

**Attachment A – Warning & Surveillance Systems
Standard Operating Guideline to Annex H**



APPROVAL & IMPLEMENTATION

TARRANT COUNTY PUBLIC HEALTH

**Warning & Surveillance Systems
Standard Operating Guideline to Annex H**

This SOG is hereby approved.

This SOG is effective immediately and supersedes all previous editions.

(Signature of Public Health Director)

(Date)

(Signature of Public Health Authority)

(Date)

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Foreword

A local health department's ability to efficiently safeguard the health of its community is greatly enhanced by the technology it utilizes for its daily operations. More specifically the collaboration of unique data systems within the venue of electronic surveillance systems provides the "eyes & ears" which are necessary to public health preparedness and epidemiology. Warning and surveillance systems are valuable tools to assist the public health professional with monitoring potential health dangers that can threaten a community.

The Homeland Security Presidential Directive (HSPD-21) issued on October 10, 2007 outlines the importance of surveillance systems:

This directive establishes a National Strategy for Public health and Medical Preparedness (Strategy), which builds upon principles set forth in *Biodefense for the 21st Century* (April 2004) and will transform our national approach to protecting the health of the American people against all disasters...In this directive the term "biosurveillance means 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.

Keeping with the priorities of the HSPD-21 directive this standard operating guideline summarizes the specific systems that are intrinsic to the surveillance operations of Tarrant County Public Health.

I. Authority

This document will be implemented as a standard operating guideline for Tarrant County Public Health Department and will serve as an overview of warning and surveillance systems. This document is not intended to be a comprehensive technical piece but is designed to provide a summary of these systems.

II. Purpose

This appendix defines warning systems TCPH uses to identify and respond to natural, accidental, or intentional events that warrant a public health response. The appendix reviews the distinct purposes and features of the systems and describes the protocols that TCPH staff follow in using the systems.

III. Explanation of Terms

ASP	Application Service Provider
CAD	Computer Aided Design
CDC	Centers for Disease Control
CIMS	Crisis Information Management Systems
COOP	Continuity of Operations Plan
EOC	Emergency Operations Center
ESAR-VHP	Emergency System for Advance Registration of Volunteer Health Professionals
ESSENCE	Electronic System for the Early Notification of Community Based Systems
GIS	Geographic Information System
LE/FR	Law Enforcement/First Responder
NEDSS	National Electronic Disease Surveillance System
NIMS	National Incident Management System
NRDM	National Retail Data Monitor
OTC	Over-the-Counter-Meds
PHIN	Public Health Information Network
PPE	Personal Protective Equipment
RFID	Radio Frequency ID
RODS	Real-time Outbreak & Disease Surveillance
SOG	Standard Operating Guideline
TCPH	Tarrant County Public Health

IV. Situation & Assumptions

A. Situation

1. The threat of potential public health emergencies that arise from natural, accidental, or intentional events can at any given time impact the residents of Tarrant County. The risk of terrorism and high-profile disease outbreaks necessitate that warning and surveillance systems deliver adequate safeguards for our community's health.
2. TCPH must have the ability to not only collect, analyze, and investigate health related data, but also utilize early warning detection systems to reduce morbidity and mortality and to improve health.

B. Assumptions

1. Syndromic surveillance systems may utilize real-time disease outbreak data such as in the application of NEDSS, RODS, ESSENCE, and BioSense, or there may be monitoring in fixed intervals such as in the case of Bio Watch.
2. NEDSS (National Electronic Disease Surveillance System) is utilized in Epidemiology as a tool to assist with disease data collection, analysis, and reporting. RODS also collects data from existing computer systems in clinical and other settings and displays them for public health departments through a secure Web-based user interface. ESSENCE is the Electronic Surveillance System for the Early Notification of Community-based Epidemics. BioSense utilizes existing data from healthcare organizations for disease detection and monitoring. Bio Watch detects the release of pathogens into the air in order to provide an airborne surveillance system.
3. The Public Health Information Network (PHIN) will be used to disseminate alerts, advisories, and updates regarding disease data between local health departments.
4. The Law Enforcement/First Responder system (LE/FR) utilizes Web portal technology to assist TCPH communication with identified Law Enforcement and First Responders. LE/FR will enable a leadership designated administrator to prepare appropriate content for notifications to dispatchers.

5. Collectively these systems will assist Tarrant County Public Health in syndromic surveillance activities through the collection, analysis, and investigation of health-related data that precede diagnosis. Various systems will also help to facilitate ongoing communications during a public health emergency.

V. Concept of Operations

Warning and surveillance systems are comprised of three categories: (1) Automated surveillance and analysis systems (near real time), (2) Notification and communication systems, and (3) National electronic surveillance systems. While the terms of functionality for each of these systems are unique in terms of application, the collaborative integration of data that Tarrant County Public Health collects from these systems is essential for maintaining our community's preparedness.

