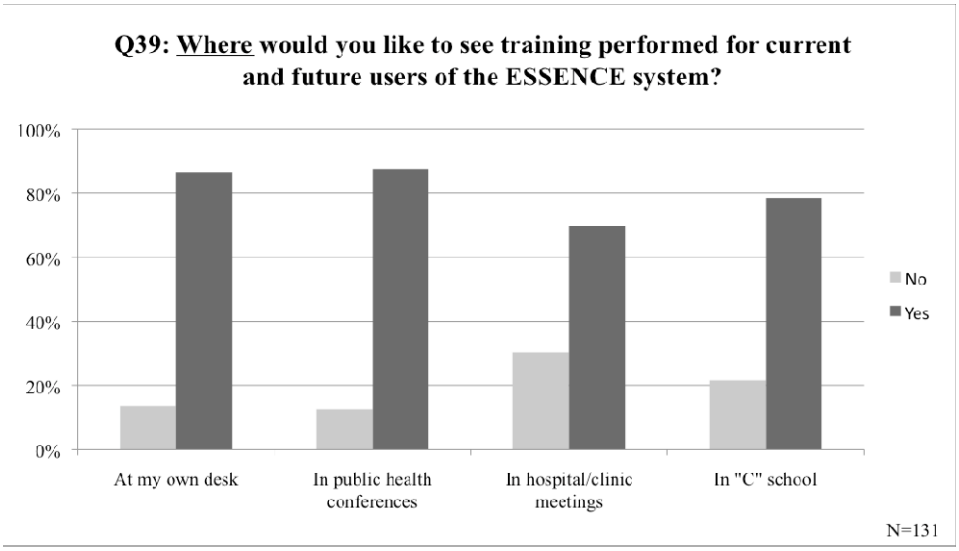


Figure 33. Distribution of where respondents would like to receive their ESSENCE training in the future.

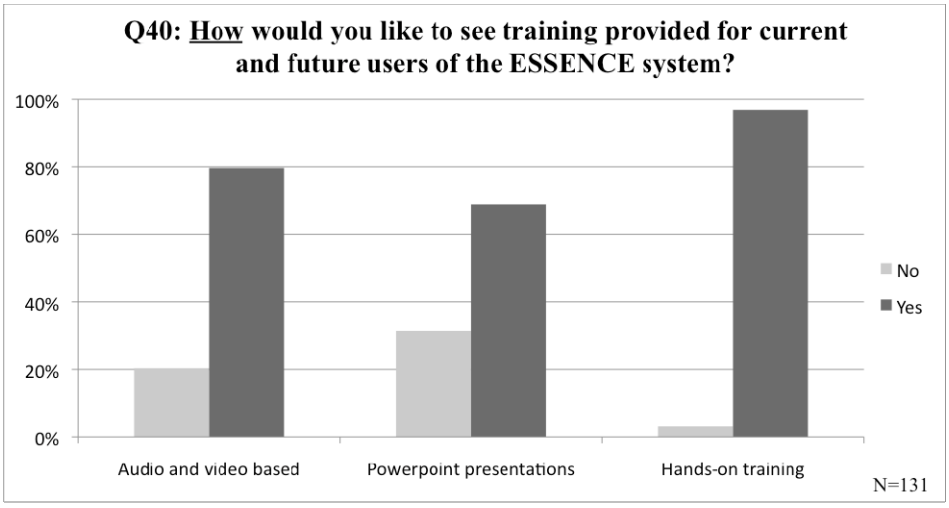


Figure 34. Distribution of how respondents would like to receive their ESSENCE training in the future.

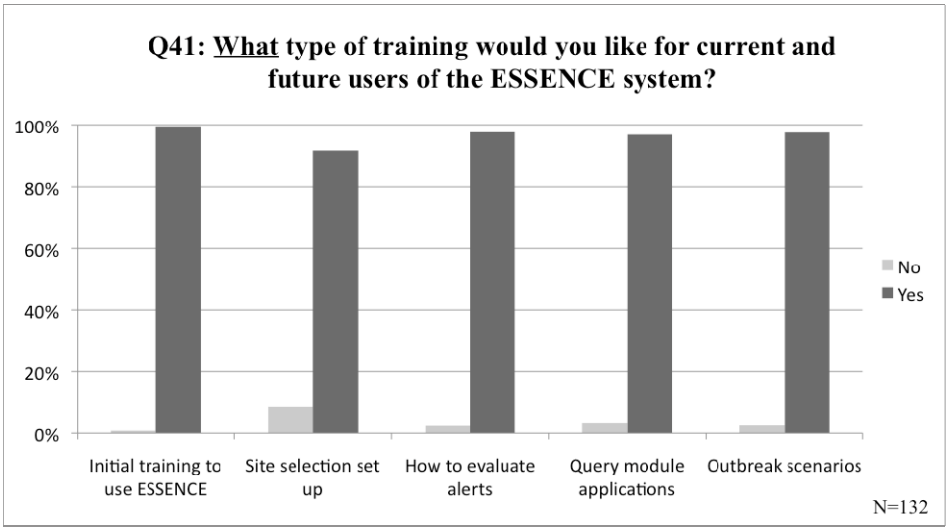


Figure 35. Distribution of what respondents would like to see in ESSENCE training in the future.

THIS PAGE INTENTIONALLY LEFT BLANK

V. CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY AND CONCLUSIONS

The Navy and Marine Corps use the ESSENCE system for early detection of diseases and other public health threats to the force and for situational awareness on the location and spread of such diseases. DoD Directive 6490.2E dated August 24, 2009 requires that "the DoD components shall conduct comprehensive, continuous, and consistent military health surveillance to implement early intervention and control strategies, using joint technologies, practices, and procedures in a manner consistent across the military services. Relevant, timely, actionable, comprehensive health surveillance information shall be collected and maintained to support the Armed Force." Following this guidance in 2009, the U.S. Navy and the Navy Bureau of Medicine and Surgery (BUMED) mandated that the "monitoring of ESSENCE alerts applies to all Navy medical treatment facilities (MTFs). Health surveillance shall be conducted to enable early intervention and control strategies. Monitoring for and timely reporting of significant health events that may adversely affect mission accomplishment and shape the commander's decision making is vital to military medicine functions.

Navy ESSENCE monitors are health professionals, including preventive medicine technicians, doctors, nurses, public health professionals, and epidemiologists. The agencies that monitor ESSENCE are the preventive medicine and public health departments of the Navy, which are spread throughout the world. They are comprised of naval clinics, naval hospitals, and naval medical centers. The Navy Environment Preventive Medicine Units (NEPMU), which are located in San Diego, California, Pearl Harbor, Hawaii, and Norfolk, Virginia, also monitor disease activity using ESSENCE. Finally, the Navy and Marine Corps Public Health Center (NMCPHC) oversees patient syndromic surveillance throughout the Navy as mandated by BUMEDINST 6220.12B.

This survey, conducted on behalf of the NMCPHC, was sent to 225 Navy and Marine Corps users with either an active or a disabled ESSENCE account. The survey was in the field for eight weeks. A total of 143 monitors (64 percent) responded to the

survey and seven (3 percent) opted out of taking it. Survey findings include that, overall, 92 percent of ESSENCE account holders, past and present, favor using the system, find it valuable, and believe the training they received was adequate. However, users raised four main issues: 1) it takes an excessive amount of time to obtain an account, 2) passwords are required to be changed too often, 3) there are too many miscodings leading to excessive false positive signals, and 4) training and training tools are insufficient.

First, acquiring an account and maintaining it is a recurrent problem among the users. Also, once the account has been given, users must change their passwords every other month. One respondent took the time to follow-up in an e-mail and wrote that:

> the stringency of the 15 digit complex password that has to be re-set every 60 days. I find myself spending an incredible amount of time "trying out" new passwords...only to discover it may have failed for lack of a second numeral, etc....and then have to do it all over again in 60 days. I do have a few "tricks" that help, but still haven't found a foolproof way to satisfy the requirement in a time-effective manner. I understand the need for security--- perhaps re-setting the pw every 90 days might be a reasonable compromise between maintaining a high-level of security and trying to increase user friendliness.

Another respondent commented in the survey:

> Don't ask for me to change my password as often as requested. I have been on leave or TAD twice when my account has been inactivated. Although I should have completed the task before I left, I don't change my bank info as much as I have to change ESSENCE. I understand the privacy issue, but most medical folks not involved in Preventive Medicine wouldn't even know where to access ESSENCE b/c they don't know what it is. I think it's a secure site, but I have had to reset my password several times.

Understanding that safeguarding of personally identifiable information (PII) is very important, but a single standard should be in place for all programs with PII, meaning that password change requirements should be the same length as AHLTA or CHCS. If passwords need to be revised often, then is it important to notify the users of this and the reasons. A well-informed account holder is a happier one.

Second, numerous comments declared that miscodings are too prevalent and respondents believe they contribute to a high false positive rate in ESSENCE. One

monitor states, “there are [too] many false positives, and many of the abbreviations remain a mystery.” The user suggests, “a key or legend would help,” and if one exists, to “make it more apparent to access. The idea of the program is marvelous --- so if it was a little easier to use I think more of us would use it as it was intended.” Another well-informed user, but one that believes false positives are numerous, said that:

> The daily requirement to check ESSENCE seems to be a bit much. I find that many times the alerts are false alerts and that the “syndrome” parameters are so wide that sometimes the alert doesn't seem credible. (i.e., a rash in 2 infants will trigger an alert and so will ptosis of the eyelid diagnosed in the optometry clinic.) I will check ESSENCE and then check the AHLTA encounter and contact the providers or clinics to 'ground truth' the data to see if what I see in ESSENCE is truly what is happening in the clinics. I do use ESSENCE to see how we are doing with regard to trends in coding for certain things like ILI, Resp, and GI syndromes. I share this with providers as appropriate. I also check the reportable disease section and use this as a 'safety net' to catch any reportable diseases that weren't consulted to Prev Med or didn't show up as a positive lab in our box in the Laboratory. We follow up on each reportable disease that shows up in ESSENCE. At times, we will find STDs and other reportable diseases this way. (Sometimes we find that they are simply rule-outs or coding errors, i.e., 'meningitis' was really a 'part 2 sea duty screen.’ Which keeps things interesting [sic].)

I am not suggesting that false positives are common, or that the system's sensitivity is too high, but ESSENCE account holders believe they are. They are requesting training, in particular, how to detect outbreaks and how to search through the alerts and false-positives for an actual alert.

Third, training will likely mitigate at least some of the problems that have been described. Many of the respondents suggested that “hands on training in practical terms for your particular command/MTF” is preferred. Although ESSENCE users have had initial training on how to log in and prepare their site selections to begin their investigations and to use the alert module and run syndromic and reportable diseases queries, most do not understand what the time-series tool contributes to and how to properly search through the alerts to detect an outbreak. Practical lessons should be developed to help educate current and future users.

B. RECOMMENDATIONS

To mitigate the password issues one recommendation that can be made is to modify ESSENCE to allow CAC enabled access. This would eliminate the need for users to have to reset passwords on a very frequent basis, which will ultimately increase the value and desire to use the system. This approach allows the frequently deployed service member the ability to gain access once they arrive back into their positions to log into ESSENCE without reacquiring an account and wasting up to a month before they can begin using ESSENCE.

To help address the issue of miscodings, perhaps modify ESSENCE to allow corrections to be made by the account holder who has access to CHCS and AHLTA, providers who verify the update, and by the laboratory technicians. If the users have the ability to change the miscodings to the correct codes, then perhaps, this may help bring down the alerts rate while improving ESSENCE sensitivity to detect actual outbreaks. Another possible fix for miscodings is to allow the individual who originally input the data incorrectly to change and delete the old entry. Or as stated in the survey, which 96 percent of the respondents agreed with, is to bold the finalized ICD-9 code and syndrome that will allow the ESSENCE monitors to focus their investigations on actual PIN information and alerts.

Lastly, in terms of training, practical applications either via Web-based video training or hands on training in the workplace will substantially increase user understanding in the system and, hopefully, will decrease their beliefs that false positives are the only thing that ESSENCE "detects." Users generally believe ESSENCE is a valuable system, and with the proper tools, account holders will be able to detect communicable diseases earlier in their area and provide the necessary situational awareness about these same diseases to enhance the security of the United States and throughout the world with healthy members of the military and their families.

C. FUTURE RESEARCH

This survey was only administered to Navy and Marine Corps active and disabled account holders, but I recommend that future research focus on Air Force and Army

account holders to see if the problems areas are similar and if not, are they better or worse. If they are better, then perhaps joint implementation of ESSENCE could be taught to the different military services to continue to improve the system and allow users to value it more. If all members of the Armed Forces have the same main problem areas, then a fix in the system and thorough training can be provided to everyone.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A. USER SURVEY

Official ESSENCE User Survey (BUMED 6220-3)

ABOUT THIS SURVEY

Introduction. You are invited to participate in a survey to help the Navy and Marine Corps Public Health Center (NMCPHC) better understand how the Electronic Surveillance System for Early Notification of Community-based Epidemics (ESSENCE) is being implemented and used in the Navy and Marine Corps. The purpose of the survey is to provide NMCPHC with information about:

- Whether and how users have been trained to use ESSENCE;
- How ESSENCE is currently being employed by the Navy and Marine Corps; and,
- How effective users think ESSENCE is for outbreak detection and situational awareness.

Procedures. This web-based survey is being conducted by the Naval Postgraduate School (NPS) on behalf of NMCPHC. *It should take no more than 20-25 minutes to complete.*

Risks. The potential risks of participating in this study are inadvertent disclosure of individual survey responses. To mitigate this risk, the project has implemented extensive data safeguarding procedures; a copy of the Data Safeguarding Plan is available from the survey project leader, LT Randi Korman. Yet, even with such procedures in place, there always remains some risk, however small, of a data breach.

Benefits. This study is designed to provide NMCPHC with recommendations to improve ESSENSE performance, training, and usability of the system. This is your opportunity to provide NMCPHC with your frank and honest feedback so decisions can be made to most benefit current and future ESSENCE users.

Compensation. No tangible compensation will be given. *If you would like to receive a copy of the report, send an email to rmkorman@nps.edu with the word 'INCLUDE' in the subject line and you will be added to the distribution list.* The results will be available in the March 2011 timeframe from NMCPHC via Ms. Asha Riegodedios, (904) 542-4635, asha.riegodedios2@med.navy.mil.

Confidentiality & Privacy Act. Any personally-identifying information that is obtained during this study will be kept confidential to the full extent permitted by law and your participation in the survey will not be disclosed outside of the NPS team. Your survey responses may be merged with demographic data provided by the NMCPHC for purposes of analysis. All efforts will be made by NPS to keep your personally-identifying information confidential, but total confidentiality cannot be guaranteed. It is possible that NPS is required to divulge information obtained in the course of this research to the subject's chain of command or other legal body. Upon completion of the survey, the team will de-identify the survey results to ensure complete anonymity and the de-identified data will be provided to NMCPHC.

Voluntary Nature of the Study. Participation in this study is strictly voluntary, and if agreement to participation is given, it can be withdrawn at any time without prejudice.

Points of Contact. Please contact the survey project leader and co-investigator, LT Randi Korman, 360-929-9843, rmkorman@nps.edu, with any questions about this survey. The principle investigator is Dr. Ron Fricker, 831-656-3048, rdfricke@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Navy Postgraduate School IRB Chair, CAPT John Schmidt, USN, 831-656-3876, jkschmid@nps.edu.

Q1 **Please click on the "YES" button to indicate that you voluntarily agree to take the survey.**

○ YES ○ NO

In this section we are interested in how you are currently using the ESSENCE system.

Page 1

Q2

On average, how often to do you log into ESSENCE?

- ○ Daily
- ○ Weekly (a couple times per week)
- ○ Monthly (a couple times per month)
- ○ Greater than monthly (a couple times per year)
- ○ Never

Q3

Do you receive e-mail alerts from ESSENCE?

- ○ Yes
- ○ No
- ○ I didn't know I could receive e-mail alerts

Q4

Do you log into ESSENCE only if you receive an e-mail alert?

- ○ Yes
- ○ No

Q5

Which e-mail alert(s) do you receive?

- ○ Yellow alerts
- ○ Red alerts
- ○ Both alerts
- ○ I don't know

Q6

Please explain why you do not receive e-mail alerts.

In this section we are interested in learning if you use the Alert List.

Q7

Do you monitor the Alert List module?

- ○ Yes
- ○ No
- ○ I don't know what this s

Q8

Please explain why you do not use the Alert List to monitor alerts.

In this section we are interested in how you run a reportable disease Query.

Q9

On average, how often do you run a reportable diseases Query?

- Daily
- Weekly (a couple times per week)
- Monthly (a couple times per month)
- More than monthly (a couple times per year)
- Never
- I don't know what this is

Q10

Do you have a Navy Disease Reporting System, internet (NDRSi) account?

- Yes
- No

Q11

If confirmed, do you or do you with a co-worker verify that the reportable diseases you see in ESSENCE are also inputed into NDRSi?

- Yes
- No

Q12

How much do you agree or disagree with the following statement?
I find that most often the reportable diseases I see in ESSENCE are rule-outs.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Page 3

Q13

Please explain why you do not use the reportable diseases Query module.

In this section we are interested in how you run a syndromic Query module.

Q14

On average, how often do you run a syndromic Query?

- ○ Daily
- ○ Weekly (a couple times per week)
- ○ Monthly (a couple times per month)
- ○ More than monthly (a couple times per year)
- ○ Never
- ○ I don't know what this is

Q15

When you run a syndromic Query, how often do you use the following data sources?

	Always	Frequently	Sometimes	Rarely	Never
SADR	○	○	○	○	○
Pharmacy	○	○	○	○	○
Laboratory	○	○	○	○	○
Radiology	○	○	○	○	○

Q16

When you run syndromic Query, how often are the following parameters important to your investigation?

	Always	Frequently	Sometimes	Rarely	Never
Age Range	○	○	○	○	○
Clinic Type	○	○	○	○	○
Start Date	○	○	○	○	○
End Date	○	○	○	○	○
Patient Category	○	○	○	○	○
Patient Military Branch	○	○	○	○	○

Q17

For a syndromic Query, do you do the following during your investigation?

	Yes	No
I narrow down (or specify) patient parameters depending on the syndrome/disease I am investigating	○	○
I look at syndromic patterns over time	○	○
I investigate certain alerts displayed on the data table by clicking on the Data Details for a given day	○	○

Page 4

Q18

Please explain why you do not use the syndromic Query module.

In this section we are interested in learning about the process of how you investigate an alert by using either the Alert List or the Query module.

Q19

Do you investigate alerts?

- Yes
- No

Q20

Do you use ESSENCE to *investigate alerts*?

- Yes
- No

Q21

When you begin an investigation using ESSENCE, which of the following site selections do you choose?

	Yes	No
Your local MTF		
Only Navy and Marine Corps MTF's in your region		
All services' MTF's in your region		
Across all Navy and Marine Corps MTFs in your country		
Across all services' MTFs in your country		

Q22

Once you notice a yellow or red alert for a particular syndrome, do you look up data details within ESSENCE to verify the need for additional investigation.

- Yes
- No

Page 5

Q23

How often do you check the following data details to look for clustering within an alert?

	Always	Frequently	Sometimes	Rarely	Never
PIN	○	○	○	○	○
Encounter Date	○	○	○	○	○
Age	○	○	○	○	○
FMP	○	○	○	○	○
ICD-9 Descriptions	○	○	○	○	○
Clinic Type	○	○	○	○	○
Provider	○	○	○	○	○
MTF	○	○	○	○	○
PatCat (Patient Category)	○	○	○	○	○
Look at the map view for a spatial representation	○	○	○	○	○

Other (please specify)

Q24

How often do you use the following external tools to further investigate clustering within an alert?

	Always	Frequently	Sometimes	Rarely	Never
AHLTA	○	○	○	○	○
CHCS	○	○	○	○	○
Speak with providers	○	○	○	○	○
Speak with laboratory technicians	○	○	○	○	○
Speak with immunizations technicians	○	○	○	○	○

Other (please specify)

Q25

Do you maintain a log or take notes (in Word or Excel) of an investigated alert for future reference?

- ○ Always
- ○ Depends on the syndrome/disease investigated and/or the severity of the outbreak investigated
- ○ Never

Q26

After researching an alert, do you brief your command?

- ○ Always
- ○ Depends on the syndrome/disease investigated and/or the severity of the outbreak investigated
- ○ Never

Page 6

Q27

Please explain why you do not investigate alerts.

Q28

If you do not use ESSENCE to investigate an alert, what alternate steps do you take to conduct your investigation?

>In this section we are interested in understanding outbreak detection while using ESSENCE.

Q29

Have you discovered an actual outbreak using ESSENCE?

- Yes
- No

Q30

If you have answered yes to the above question, check all the outbreak types you have discovered using ESSENCE.

- ILI
- Heat
- GI
- Respiratory
- Febrile
- Neurological
- Rash
- None

Other (please specify)

In this section we are interested in how you handle miscodings.

Page 7

Q31

Have you observed a miscoded ICD-9 code in ESSENCE?

- ○ Yes
- ○ No

Q32

What steps do you take to fix miscodings?
Check all that apply.

- ☐ I speak with the provider
- ☐ I speak with the immunizations representative
- ☐ I speak with the MFT coding representative
- ☐ I speak with the preventative medicine representative at the clinic/hospital
- ☐ I do not speak with anyone

Other (please specify)

In this section we are interested in your opinions of the ESSENCE system.

Q33

How much do you agree or disagree with the following statements regarding the ESSENCE program?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I feel comfortable using the ESSENCE program	○	○	○	○	○
ESSENCE provides my department with situational awareness about communicable diseases of interest in my area	○	○	○	○	○
ESSENCE allows me to monitor the trends of diseases in my area over time	○	○	○	○	○
ESSENCE allows me to follow particular reportable diseases in my area	○	○	○	○	○
ESSENCE would be easier to use if a patient's final diagnosis was viewed differently in the system, perhaps if bolded	○	○	○	○	○
ESSENCE would be easier to use if a patient's miscoded ICD-9 code were updated and correctly inputted into the system	○	○	○	○	○
The time-series module in ESSENCE is useful to identify outbreaks	○	○	○	○	○
I find that the alerts in ESSENCE are often false-positives	○	○	○	○	○

In this section we are interested in learning about your experience in obtaining your current ESSENCE account.

Q34

How long did it take you to acquire your current ESSENCE account?

- 1 - 15 days
- 16 - 30 days
- 31 - 45 days
- 46 - 60 days
- More than 60 days
- I don't remember

Q35

Did you have to apply more than once to obtain your current ESSENCE account?

