

## **1. Abstract**

The Florida Department of Health (FDOH) utilizes the Electronic Surveillance System for the Early Notification of Community-based Epidemics, Florida (ESSENCE-FL) to monitor public health data. This system aids in the detection of outbreaks and unusual cases, the monitoring of morbidity and mortality, and provides situational awareness, especially after events such as hurricanes, wildfires, and pandemics. ESSENCE-FL serves Florida's 18 million residents and 80.3 million annual visitors, relying on data from various sources including emergency departments and mortality data. The system is intuitive, supports diverse public health challenges, and enhances the efficiency and effectiveness of public health practice by providing real-time data and analytics. The document outlines the system's implementation, data quality measures, privacy protections, and its impact on population health.

## **2. World**

The implementation of ESSENCE-FL aligns with broader public health imperatives by improving disease surveillance, outbreak detection, and public health response capabilities, which are critical for managing global health threats and enhancing overall public health infrastructure.

## **3. Organization**

The Florida Department of Health (FDOH) is a comprehensive public health organization whose mission is to promote and protect the health and safety of all people in Florida through the delivery of quality public health services and the promotion of health care standards.

## **4. Role**

Role: State epidemiologist

## **5. Functions**

### **Primary Function Supported by the Solution:**

The primary function supported by the ESSENCE-FL solution is syndromic surveillance for early event detection based on emergency department (ED) chief complaints.

### **Goal for This Function from the Perspective of the Role:**

The goal for this function from the perspective of the role is minimizing the time spent accessing data and creating reports to improve decision-making related to disease control efforts through enhanced access to critical data sources formerly siloed in separate systems or not accessible to public health.

### **Evidence provided to demonstrate the achievement of this goal includes:**

1. The growth in the number of active users from an average of 6 unique log-ins in 2007 to 57 per week in 2011, indicating increased utilization and dependency on the system.
2. The generation of over 5,500 unique ESSENCE-FL webpage views per week in 2011, showing frequent use and engagement with the system.
3. Successful implementation and operation of various data modules (e.g., ED data, state reportable disease data, poison information center data, mortality data) that facilitate comprehensive surveillance and reporting capabilities.

## **6. Workflow**

The report did not describe the workflow of the Role.

## **7. Information System**

The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE-FL) system.

The document provides detailed requirements and specifications for the ESSENCE-FL system, which are designed to meet the diverse challenges of public health surveillance:

### **Goals of the System:**

- Improve internal public health efficiencies.
- Enhance decision-making through better access to critical data.
- Improve communication and data sharing.
- Reduce the need for specialized training.
- Provide an intuitive environment for analyses and monitoring.
- Ensure system flexibility to incorporate new data streams and update definitions as needed

### **System Design:**

- The system must be intuitive due to varying technical skills among staff.
- It should support multiple data sources and provide robust data visualization and reporting tools.
- Designed to evolve from a syndromic surveillance system to a multifaceted surveillance system.
- Incorporates tools for descriptive epidemiologic analysis, data visualization, and reporting

### **Project Organization:**

- Managed by the Bureau of Epidemiology (BOE) in collaboration with the Johns Hopkins University Applied Physics Laboratory.
- A state-wide surveillance epidemiologist oversees the system, ensuring goals are met and managing technical components.
- The system includes data from emergency departments, the state reportable disease system (Merlin), the Florida Poison Information Center Network (FPCIN), and the Office of Vital Statistics Mortality Data

## **8. Module**

Modules are not included in this information system.

## **9. DIKW**

Primary Data and Their Data Types:

The primary data used in the ESSENCE-FL system include:

a) Emergency Department/Urgent Care Data:

- Timeliness: 1 file each day
- Volume: ~25 million records

- Primary Units of Analysis: Syndromes, sub-syndromes, free text queries, stratified by various demographic variables.

b) Merlin - Reportable Diseases/Conditions:

- Timeliness: 1 file each hour
- Volume: ~350,000 case reports
- Primary Units of Analysis: Reportable disease cases, stratified by various demographic variables.

c) Florida Poison Information Center Network (FPCIN) - Call Data:

- Timeliness: 1 file every 20 minutes
- Volume: ~1.5 million calls
- Primary Units of Analysis: Major substance, minor substance, individual substance, clinical effects, stratified by various demographic variables.

d) Florida Office of Vital Statistics – Mortality Data:

- Timeliness: 1 file per day
- Volume: ~2.1 million deaths
- Primary Units of Analysis: NCHS cause of death groups, flexible ICD-10 and free text queries, stratified by various demographic variables .

**Most Important Pieces of Information:**

The most important pieces of information are those that provide actionable insights for public health surveillance and response. These include:

- Syndromic data from emergency departments, which help in detecting early signs of outbreaks.
- Reportable disease cases from Merlin, which offer detailed epidemiological data for specific diseases.
- Poison control call data from FPCIN, which assist in identifying trends in substance exposures.
- Mortality data from the Office of Vital Statistics, which are crucial for tracking cause-specific death trends.

These pieces of data are considered information because they have been processed and organized in a way that supports decision-making and action within the public health domain.

### **Explicit Knowledge Used by the System to Support the User:**

The system uses several types of explicit knowledge to support its users, including:

- Syndrome definitions and symptom classification tables shared across jurisdictions, which provide a standardized framework for data interpretation and comparison.
- Automated alert systems that notify users when observed counts exceed expected counts for various stratifications, aiding in the timely identification of potential public health threats.
- Customizable alert lists that allow users to set specific criteria for monitoring and receive automatic updates based on their needs.
- Data integration and interoperability frameworks, which ensure that diverse data sources are harmonized and can be effectively utilized within the system.