- Yes
- No

Q36

Did you have to speak with an ESSENCE helpdesk representative while waiting to access your current ESSENCE account? (Including e-mails and phone calls)

- Yes
- No
- I don't remember

Q37

Estimate how many times you needed to contact the helpdesk (via e-mail or phone call) to acquire your current ESSENCE account.

- 1 time
- 2 times
- 3 times
- 4 times
- 5 or more times
- I don't remember

In this section we are interested in learning about what training you have had on the ESSENCE system and what you would like to see in the future.

Q38

Who did you receive your ESSENCE training from?
Check all that apply.

- [ ] My predecessor
- [ ] My boss
- [ ] I am self-taught
- [ ] I downloaded the ESSENCE training modules and tutorials
- [ ] I attended a conference where I was taught how to work the system
- [ ] I was taught by the NEPMU

Other (please specify)

Q39

Where would you like to see training performed for current and future users of the ESSENCE system?

	Yes	No
At my own desk	○	○
In public health conferences	○	○
In hospital/clinic meetings	○	○
In "C" school	○	○

Other (please specify)

Q40

How would you like to see training provided for current and future users of the ESSENCE system?

	Yes	No
Audio and video based	○	○
Powerpoint presentations	○	○
Hands-on training	○	○

Other (please specify)

Page 10

Q41

What type of training would you like for current and future users of the ESSENCE system

	Yes	No
Initial training to use ESSENCE	○	○
Site selection set up	○	○
How to evaluate alerts	○	○
Query module applications	○	○
Outbreak scenarios	○	○

Other (please specify)

Q42

Do you have any suggestions that will help make the ESSENCE system easier to use?

Q43

Do you have any suggestions that will help make the ESSENCE system more effective?

Q44

Do you have any other comments that you would like to make regarding the ESSENCE system?

In this section we are interested in learning about you as a monitor.

Page 11

Q45

Select the current user level that best describes you.

- ○ Single MTF level user
- ○ Multiple MTF's level user
- ○ NEPMU level user

Other (please specify)

Q46

Select the facility that you currently support.

- ○ Clinic
- ○ Naval Hospital
- ○ Naval Medical Center
- ○ NEPMU

Other (please specify)

Q47

Check all the service(s) you currently support.

- ☐ U.S. Air Force
- ☐ U.S. Army
- ☐ U.S. Marine Corps
- ☐ U.S. Navy

Q48

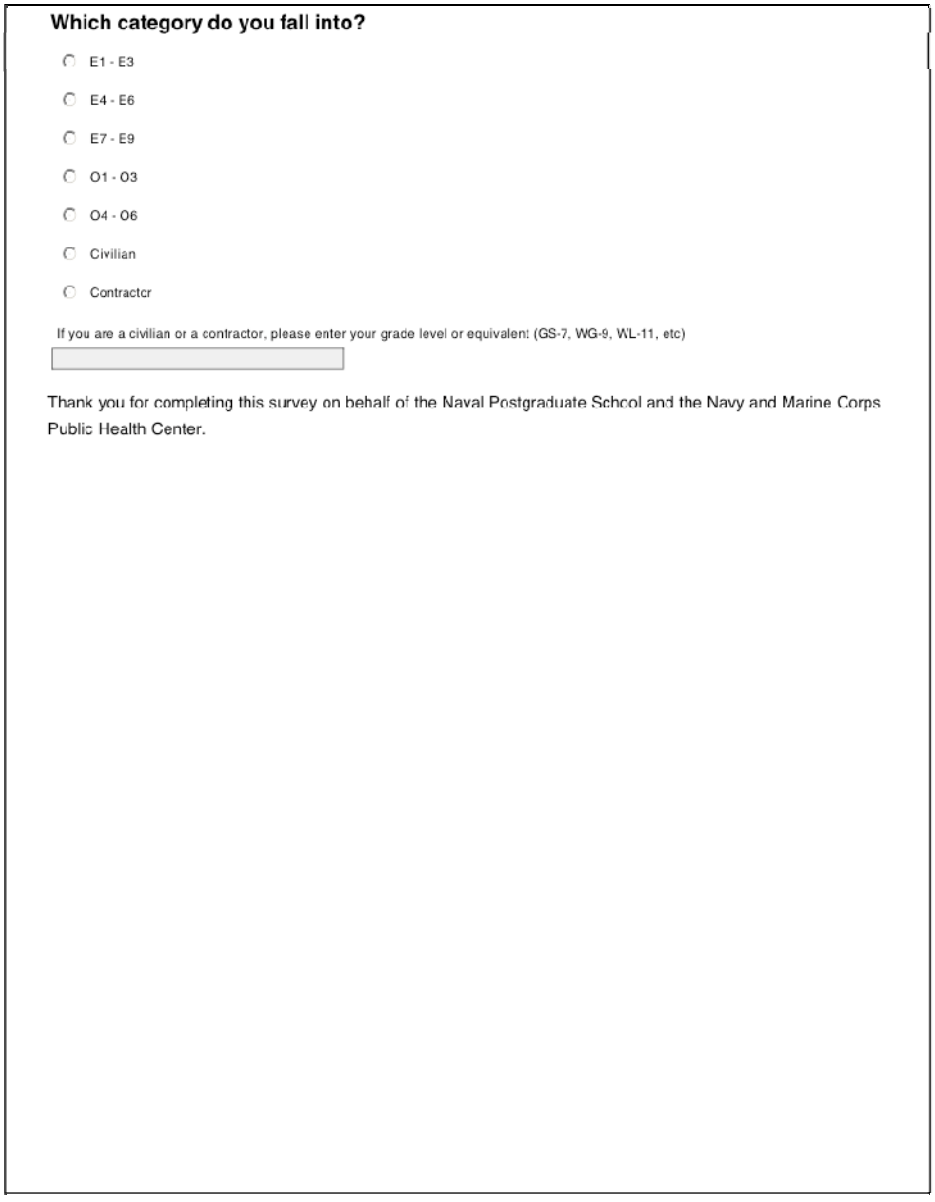
Select the professional background that best describes you.

- ○ Corpsman
- ○ Preventative Medicine Technician
- ○ Epidemiologist
- ○ Environmental Health Officer
- ○ Preventative Medicine Officers
- ○ Nurse
- ○ Physician

Other (please specify)

Page 12

Q49



Which category do you fall into?

- E1 - E3
- E4 - E6
- E7 - E9
- O1 - O3
- O4 - O6
- Civilian
- Contractor

If you are a civilian or a contractor, please enter your grade level or equivalent (GS-7, WG-9, WL-11, etc)

Thank you for completing this survey on behalf of the Naval Postgraduate School and the Navy and Marine Corps Public Health Center.

Page 13

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B. IRB DOCUMENTS

Naval Postgraduate School
Institutional Review Board (IRB)

From: President, Naval Postgraduate School
Via: Chairman, Institutional Review Board
To: Dr. Ronald Fricker, Jr., Operations Research Department
LT Randi Korman, USN

OCT 22 2010

SUBJ: ASSESSING THE ESSENCE BIOSURVEILLANCE SYSTEM AS USED BY THE NAVY AND MARINE CORPS: USER TRAINING, SYSTEM EMPLOYMENT AND PERCEIVED VALUE

Encl: (1) Approved IRB Protocol

1. The NPS IRB is pleased to inform you that the NPS President has approved your project (NPS IRB# NPS.2011.0001-IR-EP7-A). The approved IRB Protocol is found in enclosure (1). Completion of the CITI Research Ethics Training has been confirmed.

2. This approval expires on 31 March 11. If additional time is required to complete the research, a continuing review report must be approved by the IRB and NPS President prior to the expiration of approval. At expiration all research (subject recruitment, data collection, analysis of data containing PII) must cease.

3. You are required to report to the IRB any unanticipated problems or serious adverse events to the NPS IRB within 24 hours of the occurrence.

4. Any proposed changes in IRB approved research must be reviewed and approved by the NPS IRB and NPS President prior to implementation except where necessary to eliminate apparent immediate hazards to research participants and subjects.

5. As the Principal Investigator it is your responsibility to ensure that the research and the actions of all project personnel involved in conducting this study will conform with the IRB approved protocol and IRB requirements/policies.

6. After the experiment is completed the Principal Investigator will submit to the Human Subjects Protection Office, all signed informed consent documents, unanticipated problem reports, adverse event reports and a End of Experiment Report. The Human Subjects Research Office will secure these documents for 10 years and then forward to the nearest FRC.

CAPT John Schmidt, MSC, USN
Chair
Institutional Review Board

Daniel T. Oliver
President
Naval Postgraduate School

DEPARTMENT OF THE NAVY
NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
620 JOHN PAUL JONES CIRCLE SUITE 1100
PORTSMOUTH VA 23708-2103

5300
Ser PH/

From: Commanding Officer, Navy and Marine Corps Public Health Center
To: Superintendent, Naval Postgraduate School

Subj: SUPPORT OF STUDENT SURVEY PROJECT

Ref: (a) BUMEDINST 6220.12B
(b) OPNAVINST 5300.8C

Encl: (1) ESSENCE User Survey Package

1. This letter is to authorize NMCPHC support for a Naval Postgraduate School (NPS) student project that will also benefit this command. Per reference (a), the Navy and Marine Corps Public Health Center is tasked with management of medical surveillance functions as well as evaluation of program areas for process improvement. To support this effort, one of your students is interested in administering a survey to all Navy Medicine Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) users as part of her thesis project. LT Randi Korman has been working with members of my Preventive Medicine Department in the design of this survey and has created the draft package (enclosure (1)). The next step is for LT Korman to seek approval from the NPS Institutional Review Board as well Navy Survey approval per reference (b).

2. Once the IRB and survey approvals are received, NMCPHC will provide NPS the email addresses of Navy ESSENCE users as well as a pre-survey email notice to those users to facilitate LT Korman's survey project. It is anticipated that LT Korman's results can be used for improving this important medical surveillance program so we are pleased to assist in this joint venture.

3. Point of contact is CDR Christopher Clagett, DSN 377-0715 or (757) 953-0715 or email at christopher.clagett@med.navy.mil.

B. A. COHEN

Copy to:
BUMED M3/5

Data Safeguarding Plan

Associate Professor R.D. Fricker, Jr., Principal Investigator
LT Randi Korman, Co-investigator

August 13, 2010

Project Description

The research consists of a survey of ESSENCE monitors and subsequent analysis of the resulting data. The survey will be conducted as a thesis project on behalf of the Navy and Marine Corps Public Health Center (NMCPHC). The instrument will consist of questions about how extensive the user training was prior to program operation, system employment, and their perceived value.

Description of Data to be Acquired and their Usage

Survey data will be acquired from current users of the ESSENCE biosurveillance system via a Web-based survey instrument. If possible, this data will be merged with respondent demographic information obtained from the NMCPHC that will include last name, first name, e-mail, and Medical Treatment Facility (MTF) or Navy Environmental Preventive Medicine Unit (NEPMU). This information will be used to personalize the survey e-mail invitations and for analysis of results by the team members.

Data Sensitivity

The personal identifying information (PII) that will be acquired from the NMCPHC for use in this survey will be the ESSENCE monitor's e-mail addresses, last name, first name, and MTF or NEPMU affiliation. Some demographic information may be sensitive to some individuals. However, the survey data itself will consist of individual responses to questions about user training, system employment, and perceived value, a fairly innocuous subject that poses minimal risk to survey respondents.

Data Safeguarding Responsibilities

The Principal Investigator (PI) and Co-investigator bear sole and complete responsibility for safeguarding the data. Only the PI and Co-investigator will have access to the complete data set. They will ensure that all provisions of this Data Safeguarding Plan, as well as any other requirements levied by the NMCHPC, are fully and completely implemented.

Data Safeguarding Procedures

The PI and Co-investigator will implement the following procedures for safeguarding the data on this project:

1. All requirements for safeguarding personally identifiable information (PII) outlined in NAVPGSCOL Instruction 2201 dated 5 July 2007 will be fully implemented and followed.
2. The data will be collected using a commercial Web survey program (SurveyMonkey). All survey data will be collected using enhanced SSL encryption to protect respondent information during transmission. Once data collection is complete, the data will be downloaded to a file system at NPS and the data deleted from the SurveyMonkey server.
3. Data files, lists or any other reports or printouts that link personnel names or contain personal or other sensitive data will *never* be received or transmitted via e-mail. The preferred method of receiving such information is via a common shared drive on the NPS intranet. In accordance with NAVPGSCOL Instruction 2201 dated 5 July 2007, the project will only transport PII data "using the secure server and following the NPS encryption guidelines."
4. Respondent contact information will be strictly limited to members of the survey team on a need to know basis.
5. All such data will only be stored on computers and file systems physically located within, and will not be removed from, the physical confines of the Naval Postgraduate School. In addition, data files containing personal or other sensitive data will *never* be stored on thumb drives or laptop computers.
6. Working files of the original data files will only be stored on a password protected network drive physically located within the confines of NPS. Any other media (e.g., CD-ROM) containing data that is received or created will also be stored in a secure locker in the System Technology

Battle Laboratory (STBL) for as long as it is needed by the project and then destroyed. The STBL is supervised during normal working hours and kept locked after hours at all times.

7. Sensitive hard copy lists and reports will be stored in a secure locker in the STBL when they are not being used. Access to these materials will be limited to the PI and Co-investigator.

8. Identifiable information will not be printed unless absolutely necessary. Such printing should be very rare. Printed output containing identifiers will be treated as confidential. Printouts containing identifiable data will be destroyed by shredding when no longer needed.

9. Analytical files, constructed from the original data files, will not contain any personal data, including names, SSNs, or other information from which an individual can be identified. This de-identified analytical file will contain an identifying number that uniquely links each individual in the analytical file to the relevant records in the original data files.

10. The cross-walk file from the identifying information to unique identifying number will be secured in the same manner as the original files (see item 3 above).

11. The de-identified analytical file or files will only be stored on a password protected internal ("H") drive. .

12. The project will maintain a log of all sensitive computer files and all media, output and reports containing sensitive data contained in the secure locker. Directories containing sensitive files will be monitored on a regular basis to ensure that file permissions are correctly set on all files.

13. Upon completion of the project, all electronic files with identifiable information will be positively erased using a utility that overwrites the files on the hard drive, all other data storage media will be physically destroyed in such a manner that data recovery is impossible (i.e., shredding CD-ROM disks), and all paper files with personal or other identifying information will be destroyed by shredding.

14. Any serious violation of the Data Safeguarding Plan will be reported in writing to the NPS Institutional Review Board, with a copy to the NPS Operations Research Department Chair.

Audit and Monitoring Plans

This Data Safeguarding Plan will be reviewed periodically to ensure that it continues to meet the needs of the project, as well as that the project is following all procedures and requirements outlined herein. Logs will be reviewed as necessary to ensure they are up-to-date. A periodic review of file permissions will be conducted to ensure that file permissions are correctly set and maintained on all files.

REPORT ANALYSIS DATA

1. SSIC NUMBER: 6220

2. REPORT CONTROL SYMBOL: BUMED 6220-3

3. TITLE OF REPORT
Assessing the ESSENCE Biosurveillance System as Used by the Navy and Marine Corps: User Training, System Employment, and Perceived Value

4. PURPOSE OF REPORT
The Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE) biosurveillance system is a complex computer-based system intended to provide early warning of and situational awareness about disease outbreaks in military populations. The NMCPHC is interested in determining the value the program has for its users. LT Randi Korman will conduct and analyze the results of a survey to assess the monitor's usage, training, and perceived value of the biosurveillance system.

5. REQUIRING DIRECTIVE(S): (List all that apply)
BUMEDINST 6220.12B

6. FREQUENCY OF REPORT
☐ DAILY ☐ QUARTERLY ☒ ONE TIME
☐ WEEKLY ☐ SEMI-ANNUALLY ☐ SITUATIONAL
☐ MONTHLY ☐ ANNUALLY ☐ _____

7. REPORT FORMAT
☐ MESSAGE ☐ LETTER ☒ FORM (Attach copy)

8. IS REPORT SUBJECT TO MINIMIZE?
☐ YES ☐ NO ☒ NOT APPLICABLE

9. METHOD OF PREPARATION
☒ ADPE ☐ TYPEWRITER ☐ MANUAL ☐ _____

10. IS REPORT ENTERED INTO AN ADP SYSTEM?
☐ NO ☒ YES (list name and location of system)
NPS Thesis System and DTIC

11. WHO USES COMPLETED REPORT? (list by command, OP code, etc.)
Navy and Marine Corps Public Health Center
Naval Postgrduate Sschool

12. THIS REPORT IS COMPLETED BY ☐ OPERATING FORCES (SNDL Part 1) ☒ SHORE ESTABLISHMENT (SNDL Part 2)
IF COMPLETED BY OPERATING FORCES, ARE FLEET CINC COMMENTS ATTACHED? ☐ YES ☐ NO

13. RESPONDENTS

	OPERATING FORCES (SNDL Part 1)	SHORE ESTABLISHMENT (SNDL Part 2)
A. LIST RESPONDING COMMANDS BY A COLLECTIVE TERM OR BY NAME (FOR EXAMPLE: FLTCINCS, TYCOMS, NAVAL LABS, ALL LEGSERVOFF, CRUITSTAS, AREA COORDINATORS, ALL OPER AVIATION SQUADRONS, ALL SUBMARINES, ALL SSN, ALL SURFACE SHIPS, MAJOR CLAIMANTS, ALL SHOREACTS W/BEQ/BOQ, ALL COMDS W/DENTISTS, ALL S&S W/MEDPERS, SYSCOMS, COMDS W/GEN MESS, ALL S&S, ALL COMDS W/CIVILIANS, ALL OVS COMDS, ALL ECHELON 2 COMDS)	(1)	(2) ESSENCE users at: Naval Medical Centers Naval Hospitals Ambulatory Care Clinics Navy Environment Preventive Medicine Units
B. TOTAL NUMBER OF RESPONDENTS	(1)	(2) Less than 200
C. TOTAL COST TO PREPARE AND SUBMIT THIS REPORT (from reverse)	(1)	(2) $ 11 01.43

14. ACTION OFFICER

A. NAME, RANK/RATE/GRADE AND TITLE
Christopher D. Clagett, MD, MPH, MSBA
CDR, MC, USN (FMF)
Head, Preventive Medicine Dept, NMCPHC

B. ACTIVITY NAME AND ADDRESS (include room no.)
NAVY AND MARINE CORPS PUBLIC HEALTH CENTER
620 JOHN PAUL JONES CIRCLE SUITE 1100
PORTSMOUTH VA 23708-2103

C. SIGNATURE: Christopher D Clagett

D. DATE: 22 Oct 10

E. PHONE NO.: 757-953-0715

OPNAV 5214/10 (Rev. SEP 1981)

Page 1 of 2 Pages

Use this worksheet for estimating the total cost to prepare and submit this report. Compute two costs-one for operating forces and one for shore establishments. The hourly rate may be taken from any current pay chart.

OPERATING FORCES COSTS TO PREPARE AND SUBMIT

PAY GRADE	NO. HOURS SPENT	X HOURLY RATE	= PERSONNEL COSTS	+ 25% OVERHEAD	= TOTAL COSTS BY PAY GRADE

Total Cost to Prepare and Submit One Report: _____

X _____ Commands Required to Submit = _____

X _____ Reports per Year = _____

Total Cost to Prepare and Submit * _____

* Enter this figure in column 13(c) (1)

SHORE ESTABLISHMENT COSTS TO PREPARE AND SUBMIT

PAY GRADE	NO. HOURS SPENT	X HOURLY RATE	= PERSONNEL COSTS	+ 25% OVERHEAD	= TOTAL COSTS BY PAY GRADE
Prev Med Techs	.25	19.68	4.92	1.23	6.15
Nurses	.25	36.45	9.11	2.28	11.39
Doctors	.25	44.58	11.14	2.79	13.47

Total Cost to Prepare and Submit One Report: 31.47

X 35 Commands Required to Submit = 1101.43

X 1 Reports per Year = 1101.43

Total Cost to Prepare and Submit ** 1101.43

* *Enter this figure in column 13(c) (2)

SAMPLE COMPUTATION (SALARIES ARE NOT ACCURATE)

PAY GRADE	NO. HOURS SPENT	X HOURLY RATE	= PERSONNEL COSTS	+ 25% OVERHEAD	= TOTAL COSTS BY PAY GRADE
0-2 (Note 1)	.25	7.45	1.86	0.47	2.33
E-8 (Note 2)	3	7.45	22.35	5.59	27.94
GS-4 (Note 3)	1	4.77	4.77	1.19	5.96

Total Cost to Prepare and Submit One Report $ 36.23

X 4 Commands Required to Submit = $ 144.92

X 4 Reports per Year = 579.68

Total Cost to Prepare and Submit $ 579.68

Note 1: Reviews and signs report.

Note 2: Collects required information; prepares chart; writes report.

Note 3: Types and mails report.

OPNAV 5214/10 (Rev. SEP 1981)

APPENDIX C. E-MAIL NOTIFICATIONS

(Pre-Notification E-mail):

From: christopher.clagett@med.navy.mil
To: [E-mail]

Subject: ESSENCE User Survey

Dear [FirstName] [LastName],

Tomorrow you will receive an e-mail invitation to participate in a brief survey being conducted by the Naval Postgraduate School (NPS) about the Electronic Surveillance System for Early Notification of Community-based Epidemics (ESSENCE) system. This survey was developed by NPS on behalf of the Navy and Marine Corps Public Health Center (NMCPHC).

The purpose of the survey is to provide NMCPHC with information about:

- Whether and how users have been trained to use ESSENCE;
- How ESSENCE is currently being employed by the Navy and Marine Corps; and,
- How effective users think ESSENCE is for outbreak detection and situational awareness

In short, NMCPHC wants to better understand how to better facilitate ESSENCE use in the Navy.

The purpose of this e-mail is to provide you with advanced notice and request your participation. You will receive an e-mail tomorrow from LT Randi Korman (rmkorman@nps.edu) with the subject line: ESSENCE Monitor Survey. Please click on the link that will be provided as the survey is entirely online.

We look forward to your participation and thank you in advance.

Sincerely,
Christopher D. Clagett, MD, MPH, MSBA
CDR, MC, USN (FMF)
Head, Preventive Medicine Dept
Navy & Marine Corps Public Health Center

Please wait until tomorrow to receive the official survey.
[SurveyLink]
This link is uniquely tied to this survey and your e-mail address. Please do not forward this message.

Please note: If you do not wish to receive further e-mails from us, please click the link below, and you will be automatically removed from our mailing list.
[RemoveLink]

(Notification E-mail):

From: rmkorman@nps.edu
To: [E-mail]

Subject: Official ESSENCE User Survey (BUMED 6220-3)

Dear [FirstName] [LastName],

As mentioned in CAPT Clagett's e-mail yesterday, you are invited to take a survey about your use of the ESSENCE system. The purpose of the survey is to solicit ESSENCE users' opinions about training, system employment, and users' perceived value of the system. This is your opportunity to provide the Navy and Marine Corps Public Health Center (NMCPHC) with feedback about what is working and what needs improvement in the ESSENCE program.

The survey is now available via the following link: [SurveyLink]

The survey takes approximately 20-25 minutes to complete. Note the above link is uniquely tied to the survey and your e-mail address. Please do not forward this message. If you've received this message in duplicate and have already completed the survey please disregard. Also note that all information collected in this survey will be kept strictly confidential and will only be accessible by the Naval Postgraduate School (NPS) investigators. Only anonymous survey results will be forwarded to NMCPHC, without identifying information (including e-mail address). Any information identifying your participation in this survey will be destroyed by NPS upon completion of the analysis.

Please feel free to contact me if you have any questions regarding the survey. Mrs. Asha Riegodedios (asha.riegodedios2@med.navy.mil; COMM: 904-542-4635; DSN: 942-4635) is your NMCPHC point of contact and will distribute the results in the MAR 2011 timeframe.

Thank you for your participation.

Sincerely,
LT Randi Korman
rmkorman@nps.edu
XXX-XXX-XXX

Please note: If you have never been an ESSENCE user, please click the link below. We apologize for any inconvenience.

[RemoveLink]

(1st Follow-Up E-mail):

From: rmkorman@nps.edu
To: [E-mail]

Subject: Official ESSENCE User Survey (BUMED 6220-3)

Dear [FirstName] [LastName],

On Monday, November 8, 2010 you received an e-mail invitation to take a survey about your use of the ESSENCE system. To date we have not received your response. The purpose of the survey is to solicit ESSENCE users' opinions about training, system employment, and users' perceived value of the system. This is your opportunity to provide the Navy and Marine Corps Public Health Center (NMCPHC) with feedback about what is working and what needs improvement in the ESSENCE program.

The survey is now available via the following link: http: [SurveyLink]

The survey takes approximately 20-25 minutes to complete. Note the above link is uniquely tied to the survey and your e-mail address. Please do not forward this message. If you've received this message in duplicate and have already completed the survey please disregard. Also note that all information collected in this survey will be kept strictly confidential and will only be accessible by the Naval Postgraduate School (NPS) investigators. Only anonymous survey results will be forwarded to NMCPHC, without identifying information (including e-mail address). Any information identifying your participation in this survey will be destroyed by NPS upon completion of the analysis.

Please feel free to contact me if you have any questions regarding the survey. Mrs. Asha Riegodedios (asha.riegodedios2@med.navy.mil; COMM: 904-542-4635; DSN: 942-4635) is your NMCPHC point of contact and will distribute the results in the MAR 2011 timeframe.

Thank you for your participation.

Sincerely,

LT Randi Korman
rmkorman@nps.edu

Please note: If you have never been an ESSENCE user, please click the link below. We apologize for any inconvenience.

[RemoveLink]

(2nd Follow-Up E-mail):

From: rmkorman@nps.edu
To: [E-mail]

Subject: Official ESSENCE User Survey (BUMED 6220-3)

Dear [FirstName] [LastName],

Last week you received an e-mail invitation to take a survey about your use of the ESSENCE system. To date we have not received your response. The purpose of the survey is to solicit ESSENCE users' opinions about training, system employment, and users' perceived value of the system. This is your opportunity to provide the Navy and Marine Corps Public Health Center (NMCPHC) with feedback about what is working and what needs improvement in the ESSENCE program.

The survey is now available via the following link: http: [SurveyLink]

The survey takes approximately 20-25 minutes to complete. Note the above link is uniquely tied to the survey and your e-mail address. Please do not forward this message. If you've received this message in duplicate and have already completed the survey please disregard. Also note that all information collected in this survey will be kept strictly confidential and will only be accessible by the Naval Postgraduate School (NPS) investigators. Only anonymous survey results will be forwarded to NMCPHC, without identifying information (including e-mail address). Any information identifying your participation in this survey will be destroyed by NPS upon completion of the analysis.

Please feel free to contact me if you have any questions regarding the survey. Mrs. Asha Riegodedios (asha.riegodedios2@med.navy.mil; COMM: 904-542-4635; DSN: 942-4635) is your NMCPHC point of contact and will distribute the results in the MAR 2011 timeframe.

Thank you for your participation.

Sincerely,

LT Randi Korman
rmkorman@nps.edu

Please note: If you have never been an ESSENCE user, please click the link below. We apologize for any inconvenience.

[RemoveLink]

(3rd Follow-Up E-mail):

From: rmkorman@nps.edu
To: [E-mail]

Subject: Official ESSENCE User Survey (BUMED 6220-3)

Dear [FirstName] [LastName],

Two weeks ago you received an e-mail invitation to take a survey about your use of the ESSENCE system. To date we have not received your response. The purpose of the survey is to solicit ESSENCE users' opinions about training, system employment, and users' perceived value of the system. This is your opportunity to provide the Navy and Marine Corps Public Health Center (NMCPHC) with feedback about what is working and what needs improvement in the ESSENCE program.

The survey is now available via the following link: http: [SurveyLink]

The survey takes approximately 20-25 minutes to complete. Note the above link is uniquely tied to the survey and your e-mail address. Please do not forward this message. If you've received this message in duplicate and have already completed the survey please disregard. Also note that all information collected in this survey will be kept strictly confidential and will only be accessible by the Naval Postgraduate School (NPS) investigators. Only anonymous survey results will be forwarded to NMCPHC, without identifying information (including e-mail address). Any information identifying your participation in this survey will be destroyed by NPS upon completion of the analysis.

Please feel free to contact me if you have any questions regarding the survey. Mrs. Asha Riegodedios (asha.riegodedios2@med.navy.mil; COMM: 904-542-4635; DSN: 942-4635) is your NMCPHC point of contact and will distribute the results in the MAR 2011 timeframe.

Thank you for your participation.

Sincerely,

LT Randi Korman
rmkorman@nps.edu

Please note: If you have never been an ESSENCE user, please click the link below. We apologize for any inconvenience.

[RemoveLink]

(4th Follow-Up E-mail):

From: rmkorman@nps.edu
To: [E-mail]

Subject: Official ESSENCE User Survey - A Few Comments/Results

Dear [FirstName] [LastName],

Early this month you received an e-mail invitation to take a survey about your use of the ESSENCE system. To date we have not received your response.

However, we have received response from 124 monitors so far. Below are some of their opinions about the ESSENCE system.

Positive:
- "It has been a great additional tool to capture reportable diseases and track for outbreak trending. Hope it is a program that Navy Medicine and the Tri-Services keep as our Preventive Medicine Departments keep getting smaller with continued deployment support missions."
- "Overall, I am glad that ESSENCE exists. The ability to perform active surveillance is wonderful, as providers, historically, do a horrible job reporting infectious diseases to the PMA."
- "Great system."

Negative:
- "Direct access patient information to AHLTA/CHCS and NDRSi. Too much time is spent switching between programs to find patient information in order to ensure treatment and that reporting was completed."
- "Get rid of it. Have a program that is used by most of the medical community (CHCS or AHLTA) do disease reporting. When we do reports here the information we need we have to get from AHLTA/CHCS so why not just get rid of the middle man and have those programs report the same things as ESSENCE."

Your response is important. We want to ensure that all opinions and viewpoints are reflected in the results. Please click on the following link to take the survey: http://www.surveymonkey.com/s.aspx . It will take approximately 20-25 minutes to complete.

Note the above link is uniquely tied to the survey and your e-mail address. Please do not forward this message. Also note that all information collected in this survey will be kept strictly confidential and will only be accessible by the Naval Postgraduate School (NPS) investigators. Only anonymous survey results will be forwarded to NMCPHC, without identifying information (including e-mail address). Any information identifying your participation in this survey will be destroyed by NPS upon completion of the analysis.

Please feel free to contact me if you have any questions regarding the survey. Mrs. Asha Riegodedios (asha.riegodedios2@med.navy.mil; COMM: 904-542-4635; DSN: 942-4635) is your NMCPHC point of contact and will distribute the results in the MAR 2011 timeframe.

Thank you for your participation.
Sincerely,

LT Randi Korman
rmkorman@nps.edu

Please note: If you have never been an ESSENCE user, please click the link below. We apologize for any inconvenience. [RemoveLink]

(5th Follow-Up E-mail):

From: christopher.clagett@med.navy.mil
To: [E-mail]

Subject: Request for your Participation in the ESSENCE User Survey

Dear [FirstName] [LastName],

Over the last few weeks you should have received a number of e-mail invitations from LT Randi Korman to participate in a brief survey about the ESSENCE system. To date your response has not been received.

The survey was developed to gather information about ESSENCE use, training, and effectiveness. One of our primary purposes in soliciting your feedback is to help us ascertain the information needs of ESSENCE users, as well as the effectiveness of training we have made available to date. Your input is very important to the Navy and Marine Corps Public Health Center so we can better understand how to improve ESSENCE use in the Navy.

Please click on the following link to participate: http://www.surveymonkey.com/s.aspx

Thank you for taking the time to complete the survey.

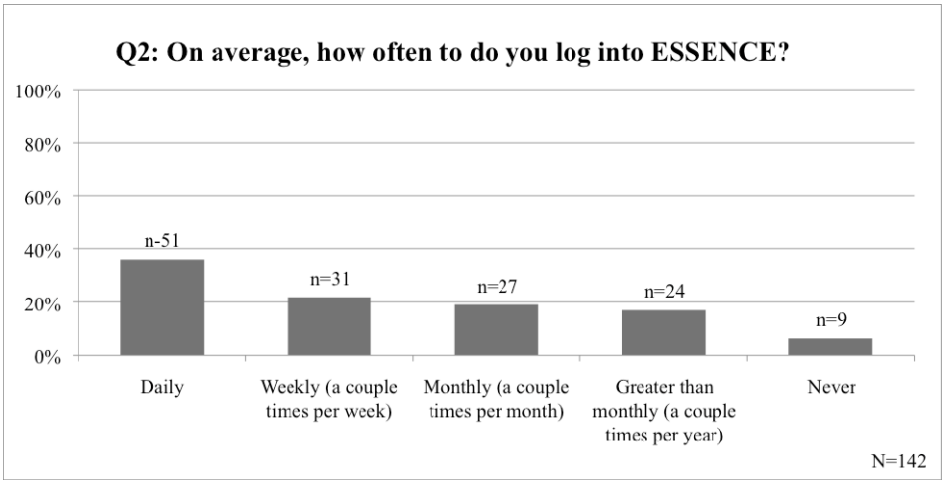
Sincerely,

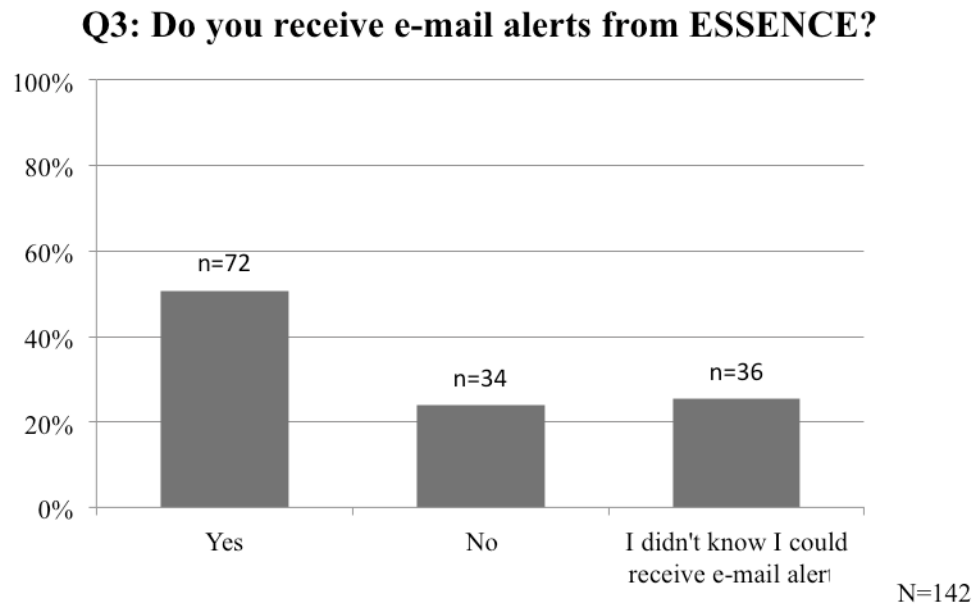
Christopher D. Clagett, MD, MPH, MSBA
CAPT, MC, USN (FMF)
Director, Preventive Medicine Dept
Navy & Marine Corps Public Health Center

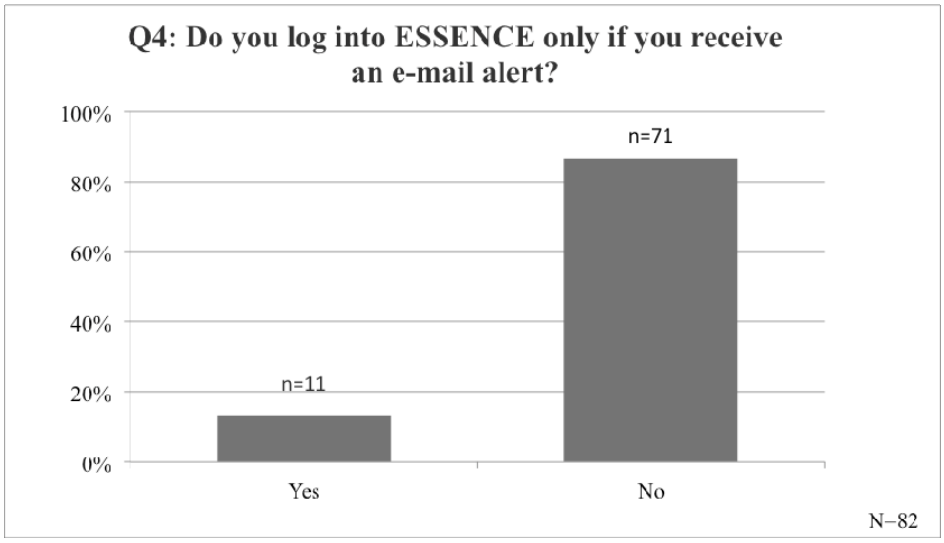
Note: If you do not wish to participate in this survey, please click on the following link: [RemoveLink]

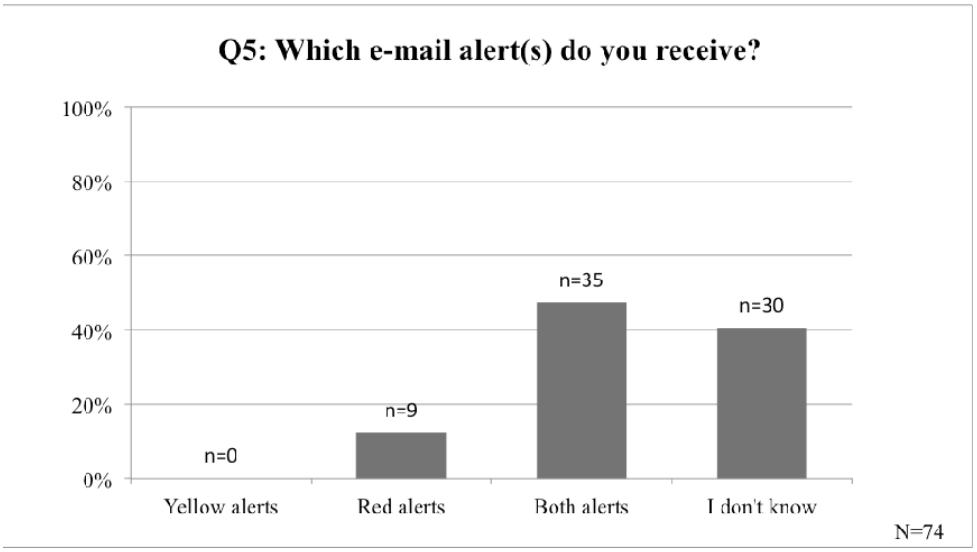
THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX D. SURVEY RESULTS

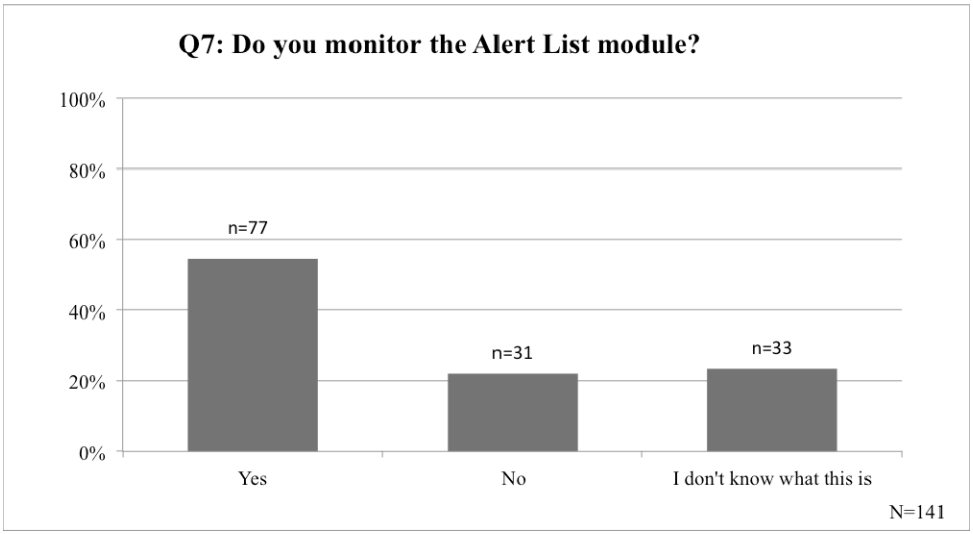





Q4: Do you log into ESSENCE only if you receive an e-mail alert?
100%
80%
60%
40%
20%
0%
n=11
n=71
Yes
No
N=82

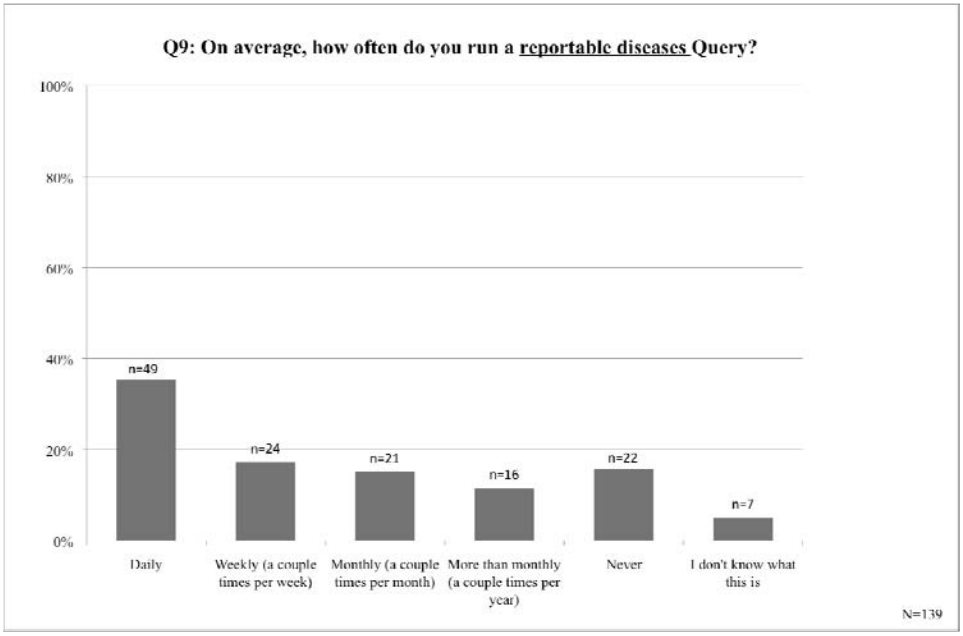

Q5: Which e-mail alert(s) do you receive?
100%
80%
60%
40%
20%
0%
n=0
n=9
n=35
n=30
Yellow alerts
Red alerts
Both alerts
I don't know
N=74

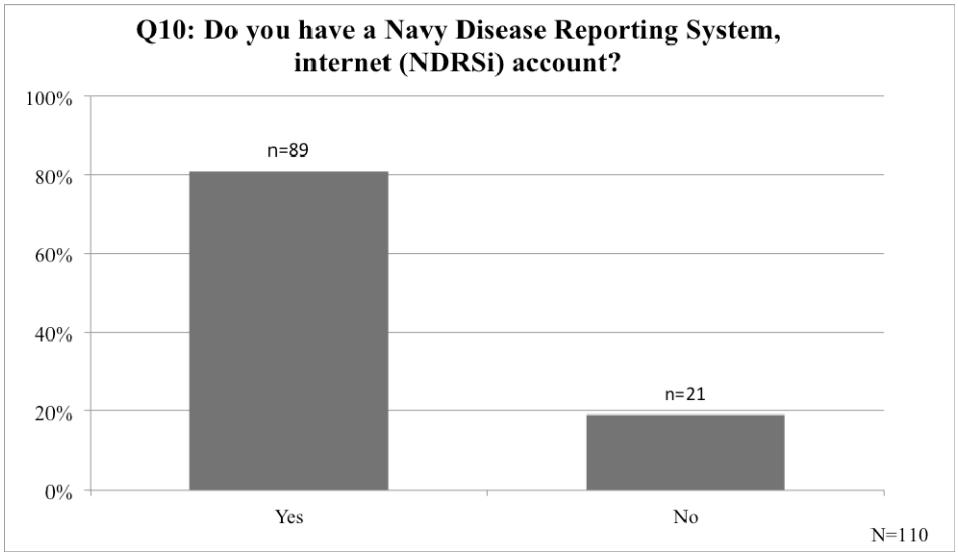
Q6: Please explain why you do not receive e-mail alerts.
I am a program manager and do not need alerts at my level.
I have not set up the system to send me alerts.
I check essence everyday so I see no need to have e-mail alerts
I get enough e-mail already. Please don't e-mail me. I'll check ESSENCE every day.
I don't use ESSENCE as a primary alerting tool, rather as a quick look at trends when I'm investigating a particular phenomenon.
When I got me account Essence stated they do not send out e-mail alerts
Because I check the alerts daily when I am at work so I see the alerts.
Didn't know feature was available
They don't show up
Have only received system maintenance alerts.
Fills up e-mail Inbox- Cumbersome
Daily log in dispenses with the need for alerts. If you are looking at them, you don't need an e-mail about them.
I JUST NEVER HAVE. THERE ARE MANY OF US IN THIS OFFICE THAT HAVE ACCESS TO ESSENCE. THEY MIGHT. ONE OF OUR STAFF CHECKS ESSENCE DAILY FOR REPORTABLE DISEASES.
Forward deployed to AFG for past 7 months.
Just never signed up for them not necessary for my job.
I have technicians who monitor and notify me if we have issues.
Did not sign up for e-mail alerts.
I work at the public health center
I only receive notes about up grades.
I do not think I ever elected to receive them.
I am not a local level user. Navy wide alerts would be too much. Also, when have looked at alerts, do not find them helpful - there is no history contained in the alert.
Did not know I could nor how to request or set it up
Way too many false negatives to make it useful
Have not requested alerts
I have not requested e-mail alerts
I don't know why I don't receive e-mail alerts.
Other people w/in the PH Directorate receive ESSENCE e-mail alerts
Because of other methods of information.
I rarely use essence and that is to check for my staff members. So I cannot tell you why I don't receive the colored alerts. I have received e-mails stating that that my Essence account is about to expire.
IT IS NOT MY PROGRAM ONLY CHECK WHEN I HAVE THE PREVENTIVE MEDICINE DUTY ONE WEEK A MONTH
I am not sure, The only alerts I receive is for down time