## **10. Technology**

Technologies Supporting the Project:

The ESSENCE-FL system utilizes various technologies to support its functions, including:

- Database Management Systems: For storing and retrieving large volumes of data.
- Data Integration Tools: To combine data from multiple sources such as emergency departments, reportable diseases, poison control centers, and mortality records.
- Data Visualization Tools: For creating dashboards and visual reports to monitor trends and detect anomalies.
- Alerting Systems: Automated alerts to notify users of unusual patterns or potential outbreaks.
- Secure Data Transfer Methods: Using sftp, VPN, and public/private keys to ensure the secure transmission of data.
- Encryption Technologies: SSL encryption to protect data in transit and at rest.
- Web-Based Applications: For providing user-friendly interfaces for data access and analysis

Hype Cycle Placement:

The most important technology in this context is syndromic surveillance systems. On the Gartner Hype Cycle, syndromic surveillance systems would likely be positioned between the "Slope of Enlightenment" and the "Plateau of Productivity" stages. This is because such systems have moved past the initial hype and disillusionment phases and are now being widely adopted and optimized for practical use in public health.

Interoperability Standards:

- Data Content: HL7 standards are used to ensure consistent and structured data content across different systems.
- Information Exchange: The system uses standards like HL7 for exchanging data between different health information systems.

- Identifiers/Privacy: Role-based access controls and unique identifiers ensure data privacy and security.
- Transport: Secure methods such as sftp and VPN are used for data transport

## **11. Policies**

### **Inter-organizational Agreements:**

- FDOH has agreements with various data providers and partners, including hospitals, poison control centers, and the Office of Vital Statistics, to share and integrate data into the ESSENCE-FL system.

### **Use Cases:**

- ESSENCE-FL is used for detecting outbreaks, monitoring disease trends, and providing situational awareness during public health emergencies. Specific use cases include tracking emergency department visits for syndromic surveillance, analyzing reportable disease cases, monitoring poison control data, and assessing mortality trends.

### **Functional Standards:**

- Functional standards include the requirements for data timeliness, volume, and granularity, ensuring that the system can effectively support public health surveillance and response activities.

### **Identifiers/Privacy:**

- The system employs de-identified data, role-based access controls, and secure data transfer methods to ensure privacy and confidentiality. Public health data are protected through encryption and secure web applications.

### **Information Exchange:**

- Information exchange is facilitated through the use of HL7 standards, enabling seamless data sharing between different health information systems and ensuring interoperability.

### **Data Content:**

- Data content standards such as HL7 are used to ensure that data from various sources are structured and coded consistently, facilitating effective integration and analysis.

### **Transport:**

- Data transport standards involve the use of secure methods such as sftp, VPN, and SSL encryption to protect data during transmission

## **12. Privacy, Confidentiality, Security**

**Privacy Concerns:** Privacy concerns are addressed by using de-identified data. This ensures that personal information is not disclosed and individual identities are protected. ESSENCE-FL relies on data that have been stripped of personally identifiable information before being used in the system.

**Confidentiality Concerns:** Confidentiality concerns are managed through the use of role-based access controls, which restrict access to data based on the user's role within the organization. Only authorized personnel have access to sensitive data, ensuring that information is only available to

those who need it for their work. Additionally, data sharing agreements and strict policies govern the use and dissemination of data to maintain confidentiality.

**Security Concerns:** Security concerns are addressed through the implementation of several measures:

- **Secure Data Transfer Methods:** Use of secure file transfer protocol (sftp), virtual private networks (VPN), and public/private keys for data transfer.
- **Encryption:** Data are encrypted using SSL encryption both in transit and at rest to protect against unauthorized access.
- **Role-Based Access:** Access to data and system functionalities is controlled based on the user's role, ensuring that only authorized personnel can access sensitive information.
- **Secure Web Applications:** Web applications are secured to prevent unauthorized access and data breaches

### 13. Ethical Concerns

**Ethical Concerns Raised by the Report Authors:** The report does not explicitly mention specific ethical concerns raised by the authors. However, implicit ethical considerations can be inferred from the measures taken to ensure privacy, confidentiality, and security. These include:

- **Protection of Personal Data:** Ensuring that personal and sensitive data are protected and not misused.
- **Equitable Access:** Making sure that the surveillance system benefits all segments of the population and does not inadvertently disadvantage any group.
- **Transparency and Accountability:** Maintaining transparency in data collection, use, and sharing practices, and holding individuals and organizations accountable for their handling of public health data.

**Ethical Concerns Identified:** From the information provided, potential ethical concerns could include:

- **Data Accuracy and Reliability:** Ensuring that the data used in the system are accurate and reliable to avoid misleading public health responses.
- **Informed Consent:** The challenge of obtaining informed consent from individuals whose de-identified data are used in the system.
- **Balancing Public Health and Privacy:** Striking the right balance between the need for public health surveillance and the right to individual privacy.

These sections highlight the comprehensive efforts made by the Florida Department of Health to address privacy, confidentiality, and security concerns while also considering ethical implications in the use of the ESSENCE-FL system.

### 14. Reflection

This assignment emphasizes the importance of understanding and applying stacks properly in each unique case..