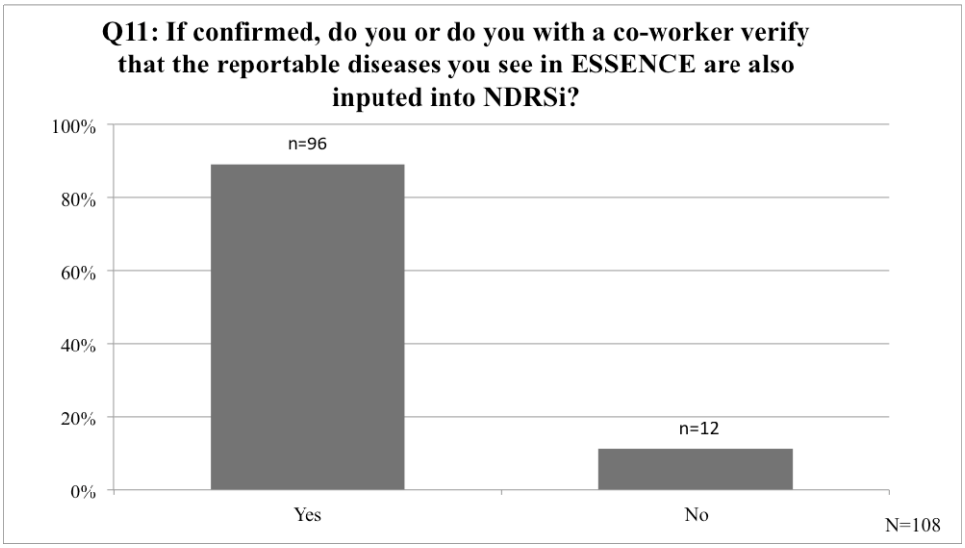


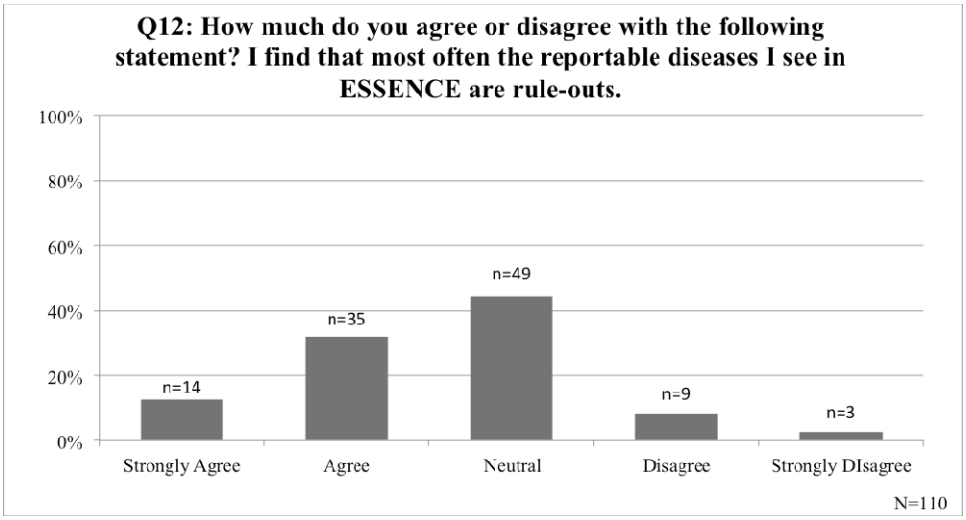
Q8: Please explain why you do not use the Alert List to monitor alerts.
I look at the e-mail alerts, log into essence, and look for trends.
No because I do not receive the alerts.
No idea how
I am in Business OPS and I normally get into ESSENCE at the request of the ESC members
I just returned from deployment and have not reactivated my account.
Fills inbox
I HAVE NO IDEAL WHAT IT IS.
I am an Administrative Clerk. I have no access to ESSENCE, nor will I be using the program to monitor any medical info/updates.
I have not used ESSENCE in over a year since I left the Preventive Medicine field.
Forward deployed to AFG for past 7 months.
It's a passive surveillance system and there is no authority to ensure proper reporting or accountability of users who are "supposed" to input data. Users and data entry personnel are not properly trained. Even when following up alerts or after review of surveillance data, end users would not respond to inquiries or even know anything about the diseases of concern, the cases, or the circumstances of the interested diseases. ESSENCE and the process in which is it currently used is not a useful program, period!
I am not the primary user that the command. I only access when the primary user is on leave.
Not part of my job description
Our Command EHO does that, we only cover if he is away from the office
The alerts are e-mailed to me, so I don't routinely log in to check the list.
Ditto
Other people use it and inform me
I already receive alerts that are specific to me; therefore I do not feel the need to always monitor the alert list, which includes other facilities. I do, however, occasionally look at it.
Not sure what you mean by alert lists. I use alert e-mails, which I really don't like because for large AOR, such as mine, I receive so many alerts.
I don't have access to many features of ESSENCE so the database is useless to me. I submitted 2 trouble tickets so far and my issues have not been resolved.

Q8: Please explain why you do not use the Alert List to monitor alerts.
Don't know how
Not the primary monitor for Essence at this command. Think it would be helpful, though.
We have an HM1 assigned to do monitor ESSENCE daily. He cuts/pastes and forwards the SADR MTF-Based Temporal Alerts and Reportable Disease list to the chain of command daily.
I have someone else who monitors it. I will do occasional query for a disease of interest.
I am not one of the primary ESSENCE monitors at this duty station and only access ESSENCE when needed, which has been rare
Co workers monitor that aspect

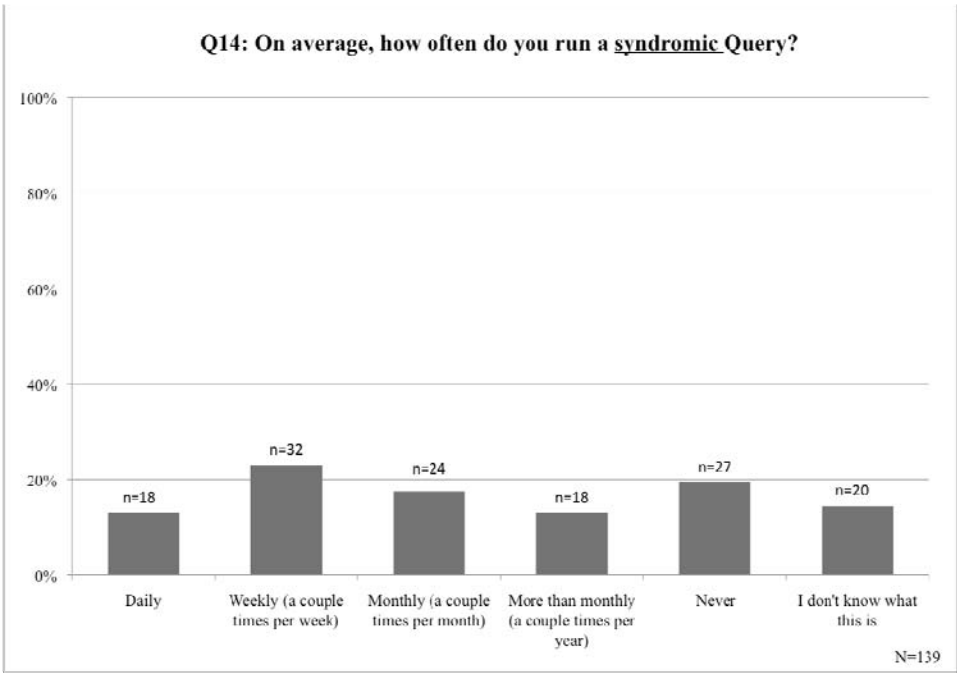


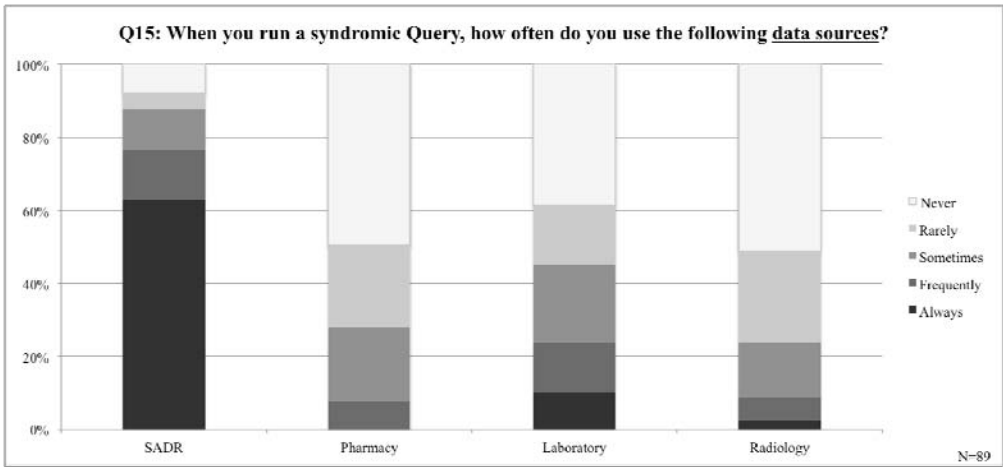

Q10: Do you have a Navy Disease Reporting System, internet (NDRSi) account?
100%
80%
60%
40%
20%
0%
n=89
n=21
Yes
No
N=110

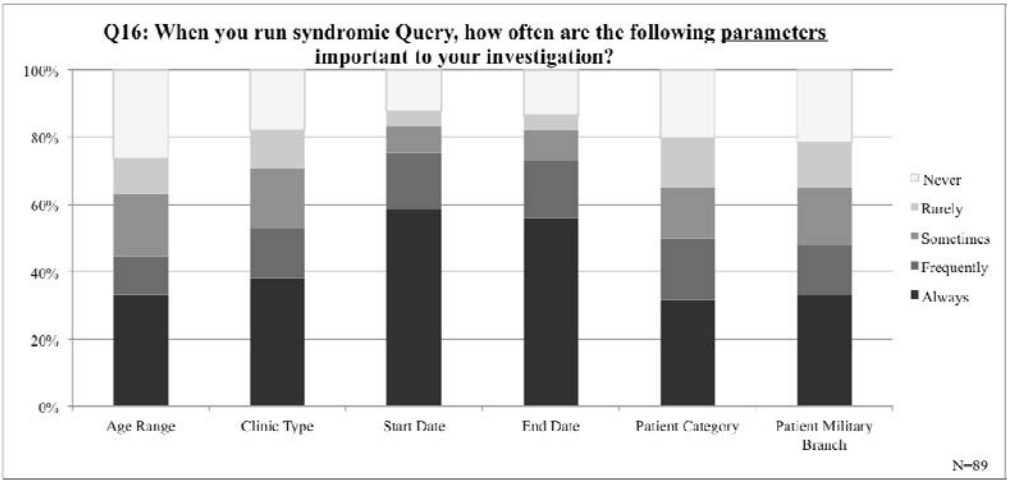

Q11: If confirmed, do you or do you with a co-worker verify that the reportable diseases you see in ESSENCE are also inputed into NDRSi?
100%
80%
60%
40%
20%
0%
n=96
n=12
Yes
No
N=108

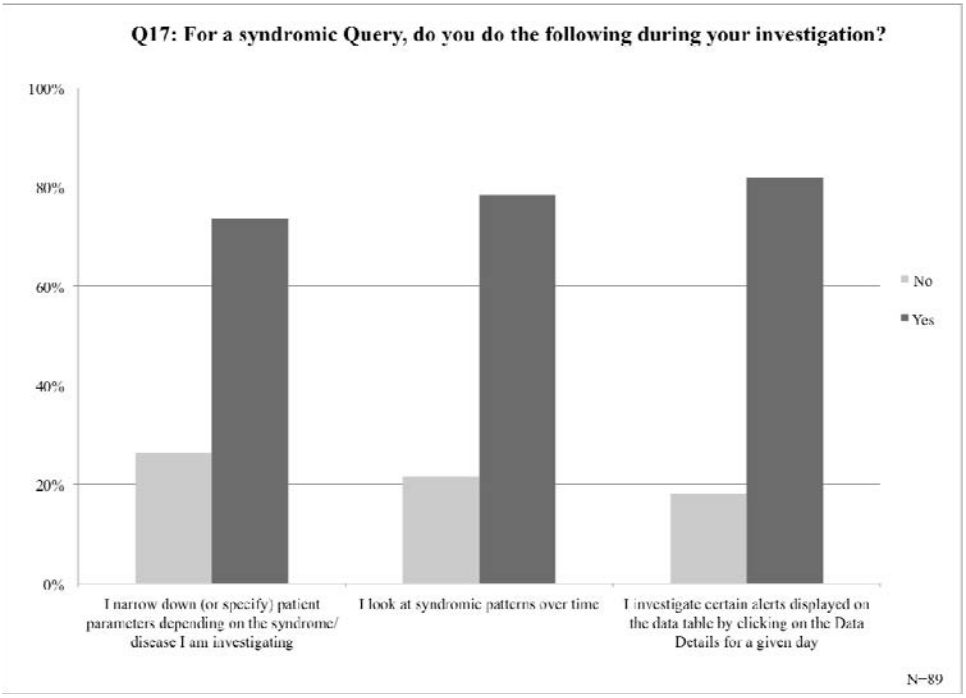


Q13: Please explain why you do not use the reportable diseases Query module.
Did not know this was available on this application.
Don't use essence often and still learning essence
This is done by our diseases folks I only review some of the data in a pinch
I did in the past, but found the MTFs in our area are familiar with it and use it as a check against MERs submitted.
I have no access to ESSENCE program
I have a personnel that do this specifically and he briefed me on the things that he do
I haven't used ESSENCE in over a year since I left the Preventive Medicine field.
No need
It's a passive surveillance system and there is no authority to ensure proper reporting or accountability of users who are "supposed" to input data. Users and data entry personnel are not properly trained. Even when following up alerts or after review of surveillance data, end users would not respond to inquiries or even know anything about the diseases of concern, the cases, or the circumstances of the interested diseases. ESSENCE and the process in which is it currently used is not a useful program, period!
I am not a Preventive Medicine Technician. There is someone in the department designated to handle the reporting of disease.
I have other ways to get the information.
Not trained on how.
I only look for alerts that are in reference to my area.
Others in department to do it.
See previous comment on the ongoing issues
Because do not have access to ESSENCE.
Not as familiar with Essence as I should. Time is not on my side at this time.
I don't know how too.


Q14: On average, how often do you run a syndromic Query?
100%
80%
60%
40%
20%
0%
n=18
n=32
n=24
n=18
n=27
n=20
Daily
Weekly (a couple times per week)
Monthly (a couple times per month)
More than monthly (a couple times per year)
Never
I don't know what this is
N=139

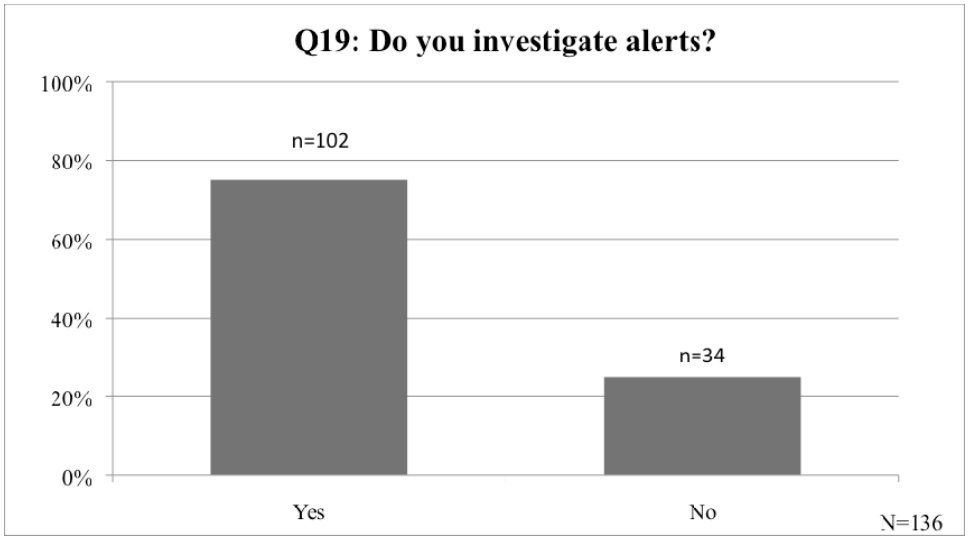

Q15: When you run a syndromic Query, how often do you use the following data sources?
100%
80%
60%
40%
20%
0%
SADR
Pharmacy
Laboratory
Radiology
Never
Rarely
Sometimes
Frequently
Always
N=89

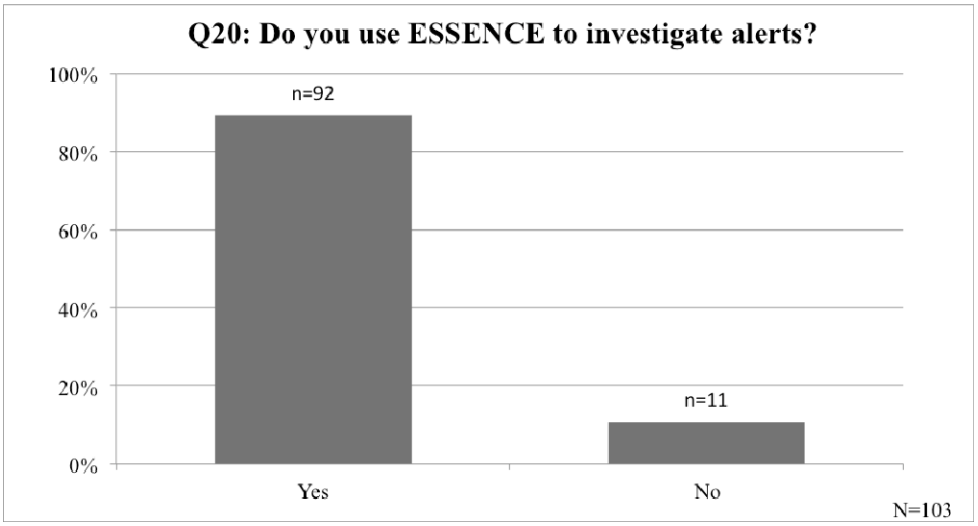


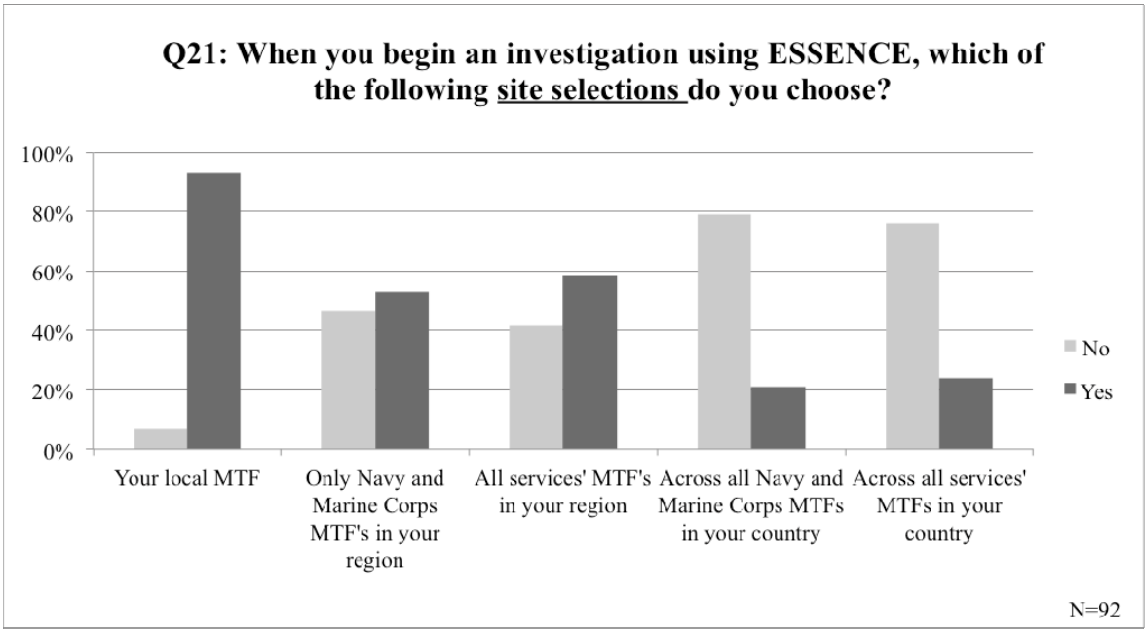


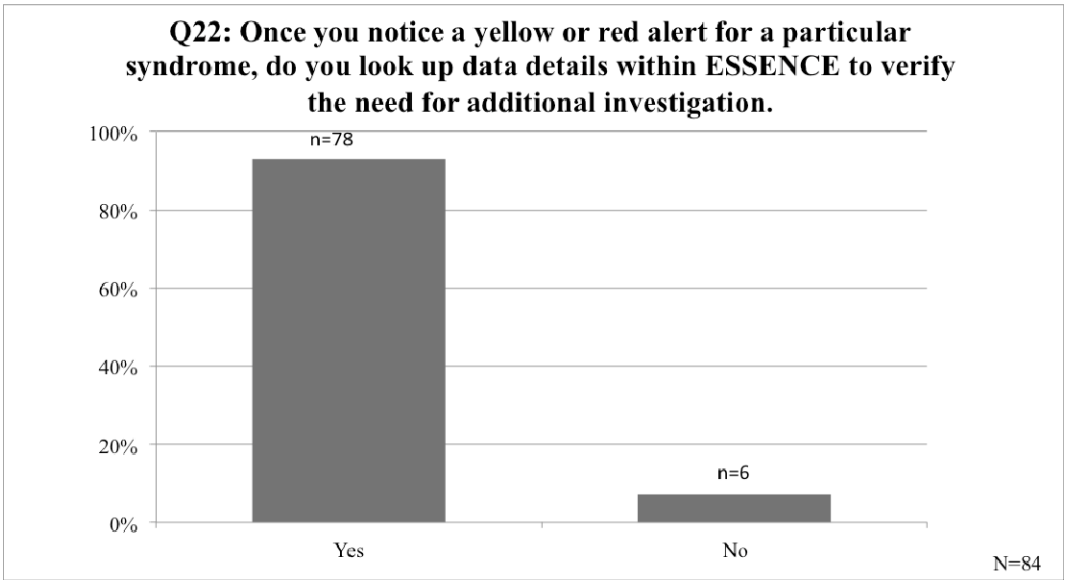
Q18: Please explain why you do not use the syndromic Query module.
Don't know. Never had an incident to use it.
If there is an issue with a particular syndrome it usually shows up on the alert list.
Our clinic does active surveillance of infectious diseases including acute respiratory disease rates, febrile respiratory rates, pneumonia, soft skin tissue infections, conjunctivitis and many others. Our data is gathered daily or the next day. Essence syndromic query is usually at least 2-3 days behind the current

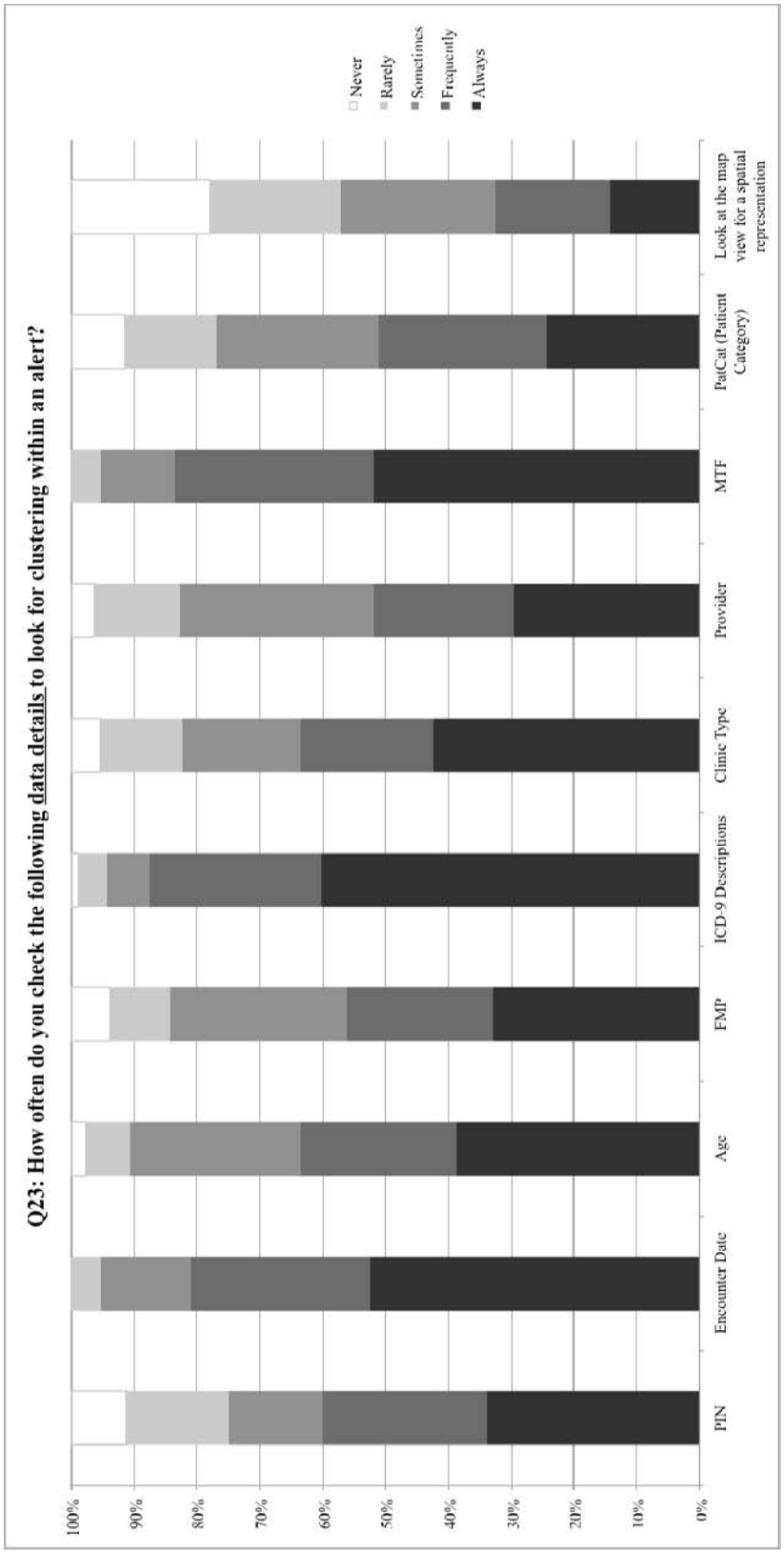
Q18: Please explain why you do not use the syndromic Query module.
infection. Our surveillance helps us explain the outcome of the syndromic queries but it is not a module we use on a regular basis.
We do daily active surveillance of syndromes and complaints through AHLTA and focus on positive results for reportable diseases. Where we get our information almost immediately, ESSENCE is normally anywhere from a few days to a week behind and is used in conjunction as a secondary check to our surveillance.
I have personnel that specifically do this; he briefed me on the process.
I haven't used ESSENCE in over a year since I left the Preventive Medicine field.
Not familiar with it or how to use the data.
We look at Reportable Diseases only.
No need
It's a passive surveillance system and there is no authority to ensure proper reporting or accountability of users who are "supposed" to input data. Users and data entry personnel are not properly trained. Even when following up alerts or after review of surveillance data, end users would not respond to inquiries or even know anything about the diseases of concern, the cases, or the circumstances of the interested diseases. ESSENCE and the process in which is it currently used is not a useful program, period!
I do not see this as a value-added service.
Not my expertise.
I supervise those who do
Haven't been trained in its use.
Ask others to do it.
See previous comment on the ongoing issues
Didn't really understand that it a tool available until this survey.
I don't understand what it is for.
No need.
I don't have the need for it.
I don't know how too.

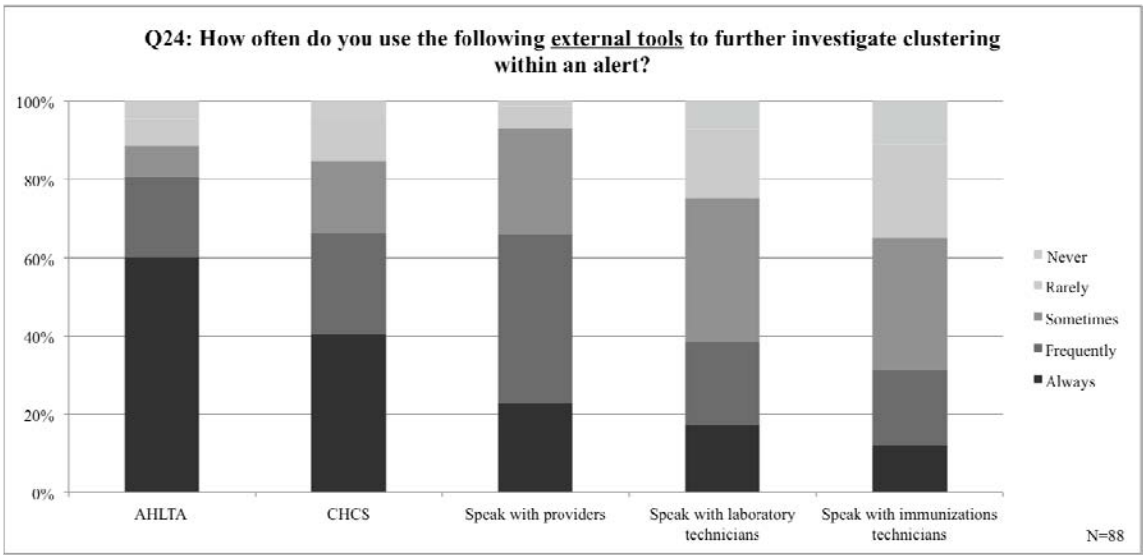



Q20: Do you use ESSENCE to investigate alerts?
100%
80%
60%
40%
20%
0%
n=92
n=11
Yes
No
N=103

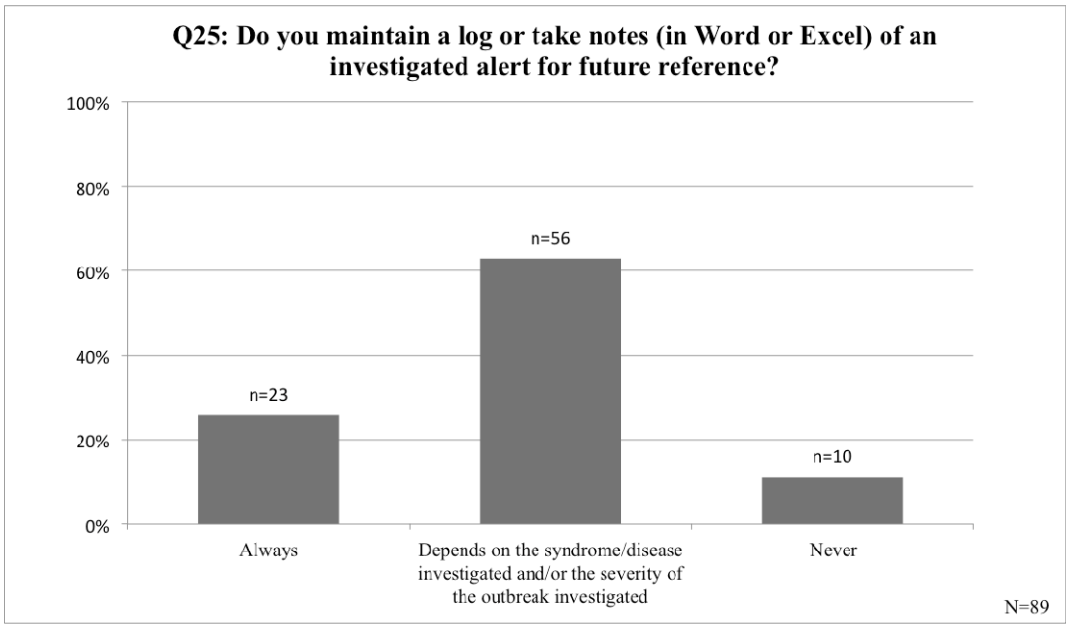

Q21: When you begin an investigation using ESSENCE, which of the following site selections do you choose?
100%
80%
60%
40%
20%
0%
Your local MTF
Only Navy and Marine Corps MTF's in your region
All services' MTF's in your region
Across all Navy and Marine Corps MTFs in your country
Across all services' MTFs in your country
No
Yes
N=92

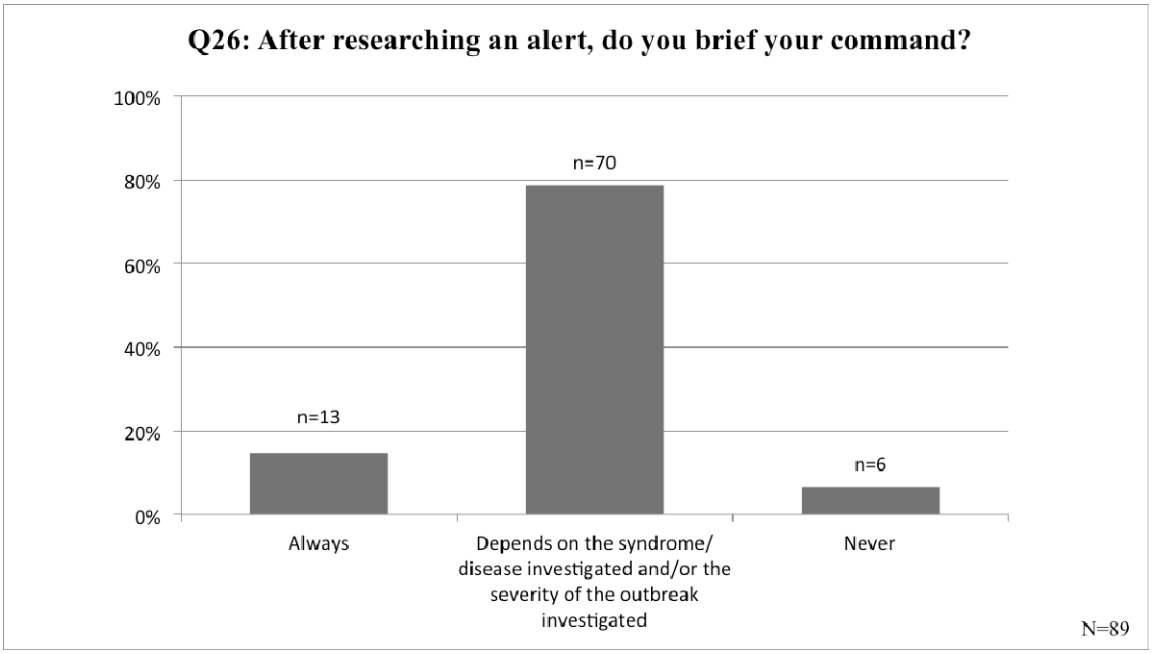

Q22: Once you notice a yellow or red alert for a particular syndrome, do you look up data details within ESSENCE to verify the need for additional investigation.
100%
80%
60%
40%
20%
0%
n=78
n=6
Yes
No
N=84


Q23: How often do you check the following data details to look for clustering within an alert?
Never
Rarely
Sometimes
Frequently
Always
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
PIN
Encounter Date
Age
FMP
ICD-9 Descriptions
Clinic Type
Provider
MTF
PatCat (Patient Category)
Look at the map view for a spatial representation



Q24: Other (please specify)
Health Level 7 data at NMCPHC
Prev Med assets @ MTF
PREVENTIVE MEDICINE
Prev Med Tech's
Local PM contact
Preventive Medicine Techs at the MTF
Use MRRS and Ahlta for imm research.

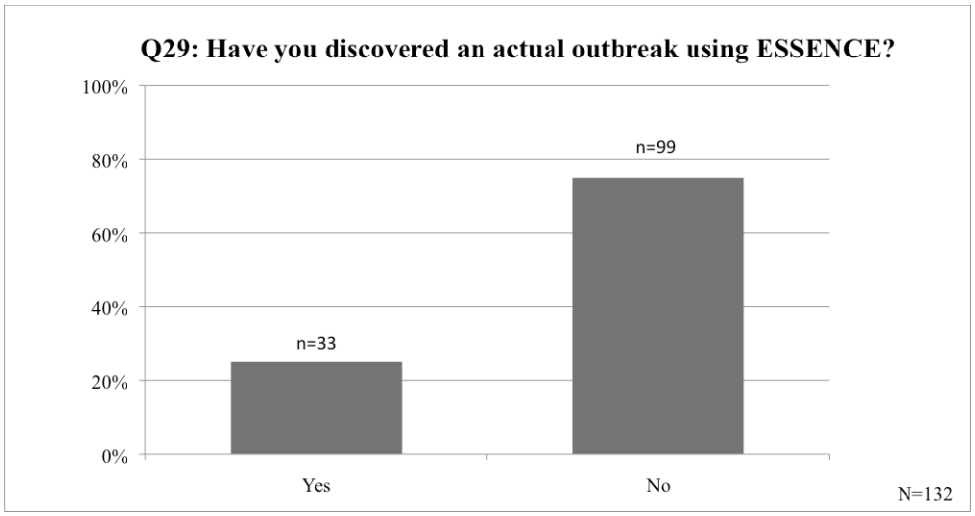


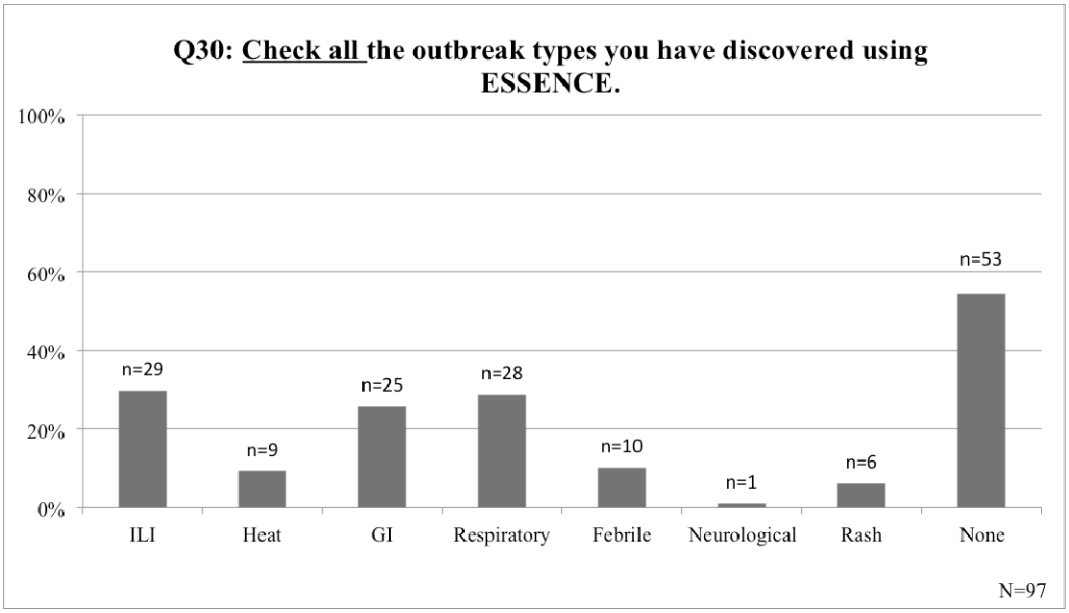


Q27: Please explain why you do not investigate alerts.
I don't receive alerts
Depends on how much over the threshold the alert is. Sometimes there is an alert for one or two additional patients... Also depends on the syndrome
I haven't used ESSENCE in over a year since I left the Preventive Medicine field.
I use this as an aid, but investigate the reportable diseases.
Have not been shown this portion of the system yet.
No need
It's a passive surveillance system and there is no authority to ensure proper reporting or accountability of users who are "supposed" to input data. Users and data entry personnel are not properly trained. Even when following up alerts or after review of surveillance data, end users would not respond to inquiries or even know anything about the diseases of concern, the cases, or the circumstances of the interested diseases. ESSENCE and the process in which is it currently used is not a useful program, period!
Primary users usually do when they get back
Someone else is designated to do so.
Although the alerts can point out an ongoing issue, they have too much background noise to be of use as a source of morbidity surveillance/tracking.
The alerts I receive are not reportable.
Not my area of expertise.
I don't know what the alert list is.
See above
Haven't been trained in this.
My AOR that I receive alerts for is NME and NCA; the alerts are rarely significant because they account for visits over those large areas.
Just now getting re-acclimated to system for use at the unit I am at.

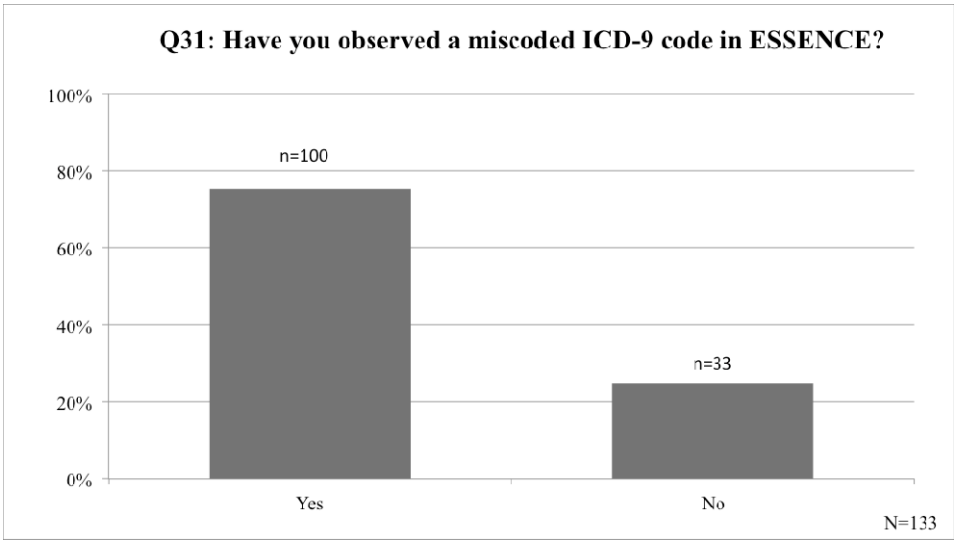
Q27: Please explain why you do not investigate alerts.
See previous comment on the ongoing issues
Don't know how
Some one else is responsible for the investigation. I just oversee that it is being completed appropriately.
I'm not sure to what sort of alert you are referring. Do you mean syndromic flags?
Never seen one
I only run reports. Another co-worker does the investigating and reporting verification.
No need
I do not receive alerts.
Co workers do this task

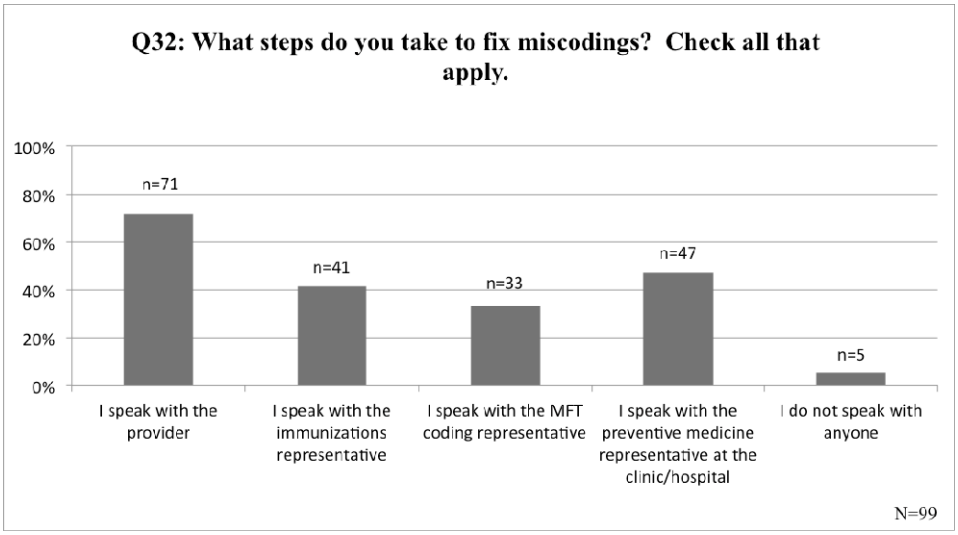
Q28: If you do not use ESSENCE to investigate an alert, what alternate steps do you take to conduct your investigation?
Our clinic is small enough for me to walk downstairs and ask the providers about an increase in a syndrome.
Patient/family/spouse interviews
Same as the rest of the questions about t he alerts
I contact the clinic and speak with the clinic manager and inquire about the patients for that day. I will also look in ALTHA and read the notes, check labs and immunizations records and demographics to see if it is common among a particular population.
We use AHLTA notes and conversations with the patient and provider.
Conduct patient interviews, utilize ALTHA notes from providers and laboratory reports if necessary
Look over patient visits in AHLTA
I look at AHLTA, CHCS and ER data.
Contact command if possible



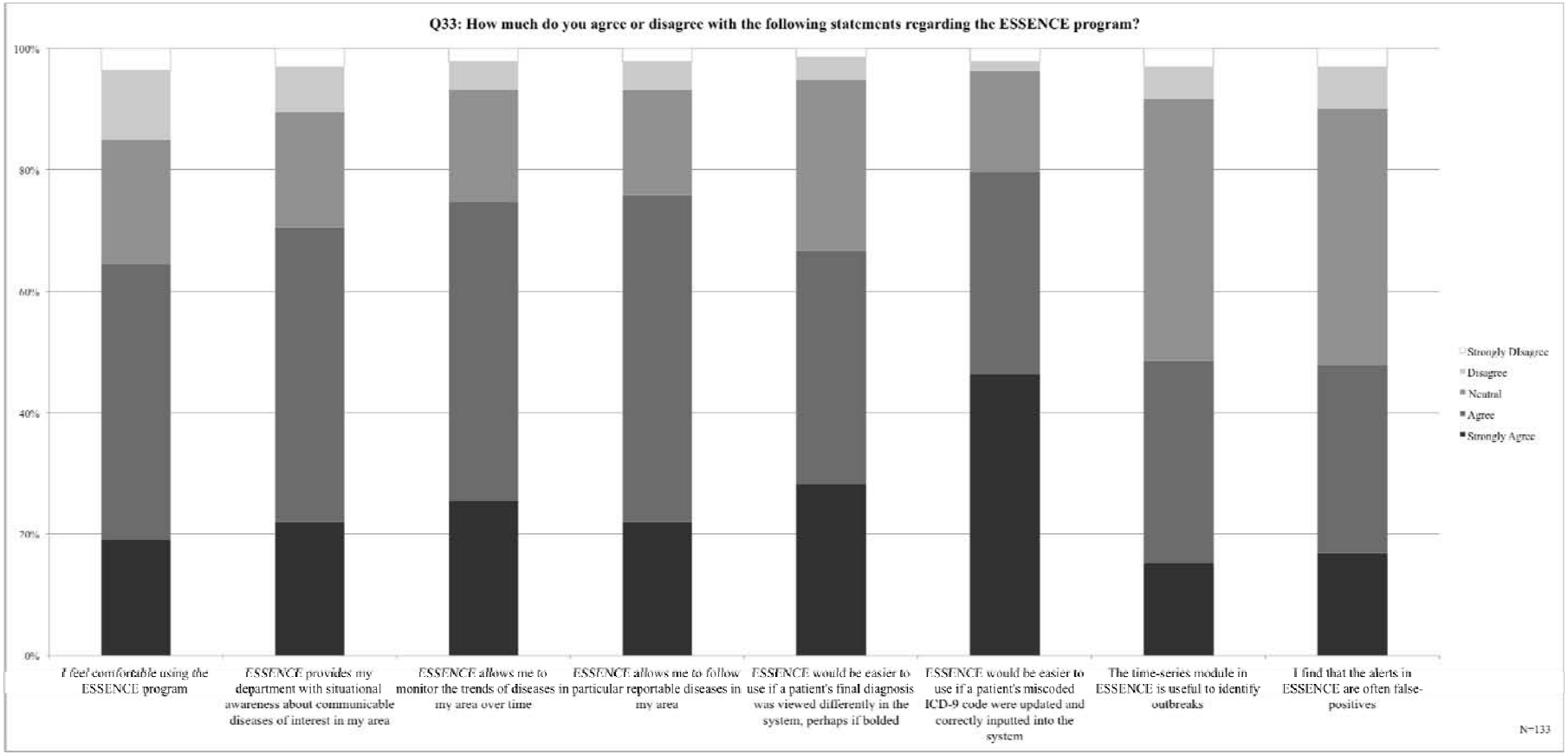


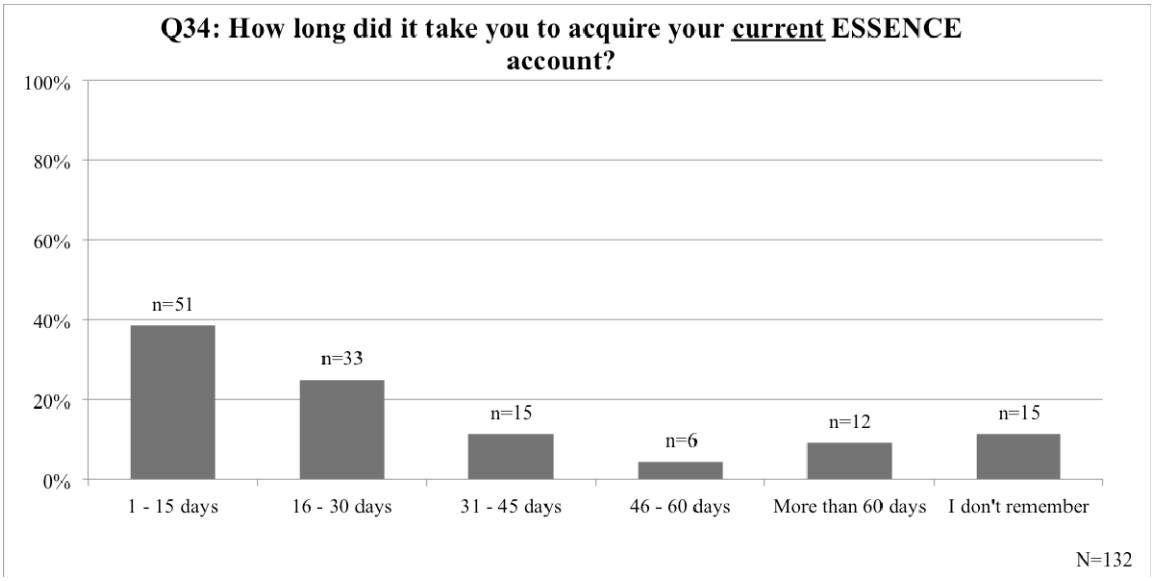
Q30: Other (please specify)
Pertussis
ESSENCE is used but is normally not the primary for the use in an investigation (It is syndromic sur)
STD's
Exposure to chemical/toxin
Animal Bite

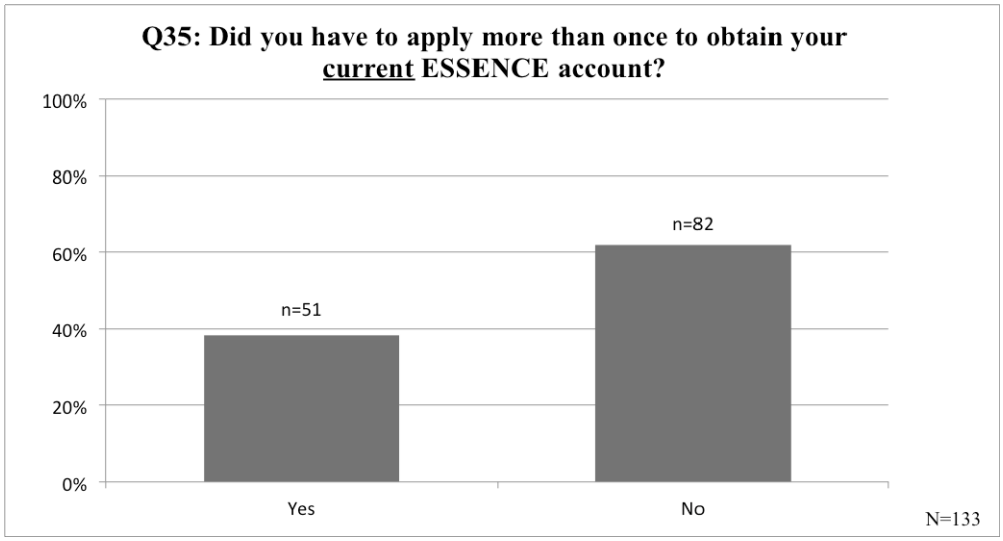


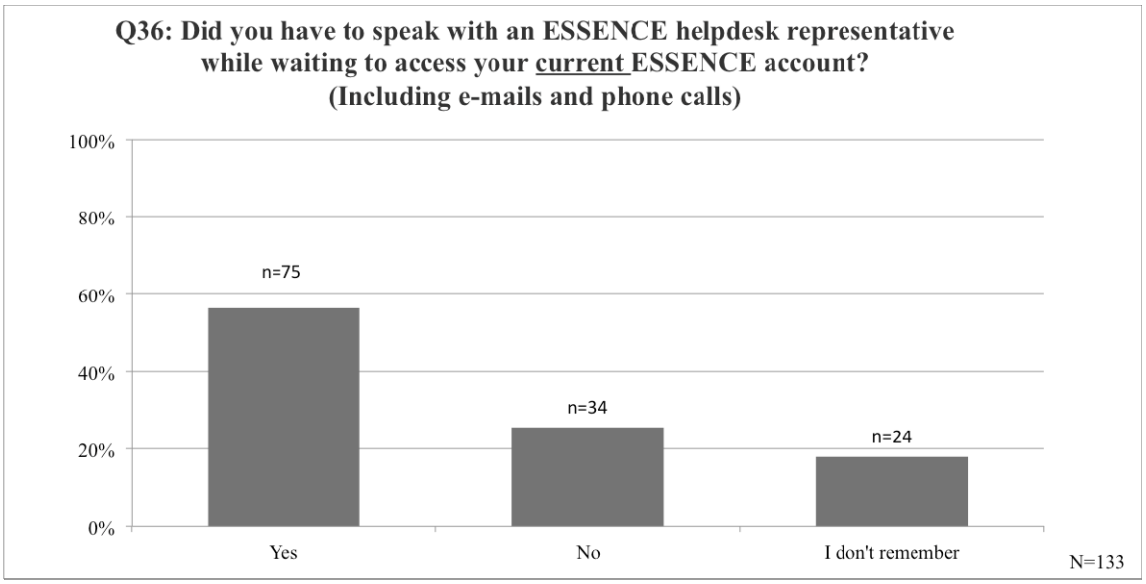


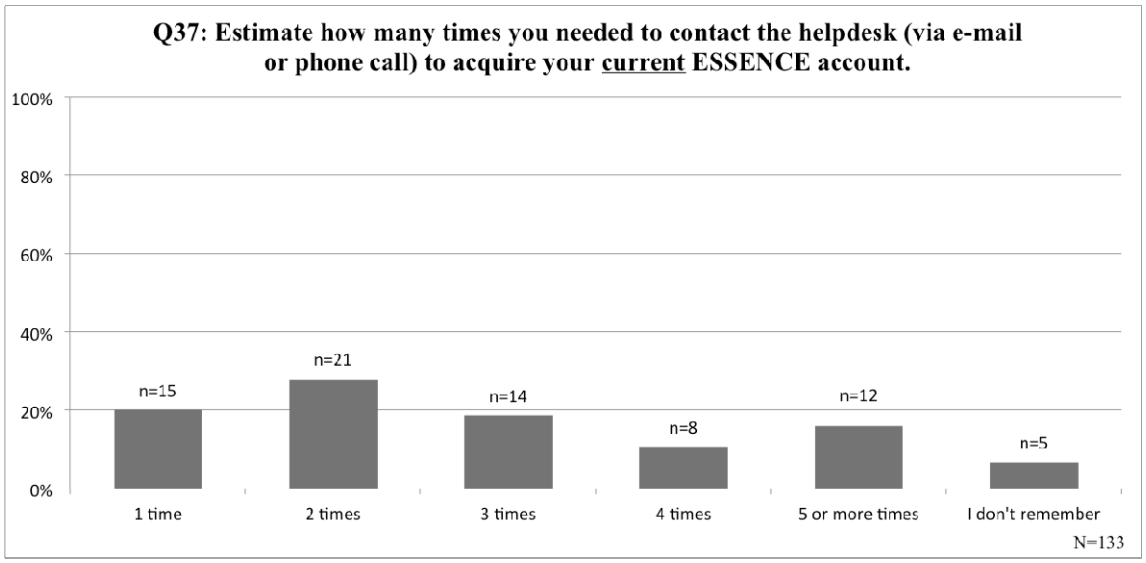
Q32: Other (please specify)
We notify NMCPHC of trends, like the current one of latent TB seen as pulmonary TB in ESSENCE...but we rarely see proof of anyone taking on the fix
I think it is a combination of people where the error occurs
E-mail the Prev med contact at that MTF
I speak to the listed ESSENCE program manager at the MTF; however, this person is not always a provider or trained technician.
I have observed it while doing OJT, the investigator has initiated their own process

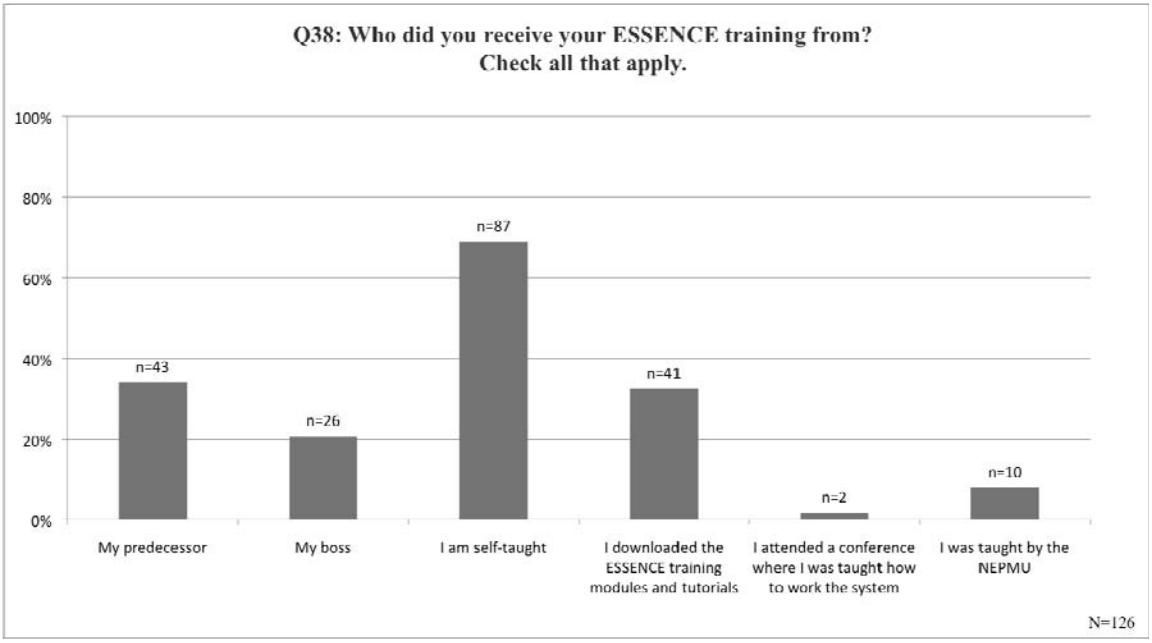

Q33: How much do you agree or disagree with the following statements regarding the ESSENCE program?
100%
80%
60%
40%
20%
0%
I feel comfortable using the ESSENCE program
ESSENCE provides my department with situational awareness about communicable diseases of interest in my area
ESSENCE allows me to monitor the trends of diseases in my area over time
ESSENCE allows me to follow particular reportable diseases in my area
ESSENCE would be easier to use if a patient's final diagnosis was viewed differently in the system, perhaps if bolded
ESSENCE would be easier to use if a patient's miscoded ICD-9 code were updated and correctly inputted into the system
The time-series module in ESSENCE is useful to identify outbreaks
I find that the alerts in ESSENCE are often false-positives
Strongly DIsagree
Disagree
Neutral
Agree
Strongly Agree
N=133


Q34: How long did it take you to acquire your current ESSENCE account?
100%
80%
60%
40%
20%
0%
n=51
n=33
n=15
n=6
n=12
n=15
1 - 15 days
16 - 30 days
31 - 45 days
46 - 60 days
More than 60 days
I don't remember
N=132

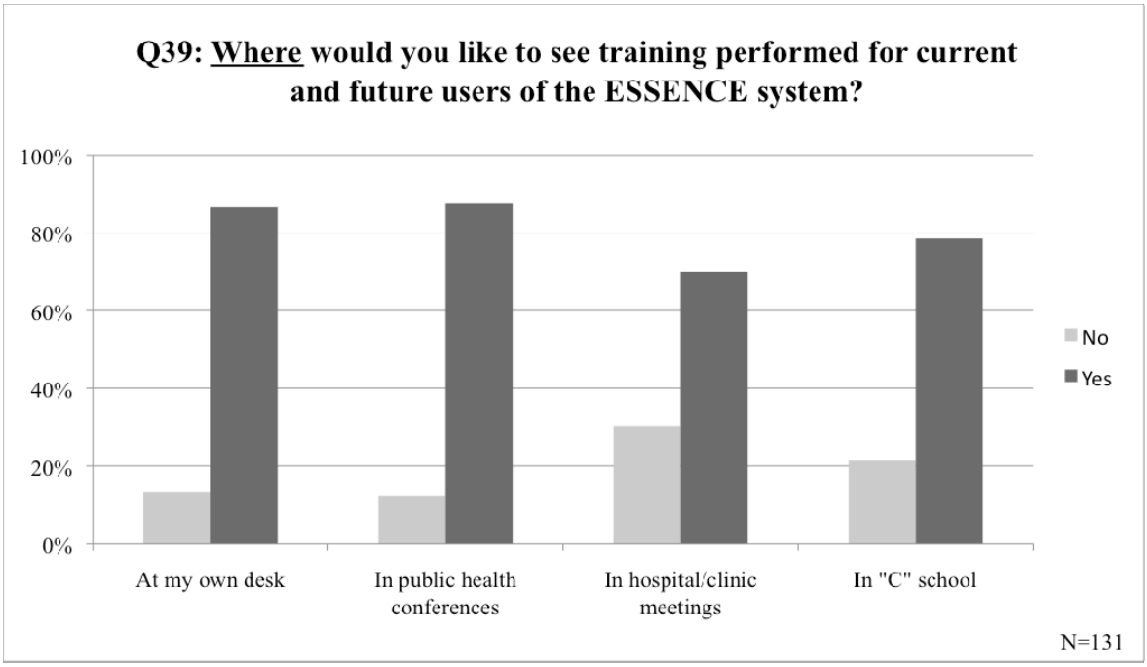

Q35: Did you have to apply more than once to obtain your current ESSENCE account?
100%
80%
60%
40%
20%
0%
n=51
n=82
Yes
No
N=133


Q36: Did you have to speak with an ESSENCE helpdesk representative while waiting to access your current ESSENCE account? (Including e-mails and phone calls)
100%
80%
60%
40%
20%
0%
n=75
n=34
n=24
Yes
No
I don't remember
N=133

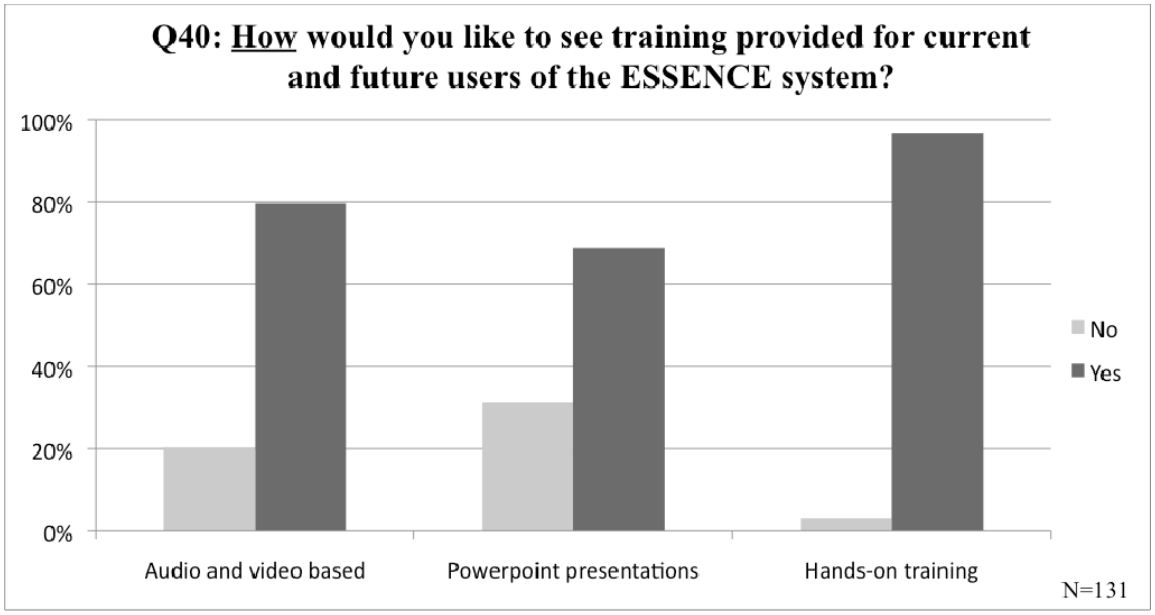

Q37: Estimate how many times you needed to contact the helpdesk (via e-mail or phone call) to acquire your current ESSENCE account.
100%
80%
60%
40%
20%
0%
n=15
n=21
n=14
n=8
n=12
n=5
1 time
2 times
3 times
4 times
5 or more times
I don't remember
N=133



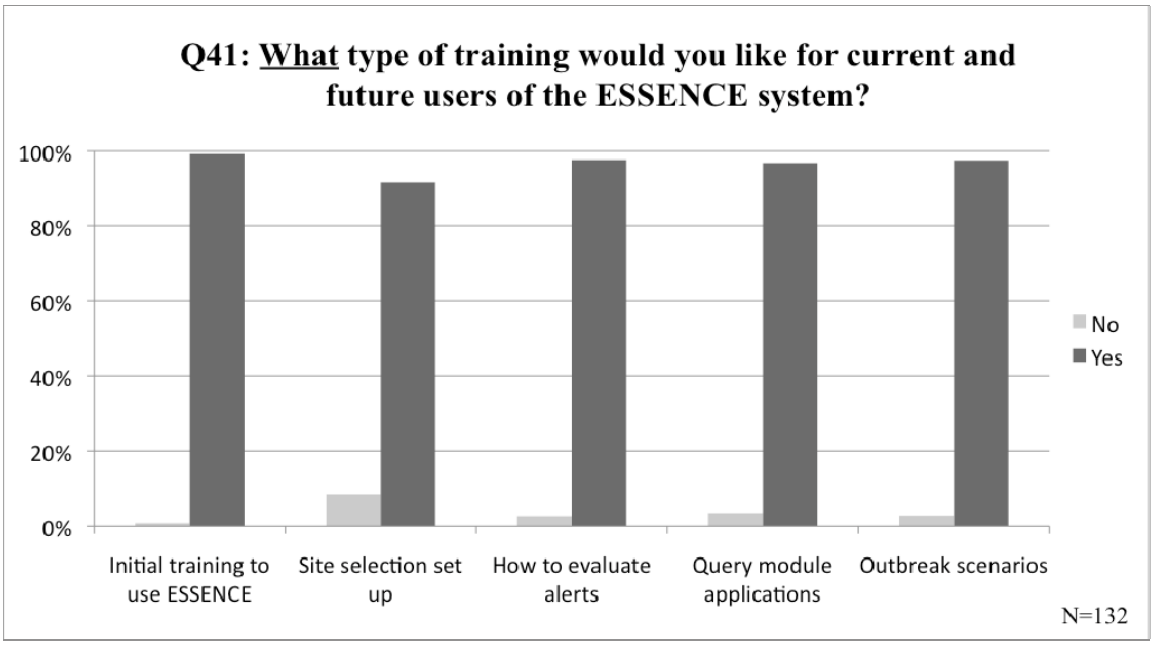
Q38: Other (please specify)
Attended training at OSDHA
Sought out help from Army Prev Med physician and drove to their MTF to get some basic training on ESSENCE.
I have no essence training
No one I have asked to get training on it
I really had no formal training- there is an SOP on our share drive. I read it. There was no further guidance.
I have been using it for about 7yrs
Had some help from PMT
Co-worker, personnel supervised
No training was given.
Supervisor & self taught
Some combination of them (mainly the modules)



Q39: Other (please specify)
I think consistent training is necessary to ensure that we are all looking at the data correctly and the same
There should be a training course held somewhere over a few days to get users familiar with the system. A one day quick run through via something like NKO would be a complete disaster.
Preventive Medicine Technician “C” School, NEPMUs
At MTF facilities so that other MTF's can attend
CME training on site
At the NEPMU
Worksite
PMT C school for essence training



Q40: Other (please specify)
Webinar
I think that everyone learns differently so it is important to have different types of training
Presentation or workshop at NMPHC conference
As required



Q41: Other (please specify)
How to detect probable false positives
See above response
Use of the Matrix function
Time-series explanation, 14 day incidence explanation, etc. Explain what trigger's alerts.
Training/insight into how syndromic alerts are derived

Q42: Do you have any suggestions that will help make the ESSENCE system <u>easier</u> to use?
Don't ask for me to change my password as often as requested. I have been on leave or TAD twice when my account has been inactivated. Although I should have completed the task before I left, I don't change my bank info as much as I have to change ESSENCE. I understand the privacy issue, but most medical folks not involved in Preventive Medicine wouldn't even know where to access ESSENCE b/c they don't know what it is. I think it's a secure site, but I have had to reset my password several times.
None. I find it very easy to use.
-The daily requirement to check ESSENCE seems to be a bit much. I find that many times the alerts are false alerts and that the "syndrome" parameters are so wide that sometimes the alert doesn't seem credible. (i.e., a rash in 2 infants will trigger an alert and so will ptosis of the eyelid diagnosed in the optometry clinic.) -I will check ESSENCE and then check the AHLTA encounter and contact the providers or clinics to "ground truth" the data to see if what I see in ESSENCE is truly what is happening in the clinics. -I do use ESSENCE to see how we are doing with regard to trends in coding for certain things like ILI, Resp, and GI syndromes. I share this with providers as appropriate. I also check the reportable disease

Q42: Do you have any suggestions that will help make the ESSENCE system <u>easier</u> to use?
section and use this as a “safety net” to catch any reportable diseases that weren't consulted to Prev Med or didn't show up as a positive lab in our box in the Laboratory. We follow up on each reportable disease that shows up in ESSENCE. At times we will find STDs and other reportable diseases this way. (Sometimes we find that they are simply rule-outs or coding errors, i.e., “meningitis” was really a “part 2 sea duty screen.” Which keeps things interesting.)
Daily log-ons to the system and navigate through the program is a key to easier use and familiarity.
Understanding how the alert functions work would be better. Right now I feel that the alerts are set to be too sensitive, as we get quite a few of them here. Investigating all of them would take far too much time...when we do investigate them, I can never come to a conclusion on the cause (if any) for the increase in patients for that particular syndrome.
Not really, it is relatively easy to use. It is not very easy to get pt info even with Level II access.
I still do not know what essence is. I arrived at my command (first duty station) and I was slammed with EIDS, NDRSi, ESSENCE, AHLTA, CHCS, etc. I am continually baffled as to why the Navy wastes so much money on redundant software and training. Life for everyone would be infinitely simpler if one program did everything.
I think that the time that it takes to get the account is too long. Then when you change duty stations you have to change your DMIS ID, which takes time. I was not given standardize training and I constantly have staff that deploys and I deploy and once I return my account is disabled. Not sure why we are monitored if we check it daily since most of the information is not updated daily. It is syndromic surveillance so it is not an active system you still have to run lab reports daily to get the information that you need for reporting. Too many systems. Too many problems with the system and it is not even helpful. The average Public Health person will already know that they have an outbreak by the time you see anything in ESSENCE. The coding is another problem, especially at large MTF (e.g NMCSD).
Training so the end user can be more proficient. And have alerts sent to you via e-mail.
Allow us to drill down to patient level data.
Make a link to the current contact at the prev med dept of the MTF from which the case was seen so that is a one-click process to make an inquiry regarding the alert.
I would suggest better training- most operational IDC's, PMT's, and EHO's are unaware of the ESSENCE program.
When I access the tool it requires me to go through two portals EIDS then Essence. Can you simply this process
Make it easier to view patient specific information. Currently we must use the information like provider code, date, clinic and age to then go into AHLTA to find out the patients name. For most cases the name is irrelevant, however it is important to distinguish between new cases and f/u cases which essence does not do, and for identifying reportable cases. Also there should be a way to query certain ICD-9 codes for specific diseases, currently this is an option but many ICD-9 codes are not identified. It would be great if there were a place to view provider codes, as many of these are not representations of the last name first name. We mostly use ESSENCE to identify reportable diseases that need to be entered into NDRSI.
Password reset is a major pain. I spend more time resetting a password, one because of frequency and two because of characters and length. Every has to write it down to remember it because once you do it changes.
It would make things better to add the diagnosis under the three tier.
No the process to get access is sometimes hard within the commands due to the COC and approval routing.
GET PROPER TRAINING FROM SOMEONE WHO KNOWS HOW TO USE IT.
Access to historical data (run through detection algorithms)

Q42: Do you have any suggestions that will help make the ESSENCE system <u>easier</u> to use?
meta-analysis of alerts
Make it user friendly
I counted there are 47 key strokes/actions required to login---many steps seem redundant--- I have never used a program---to include high level SECRET security data bases---that requires as much effort to sign in---and hence opportunities for mistakes. Some streamlining of the sign-in process would help improve the experience; cut down on non-value added time spent, and increase compliance with monitoring.
-It is very user-friendly
Getting access to the system should be easier. Most if not all users need level 2 access as well. It takes too much time to track down the cases using CHCS/AHLTA with just a clinic, date, and ICD9. Most of the folks that use ESSENCE have access to all of the PII data though other systems and I don't understand why we could not get the patient identifiers in ESSENCE to save time investigating.
A problem that I encountered was that some of the alerts were affected by follow up patients therefore skewing the ACTUAL numbers. The follow-ups that are included int he alert numbers thus causing a false alert within the system. It is cumbersome to sit there and sort all of the pins/dates/ICD-9 codes and sort, as well as track the busy provider to verify.
Direct access patient information to AHLTA/CHCS and NDRSi. Too much time is spent switching between programs to find patient information in order to ensure treatment and that reporting was completed.
Quicker uploads, change how it represents a red/yellow warning in regards to .12 or .2 or why is less than one case a trend?
I lose access every time I transfer duty stations or get deployed. Maybe making the access process easier would be helpful
1. Have it not mix follow-up visits with initial visits, or at least report them as a separate category. Mixing follow-ups with initial presentations inflates case counts. 2. Need better explanations about how to set up queries, and also about the various modules. For example, I've never been able to get the map function to work correctly.
Why does it time out so quickly? When accessing multiple cases I don't have enough time in ESSENCE to complete all the tasks before it times out.
Essence is definitely a great tool to investigate and be aware of certain medical concerns in your area of practice however, I did encounter in several instances that information provided through the database is minimal. ICD 9 codes inputted in the system are sometimes misleading since most providers use a generalize code to cover rule-outs. Also, when confirmed through ALTHA or CHCS, the results often do not match what was initially entered thus making all initial ESSENCE entry somewhat useless.
Essence itself is a good tool for the service it intends to provide. But the biggest problem in my experience is the software provider that supports it. It is not user friendly for those persons who are trying to set up their account. It has been stubborn in the past with password submission, and the system has had nervous breakdowns jealous fits of rage if you accidently put in the wrong password. It has been unnecessarily difficult to try to create new passwords in the past. A savvy user, through trial and error recognizes that, but it can be extremely frustrating for a new user. I just think improvements should be made to improve the overall system and make it much more user-friendly.
Better training opportunities
Streamline the establishment of accounts. It took approximately two months each and much correspondence with the help desk for each of two PMT's I had working for me at my previous command to set up accounts.
Grouping - it would be helpful to group all entries for a particular patient's diagnosis together to avoid duplicate reporting. Often checking current date ESSENCE and discovering a follow-up visit for a

Q42: Do you have any suggestions that will help make the ESSENCE system <u>easier</u> to use?
patient leads to reporting that patient again even though he/she may have been initially seen months before for same event. Someway to filter out miscodes
If possible, have trainings on ESSENCE, in practical application settings.
The log in and hard to use Web layout makes it very undesirable to use
Improve the application process, which includes: removing obsolete application forms, combining the requirements with the other databases, such as CDM so that items, such as AI training does not have to be resubmitted, have person doing the app screening ask for all the additional info needed at once instead of responding (a week later) after one item has been submitted then asking for something else. Fix the issues that I have had since finally gaining access so I could use the database.
I'm new to the Essence system, therefore very limited feedback at this point. I was prompted by several e-mails to complete this survey though I've only recently begun using it. Perhaps another e-mail reminder in 6 months would be more useful.
I have a very difficult time with getting access to patient's PHI. I have called several times and still don't ever have access. It would make it much easier if they would stop taking away this access. I have completed the necessary paper work and it was approved, it is just a systems issue.
User defined macros (or something similar) for running the same queries day after day (e.g., daily surveillance tasks at the NEPMUs.
Need hands on training, time management. A system that works in practical terms for your command.
Provide training for ESSENCE in “Hospital Corpsman A school” and Preventive Medicine Technician “C” school.
Double login is kind of a pain. Any way to use CAC cards for at least one or both?
I use ESSENCE as a checks and balance for my surveillance for reportable communicable diseases implemented in the MTF. I use CHCS and ALTHA and labs as my surveillance. It is somewhat useful for syndromes.
Essence is a great program but timelines could use a little more finesse. The ICD9 codes used are sometimes generalize due to rule outs. Continuity of care for these patients are logged differently thus making the Essence user have to dig through piles on information just to confirm that it is a change in that patients status. It would be nice to be able to categorize per patient to see the succession. ALTHA and CHCS will provide this information obviously but it would have been nice if this ability is available through Essence. If this ability is already programmed through Essence then I apologize for this comment and might need to look through the training materials again.
Better training
Improved maneuverability between ESSENCE and NDRSi (one account or link to one from the other).

Q43: Do you have any suggestions that will help make the ESSENCE system more effective?
Password convenience- linked to my CAC card.
Corrected miscoding would really help, especially when it is obvious that a MTF has miscoded a lot, like immunizations as actual disease.
-I think if the coding could be changed in ESSENCE, that would be helpful. For example I had a provider who saw a "pustulosis" in a pt following a smallpox vaccination, and coded it as "Poisoning-Smallpox vaccine" When we discussed it with the provider, they had no idea it was showing up in the surveillance data this way and even when they changed the coding in the AHLTA encounter, it did not update ESSENCE. -I really had minimal training in how to use ESSENCE and certainly would've appreciated some training especially when there is a daily requirement to check it. It would be nice to know what am I expected to do if I see something in ESSENCE? And how do I know it's "real"? We've sort of figured out our own way to vet the ESSENCE data, but it would be nice to know what was intended/expected. -As far as the Chem bio syndromic surveillance, I don't know how this could be that useful with the time delay in ESSENCE. I am guessing we would get a call or hear through the grapevine that the ER or clinics were seeing a lot of patients with the same symptoms...but would be surprised if we actually saw it reflected in ESSENCE until a day later, which may or may not be helpful. -I do like being able to compare last year's ILI visits with this year. Providers liked seeing that as well. We could also see the 1st and 2nd wave of H1N1 last year and that was interesting.
Frequent or regular training for people who feed the program/system with data. This will reduce some of the erroneous entries, i.e., miscodings etc.
Include some dx that are specific for recruit surveillance, such as pneumonia and pharyngitis.
I like the map function; however, when your entire base is in one zip code, it's pretty useless. If there was a way to break things down by barracks, that would be better (though probably not feasible).
At Great Lakes...ESSENCE has a major gap ...it does not show VA output clinic (ED) data for AD members seen at the Federal Health Care Center. Essentially, we can view mainly Brach Health Clinic output data.... Many recruits and students visit the ED.and weekend info is also gapped when ED is the venue when clinics are closed. Since the federal healthcare center uses VA systems at the ED, perhaps DOD Essence cannot make the link.... I have communicated this concern repeatedly for [redacted] years...NMCPHC, ESSENCE help desk, DHSS Mr. Aquaviv... but no closure. Anyway, since you asked, this is important to us. [redacted]
Get rid of it. Have a program that is used by most of the medical community (CHCS or AHLTA) do disease reporting. When we do reports here the information we need we have to get from AHLTA/CHCS so why not just get rid of the middleman and have those programs report the same things as ESSENCE.
I like the mapping function and the fact that you can put it into a spreadsheet but those are the only useful applications of the program. I would get rid of this program. We already do active lab surveillance, why create more work for everyone?
Correct issues with coding errors if possible and it would be nice if repeat diagnosises could be ruled out. For example if we have a case of Lymes and it is the initial case and it is reported in NDRSi and locally every time that patient comes back for follow he shows up on the reportable list even though he has already been reported.
Allow miscodes to be corrected and reflected in ESSENCE. For some reason, latent TB has been coded recently as pulmonary tuberculosis, NEC. Really misleading
Get it to talk to AHLTA in such a way that we can pull up an AHLTA note from the alert case- eg that way we could tell ourselves that case was miscoded as TB when it is really LTBI. We spend too much time spinning our wheels chasing wild geese with miscodes that when an actual outbreak were to occur no one will pay attention- like the boy who cried wolf too many times.

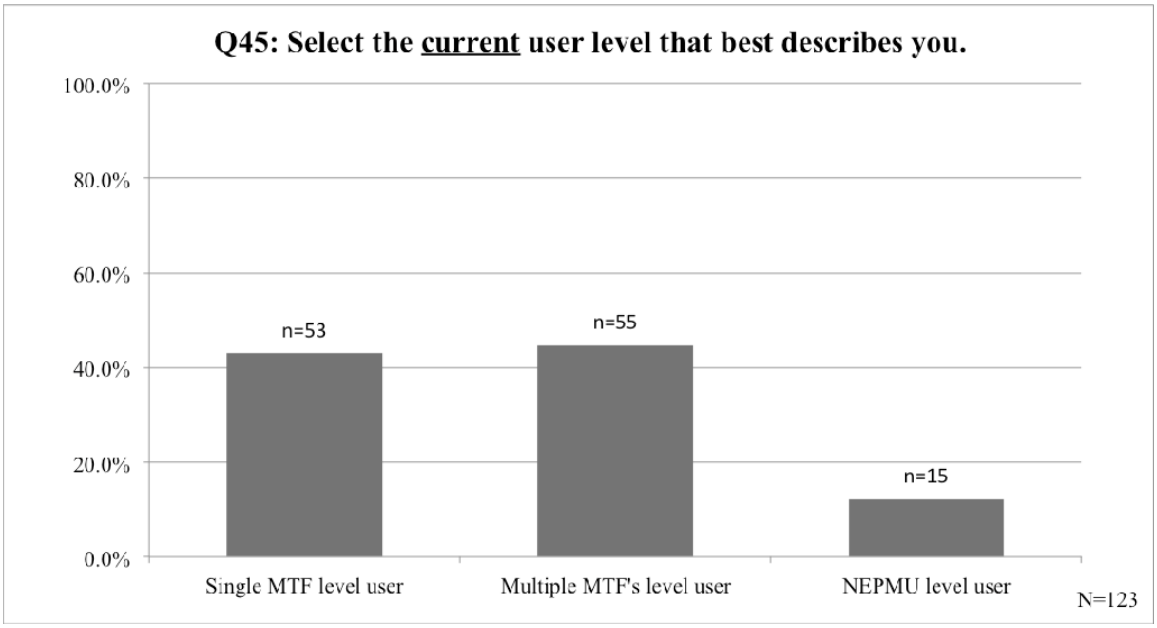
Q43: Do you have any suggestions that will help make the ESSENCE system more effective?
SADR entries (DX codes) will never be 100 percent accurate, providers enter AHLTA dx to the best of their ability but the myriad of DX options in AHLTA can make exact dx difficult at times. It is incompact upon the essence review-to-review clinical cases in AHLTA to determine relevance (not the role of the primary care provider to give the dx that the ESSENCE user wants).
Make it easier to view patient specific information. Currently we must use the information like provider code, date, clinic and age to then go into AHLTA to find out the patients name. For most cases the name is irrelevant, however it is important to distinguish between new cases and f/u cases, which essence does not do, and for identifying reportable cases. Also there should be a way to query certain ICD-9 codes for specific diseases, currently this is an option but many ICD-9 codes are not identified. It would be great if there were a place to view provider codes as many of these are not representations of the last name first name. We mostly use ESSENCE to identify reportable diseases that need to be entered into NDRSI.
I understand that there are a lot of factors to take into consideration but If there were a way to have the information updated to show more of a real time snapshot of what is going on instead of the delay in reporting I think it would help to get more of a control on outbreaks sooner than later for those that use ESSENCE only for tracking. I also think that having some type of imbedded provider index listing for the provider codes would alleviate the waste in time that is used to track down, which provider entered data.
Allow the user the ability to cut and paste graphs onto a word document. A feature that was lost roughly a year ago.
BE ABLE TO ACCESS IT VIA CAC.
Discussion board tied to alerts, so that investigated alerts are tagged and results are known
Keep it simple
Allow only one diagnosis per visit. The idea of the final diagnosis is good.
Training...
Not all the encounters have the patient information available even though you have access with Level II.
-Provide an accessible PIN for cases on the reportable disease query -Ensure the graph populates when using the matrix -Provide more spaces for the physician's full last name and initials -14day incidence can be confusing
-Better training programs need to be implemented. -Patient identifiers need to be included in the reportable event module.
Identify a way to report/track follow-ups versus new encounters.
New user, not sure at this time.
The real problem with ESSENCE is not necessarily the IT system itself, though it's not perfect, it's the overall health system in which it is employed. We need trained users. We need the users to be PM/PH trained, not some nurse or EHO who has it as a collateral duty. NMCPHC and NEPMU's need authority to both assist and ensure accountability to MTF's to report. We need recurring ESSENCE and disease reporting training at the MTF and smaller unit levels. With strengths in these areas, then we can trust the data ESSENCE provides and ensure timely input-feedback to actually make a difference in prevention. Fix the system not the IT program!!
Clean up the contact PIN to be more direct.
I do not think this system is valuable at the MTF level. Its use should be de-emphasized below the level of the NEPMU/NMCPHC. It is useful for trend analysis, but not real-time investigation (except to note general trends).
Overlaps with above response.
No, it's a very good system; it's just the getting an initial account can take a long time.

Q43: Do you have any suggestions that will help make the ESSENCE system more effective?
If you had a "pop up" in AHLTA that read "are you sure you want to code ....etc.." It may reduce the false positives.
It would be nice if ALTHA and or CHCS communicate with ESSENCE. This would provide a better picture of the true nature of all medical concerns in the area. If results haven't been verified as true or positive, those entries shouldn't be entered into the system.
-In using the system in conjunction with NDRSi, It would be helpful if NDRSi search field was by date of report and not by date of onset. -Training on how to use various modules to the system i.e., for syndromic surveillance, how are the pharmacy, radiology modules used?
As I understand Essence it pulls data straight from ALTHA/CHCS based on diagnoses code. If the diagnoses are incorrect or the lab results are negative how can this be corrected. I have instances when submission is incorrect but the data could not be edited.
Make it easier to get accounts and log in. Make it a more user-friendly interface.
As stated in your survey, the removal of repeat patients and the miscodes would make the system more effective.
Local prev med contact info for locations, available via clicking on a location in a line item, perhaps.
Weekly hands on training. Don't use it forget about it. Weekly or bi-weekly training.
Ensure that "all" demographic information on a patient is entered in the case that an investigation is needed.
Password should be required to change less frequently.
It needs to work with CHCS and ALTHA.
As I said, it is a great program but could really use an easier interface for those who haven't used it before. The PPT presentations and Audio visual trainings are somewhat ok but only talks about the basics. It would be nice to incorporate tips on how to utilize the system efficiently.
If it was closer to "real time" that would be great. ESSENCE seems to be about 5-10 days behind
Tutorial explaining how ESSENCE gets the data it reports.

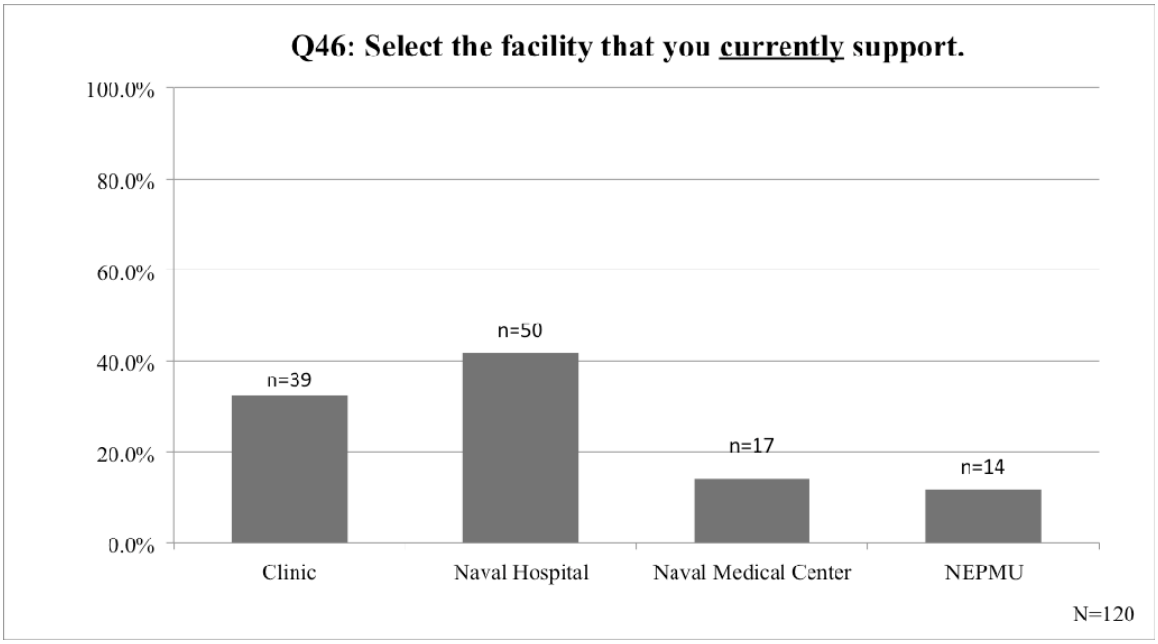
Q44: Do you have any other comments that you would like to make regarding the ESSENCE system?
Great system.
I would like to see a faster turnaround from when a case is reported into CHCS/AHLTA to when it appears in ESSENCE.
Too sensitive. One GI case isn't an outbreak even if a clinic has not had one for a few weeks. Need denominator data. No way to consider rates without it. Too sensitive. If I investigated every alert I would do nothing else. Don't like the addition of influenza specific. I need to query flu and ILI in the same query
Overall, I am glad that ESSENCE exists. The ability to perform active surveillance is wonderful, as providers, historically, do a horrible job reporting infectious diseases to the PMA. I am still on the fence about the usefulness of the alert modules, however.

Q44: Do you have any other comments that you would like to make regarding the ESSENCE system?
Training needs to be provided at the "C" school level. Students that come from PMT "C" school today are clueless about ESSENCE and we have to spend lots of time training them on its use. Also, those of us who have had to learn ESSENCE on the job, could use some better form of instruction than a PP presentation.
I would recommend retreat from the mandate to access daily, and the report card to COs. Weekly would be better....
It's PREVENTIVE not PREVENTATIVE
Make it easier for Preventive Medicine Technicians to get access to patient identification for reportable diseases.
Daily checks are overkill, alerts fill inboxes... but I must admit in the end, the ESSENCE system is worth having especially during flu season and the last H1N1 crisis.
I no longer use Essence due to my job change; I did use it as infection control officer and found it very useful and at times extremely helpful when outbreaks were noted.
It has been a great additional tool to capture reportable diseases and track for outbreak trending. Hope it is a program that Navy Medicine and the Tri-Services keep as our Preventive Medicine Departments keep getting smaller with continued deployment support missions.
Too many passwords to remember...make it part of ALTHA
As the survey suggests, there are many false positives...and many of the abbreviations remain a mystery--- a key or legend would help---or if it exists---make it more apparent to access. The idea of the program is marvelous--- so if it was a little easier to use I think more of us would use it as it was intended. Thanks for asking.
Excellent surveillance tools if you have direct access to medical records like AHLTA or CHCS.
The customer service is excellent. However, we do not use NDRSi to confirm ESSENCE. We use ESSENCE to input new cases into NDRSi and AHLTA to confirm ESSENCE. When there is no accessible PIN, we contact a POC at the location of the MTF to determine the identification of the case in question. That is tedious and time consuming.
The ESSENCE program is good as long as the users understand the limitations of the data. Provider coding is what feeds the machine and results in the majority of the issues I have.
The information provided by me in this survey was based off of my last use of the system. I used the system very frequently for 3 years and it was very beneficial in identifying and preventing outbreaks in a recruit population, which allowed us to intervene and take appropriate measures to minimize illnesses and diseases in a timely manner. I have not used ESSENCE in over a year due to my leaving the Preventive Medicine field.
Still trying to figure it all out.
Even though I am required to DOD IA required training at the hospital I worked at, I still needed to complete it online through EIDS. Double efforts. It should be tied in.
Lengthen the lock out periods. Supervisors have to get reloaded if we don't review it frequently.
Great concept, but still needs some improvement.
ESSENCE was not useful during H1N1 outbreak last year. It was sometimes more than 48 hrs. old when I saw a coded case.
Probably takes more time than should to learn to navigate EIDS/ESSENCE.
I would definitely like to have had more training on using the system. I was taught by a co-worker who was a new tech with limited experience and also by just playing around with the system. Some training in "C" school would be very helpful; also training at the annual conference by the personnel at the Public Health Center would be helpful.
Please keep upgrading the system to better it. Have a nice day.

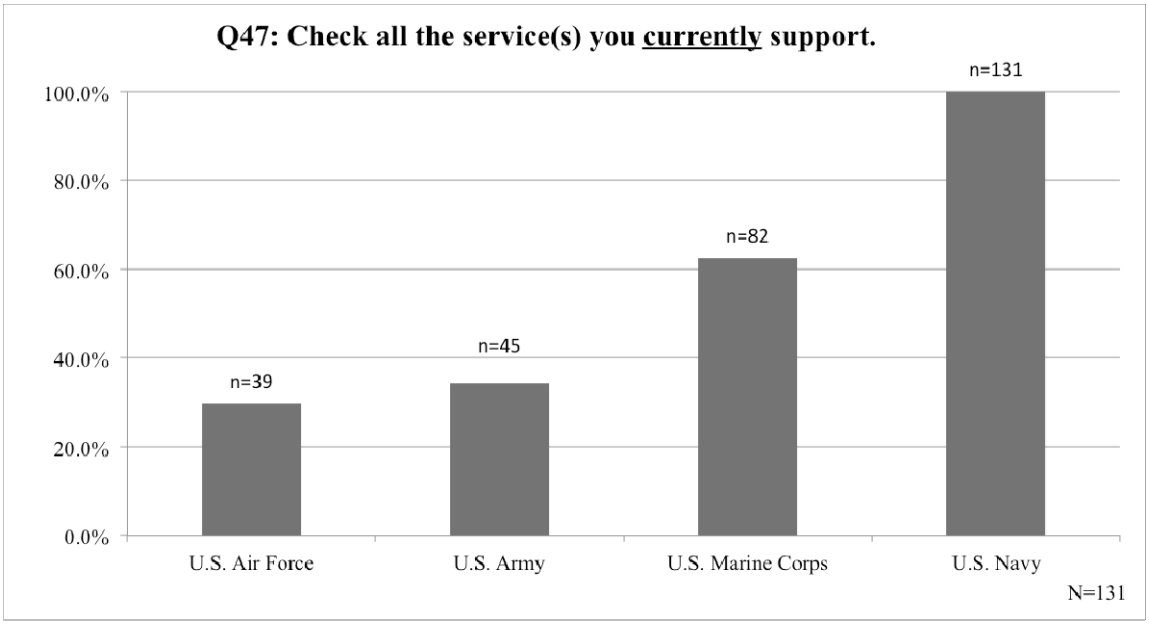
Q44: Do you have any other comments that you would like to make regarding the ESSENCE system?
Need to be able to distinguish between TB and LTBI. Coding has changed somehow and when provider codes for LTBI it comes up TB. And then unable to correct.
Training modules were easy to use.
I think the system is a good way for surveillance would hate to see it done away with. We just need hands on training. More confidence to navigate through the system.
I like the program. Communicable diseases (DNBI) monitoring and controlling through ESSENCE is a breeze once you get the hang of it. Even though I have PCS'd and no longer access the program anymore, I still recommend training for all corpsman and PMTs as part of any annual training since the program can be used in conjunction with CHCS and ALTHA to pinpoint on any disease of interest, and allows for better communication to the axillary departments (LAB, RAD, PHAM, PREVMED, etc.) If there were a way to link it to NDRSi, this program would be perfect!
The DoD disease surveillance process can be streamlined by incorporating capabilities of ESSENCE w/in AHLTA &/or CHCS. For now, we expend excessive man-hours volleying between ESSENCE, AHLTA, CHCS, ESSENTRIS (ER & wards), and NDRSi. NEPMUs should have direct access to this entire software series to view all patient activities w/in all Naval UICs. Many Prev Med Depts. simply do not have the man-hours available to capitalize on the sophisticated epi features w/in ESSENCE
I do not use it much. I “filled in” for a couple of weeks and occasionally thereafter for the person who normally runs the reports.
There need to be some form of formal training at the clinic level.

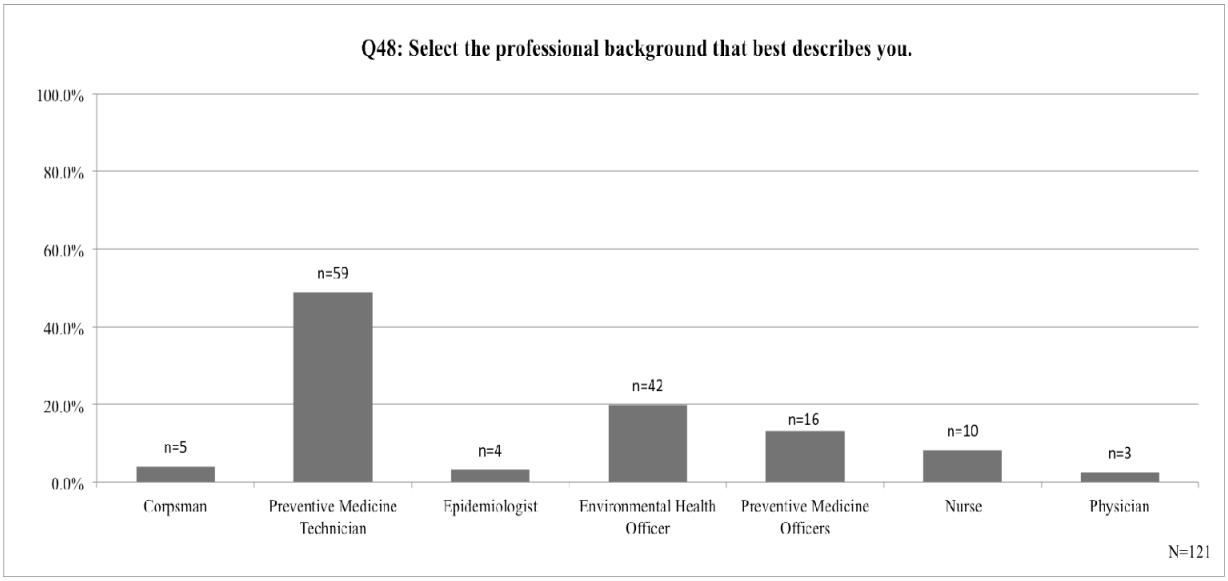


Q45: Other (please specify)
Corporate level
NHRC--all recruit training camps
No longer using ESSENCE in current navy job
Do not use.
Nay-wide (program level)
BUMED
Haven't use it since March 2010
Not sure



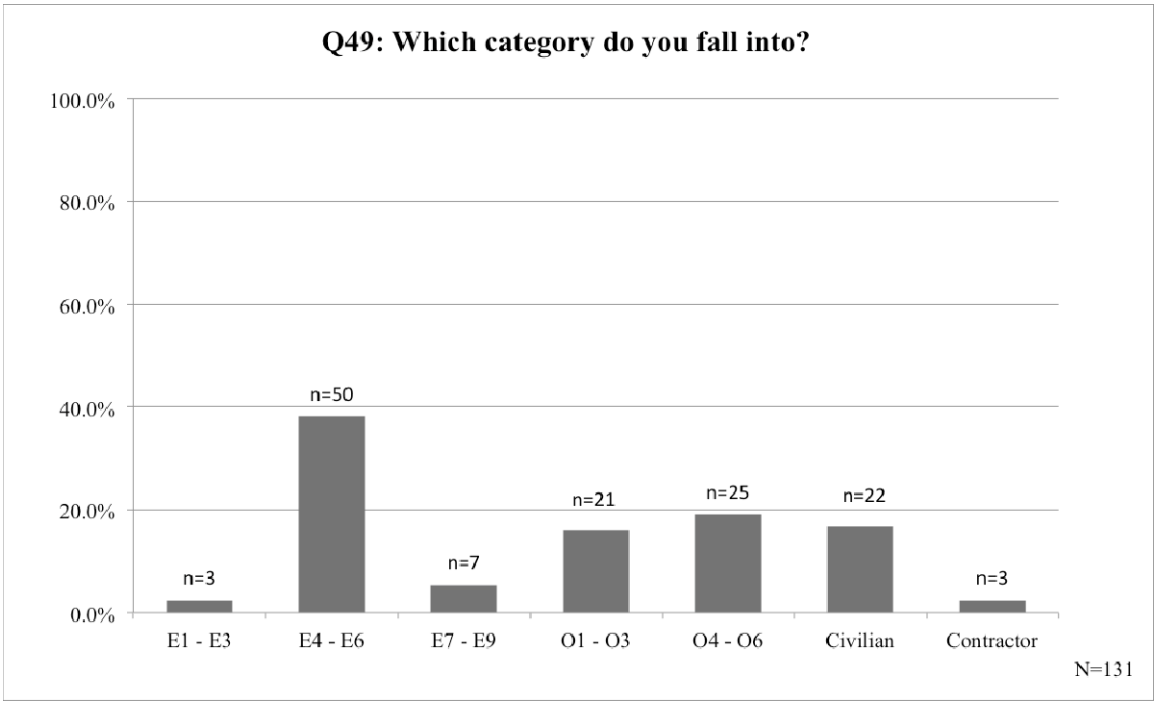
Q46: Other (please specify)
Navy and Marine Corps world-wide
Naval Hospital and 12 branch clinics
James A Lovell Federal Health Care Center
NHRC--all recruit training camps
Support a hospital and 2 outlying clinics
R&D
All Navy MTFs
And the clinic as well
BUMED Navy Medicine
I am stationed at the NEPMU, but doesn't work in the ESSENCE department.
FHCC





Q48: Other (please specify)
Environmental Health Tech
Infection Control Practitioner
Public Health Admin
Environmental Health Technician
Administration - Business OPS
HCA, Clinic Head
Program Analyst MPH

Q48: Other (please specify)
Medical Support Assistant (prior military-Prev Med)
Biochemist
Sanitarian
Planner
Public Health - Industrial Hygiene
Police



Q49: If you are a civilian or a contractor, please enter your grade level or equivalent (GS-7, WG-9, WL-11, etc)
YA-03
GS-12
GS-12
GS-11
GS15
GS11

Q49: If you are a civilian or a contractor, please enter your grade level or equivalent (GS-7, WG-9, WL-11, etc)
GS11
GS-5
GS-11
Preventive Medicine Tech
GS-12
GS-12
Equivalent to GS-14
GS-7
YC-2
YJ - 02
GS-9

LIST OF REFERENCES

Bioterrorism Agents/Diseases. CDC emergency preparedness and response. Retrieved December 14, 2010, from http://www.bt.cdc.gov/agent/agentlist.asp

Bravata. D. M., MD, MS, McDonald, K. M., MM, Smith, W. M., BA; Rydzak, C., BA, Szeto, H., MD, MS, MPH, Buckeridge, D. L. MD, MSc, Haberland, C., MD, & Owens, D. K., MD, MS. (2004, June 1). Systematic review: Surveillance systems for early detection of bioterrorism-related diseases, *Annals of Internal Medicine*, *140*(11), 910–922. Retrieved December 17, 2010, from http://www.annals.org/content/140/11/910.full

Buehler, J. (2008). Syndromic surveillance practice in the United States: Findings from a survey of state, territorial, and selected local health departments. *ADS*, *6*(3).

Buehler, J., Berkelman, R. L., Hartley, D. M., & Peters, C. J. (2003). Syndromic surveillance and bioterrorism-related epidemics. Retrieved January 10, 2011, from http://www.cdc.gov/ncidod/EID/vol9no10/03-0231.htm

BUMEDINST 6220.12B. (2009, February). Medical Surveillance and Notifiable Event Reporting. Retrieved February 14, 2011, from http://www-nehc.med.navy.mil/downloads/diseases_conditions/influenza/BUMEDINST_6220-12B.pdf

CDC. (2008, October 11). Retrieved January 10, 2011, from www.cdc.gov/BioSense/publichealth.htm

CDC. (2009). International Classification of Diseases. Ninth Revision (ICD-9). Retrieved January 10, 2011, from http://www.cdc.gov/nchs/icd/icd9.htm

CDC. (2010a). About BioSense. Retrieved January 10, 2011, from http://www.cdc.gov/biosense/

CDC. (2010b). Early Aberration Reporting System: EARS. Retrieved January 10, 2011, from http://www.bt.cdc.gov/surveillance/ears/

CDC. National Electronic Disease Surveillance System. Retrieved January 10, 2011, from http://www.cdc.gov/nedss/

Dillman, D., Smyth, J., & Christian L. M. (2008, October). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). New York, NY: John Wiley & Sons, Inc.

DoD Directive 6200.4. (2004, October). Force Health Protection (FHP). Retrieved January 13, 2011, from http://www.virtualarmory.com/mobiledeploy/PDHRA/toolkit/references/DoD percent20Directive percent206200.4.pdf

DoD Directive 6490.2. (1997, August 30). Joint medical surveillance. Retrieved January 13, 2011, from http://www.calguard.ca.gov/csc/Documents/d64902p.pdf

DoD Directive 6490.2E. (2009, August 24). Incorporating change 1. Retrieved January 13, 2011, from http://www.dtic.mil/whs/directives/corres/pdf/649002Ep.pdf

The Free Dictionary. Retrieved February 20, 2011, from http://medical-dictionary.thefreedictionary.com/

Glasow, P. (2005, April). Fundamentals of survey research methodology. Retrieved December 17, 2010, from http://www.mitre.org/work/tech_papers/tech_papers_05/05_0638/05_0638.pdf

HSPD-21. (2007). Homeland Security Presidential Directive/HSPD-21. White House. Retrieved December 17, 2010, from http://www.fas.org/irp/offdocs/nspd/hspd-21.htm

JHU/APL. (2009, September). Department of Defense electronic surveillance system for the early notification of community-based epidemics users feedback report.

Kleiner, H, MPH, Endress, K., MPH, & Barbagallo, A. (2008). Survey of syndromic surveillance uses. In pink folder Gen Surv Docs. *Booz Allen Hamilton Inc., Advances in Disease Surveillance 5*(40).

Lombardo, J. (2003). The ESSENCE II disease surveillance test bed for the national capital area, *Johns Hopkins APL Technical Digest 24*(4).

Lombardo, J. (2004, September). ESSENCE II and the framework for evaluating syndromic surveillance systems, *Johns Hopkins University Applied Physics Laboratory*, MMWR Supplement *53*(Suppl), 15–165. Retrieved November 6, 2010, from http://www.cdc.gov/MMWR/preview/mmwrhtml/su5301a30.htm

MacIntosh, V., MD. (2004, June 6). *Enhancing influenza surveillance using electronic surveillance system for early notification of community-based epidemics (ESSENCE).* Walter Reed Army Institute of Research.

NMCPHC Surveillance Tools and Event Reporting. Retrieved November 6, 2010, from http://wwwnehc.med.navy.mil/preventive_medicine/disease_surveillance/essence.aspx

NPGSINST 3900.4. (2002). Retrieved December 17, 2010, from, http://intranet.nps.edu/code00/Instructions/pdf_files/NAVPGSCOLINST percent203900.4.pdf

OPNAVINST 5300.8C. (2008, April 24). Coordination and control of personnel surveys.

OST Policy. (1996, June 12). The Office of Science and Technology Policy. Fact sheet addressing the threat of emerging infectious diseases. Retrieved November 6, 2010, from http://www.fas.org/irp/offdocs/pdd_ntsc7.htm

PHIN Preparedness. (2005). Early event detection functional requirements. Version 1.0. *CDC*. Retrieved November 6, 2010, from http://www.cdc.gov/phin/library/documents/pdf/EED_RSv1.0.pdf

SECNAVINST 3900.39D. (2006, November). Retrieved December 17, 2010, from http://www.med.navy.mil/sites/nmrc/documents/secnavinst_3900_39d.pdf

Sueker, J. (2010). Short report: Global infectious disease surveillance at DoD overseas laboratories, 1999–2007. *Am. J. Trop.Med.Hyg.*, *82*(1), 23–27.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, VA

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, CA

3. CAPT Bruce Cohen
   Navy and Marine Corps Public Health Center
   Jacksonville, FL

4. CAPT Christopher Clagget
   Navy and Marine Corps Public Health Center
   Jacksonville, FL

5. Asha Riegodedios
   Navy and Marine Corps Public Health Center
   Jacksonville, FL

6. Eve Zentrich
   Navy and Marine Corps Public Health Center
   Portsmouth, VA

7. Dr. Paul Rosenfeld
   Institute for Organizational Assessment Navy Personnel Research, Studies and Technology Department
   Washington, DC

8. Edward Orlowsky
   Bureau of Medicine and Surgery
   Washington, DC

9. Professor Ron Fricker
   Naval Postgraduate School
   Monterey, CA

10. Professor James Eagle
    Naval Postgraduate School
    Monterey, CA

11. Dr. Kenneth Cox
USA Medical Command PHC
Aberdeen Proving Ground, MD

12. Barbara Zimmer
NEMPU-5
San Diego, CA

13. LaRosa Watson
Naval Medical Center San Diego
San Diego, CA

14. HMC Robert Bolling
Naval Hospital Pensacola
Pensacola, FL

15. CAPT Joseph McQuade
Naval Hospital Jacksonville
Jacksonville, FL

16. HM2 David Cano
Naval Hospital Jacksonville
Jacksonville, FL

17. LtCOL Fred Kelsey
60th Aerospace Medicine Squadron
Travis Air Force Base, CA

18. MSgt Dante Pawa
60th Aerospace Medicine Squadron
Travis Air Force Base, CA

19. Dr. Howard Burkom
The Johns Hopkins University Applied Physics Laboratory
Laurel, MD