A. Automated Bio-Surveillance & Analysis Systems (Near Real Time)

1. RODS

Real-time Outbreak and Disease Surveillance (RODS) is an open source public health surveillance software program. It is capable of isolating the emergence of infectious diseases at a ZIP code level. RODS analyzes chief complaint data from 14 of the 16 acute-care hospitals in Tarrant County every two hours for outbreaks. E-mail alerts are sent to epidemiologists if a possible outbreak is detected based on variances that exceed a certain preset count-threshold for a ZIP code, county or entire region. ROD'S graphical presentation capabilities let users visualize the severity of chief complaints as categorized into seven different syndromes (and an eighth category for all hospital visits) with an accompanying ability, derived from the National Retail Data Monitor (NRDM) system, to see sales data from more than 100 pharmacies in Tarrant County on 18 different Over-the-Counter (OTC) medications for any time interval of interest. Users can choose to view a display of hospital syndrome data only, OTC data only, or both. Severity of syndromes are visualized/displayed via GIS mapping functions that reflect case count intensity by ZIP code based on the patient's home address.

When a statistical aberration (an alert) is signaled, epidemiologists perform an initial brief investigation that includes an examination of a line listing of records contributing to the alert across syndromes. The data is further analyzed for trends, and to determine any clusters.

Following the brief initial investigation and depending upon the level of suspicion, a more detailed investigation (medical records review and/or follow-up with cases) is warranted only when there is a cause for concern. Concerning features would include unusual epidemiology, high number of excess cases, multiple sites with excess cases, sustained increase in the number of cases, during or following a high-profile event when the findings are in concordance with other surveillance systems.

2. ESSENCE

(Electronic System for the Early Notification of Community based Epidemics) is also used for detection and tracking of infectious disease outbreaks and other health problems. Essence lets users view and analyze chief complaint and diagnostic data through its Web interface; its key features include background detection algorithms producing a list of alerts to help epidemiologists quickly determine if an abnormal event is occurring in their community. Alerts are determined by a preset threshold (p-values) for a patient count within a county area, regardless of ZIP code distribution. Geographic Information system (GIS) maps of data and alerts, pinpoint event location and outbreak or situation spread. A specialized wizard query lets users apply specific case definitions for specialized syndromes or emerging issues not previously configured; and a custom graphing and charting tool suitable for conducting analysis or creating presentation graphics is also included. ESSENCE's mapping capabilities facilitate easy visualization of the geographic dispersion and the severity of syndrome categories as reflected in hospital chief complaint data for any time interval of interest. Users can zoom in on jurisdictions or ZIP codes and easily reconfigure queries to examine different data. Severity of syndromes are visualized/displayed via GIS mapping functions that show case count intensity by ZIP code based on patient home location.

On a daily basis, a line listing of records is examined for trends and to determine any geographic clusters. Following the brief initial investigation and depending upon the level of suspicion, a more detailed investigation (medical records review and/or follow-up with cases) is warranted only when there is a cause for concern. Concerning features would include unusual epidemiology, high number of excess cases, multiple sites with excess cases, sustained increase in the number of cases, during or following high-profile event and the findings are in concordance with other surveillance systems.

3. BioSense

BioSense is a national program that provides real-time biosurveillance and health situational awareness for public health through use of existing data from healthcare organizations. BioSense is similar to ESSENCE and RODS in that it's a Web-based system for use by healthcare facilities and state and local public health partners and its surveillance methods incorporate advanced algorithms for data analysis, visualization and reporting. Unlike RODS or ESSENCE, syndromic alerts are defined by recurrence intervals of syndrome counts aggregated by hospital rather than geographic location of the patient. Like ESSENCE and RODS, severity of syndromes are visualized/displayed via GIS mapping functions that show case count intensity by ZIP code based on patient home location.

BioSense is valuable to the public health community because it provides simultaneous access to the same data, at the same time, to all levels of public health; this facilitates enhanced emergency response. At the federal level, the CDC follows its own response protocols for analyzing BioSense information. The CDC's BioSense response protocol takes into account many of the same factors as those used by Tarrant County Public Health staff. BioSense receives, analyzes, and evaluates health data from numerous data sources such as hospital emergency rooms, ambulatory care clinics, pharmacies, poison control centers, and clinical laboratories; not all of these data sources are currently available for analysis in other local surveillance systems such as ESSENCE and RODS, nor are all of those data sources now being collected in the North Texas implementation of BioSense.

In conjunction with RODS and ESSENCE, a line listing of emergency department records are reviewed daily for aberrations, clusters or trends. A more detailed investigation is initiated based on the same concerning features as are routinely considered for RODS and ESSENCE.

B. Notification/Communication Systems

1. PHIN

The Public Health Information Network (PHIN) is a nationwide program to establish the communications, information, distance-learning, and organizational infrastructure for defense against health threats, including the possibility of bioterrorism. The PHIN will link local health departments to one another and to other organizations critical for preparedness and response: community first-responders, hospital and private laboratories, state health departments, CDC, and other federal agencies.

In the event of a public health emergency the PHIN will be used to: (1) Rapidly disseminate health alert advisories and updates via: broadcast fax, auto dialer, and e-mail. (2) Send and receive disease data securely between health departments. (3) Provide redundancy to Public Health IT systems.

The PHIN message types fall into the following categories:

- (1) Alert – requires immediate action
- (2) Advisory – requires action some time in the future (i.e., a new protocol is available for testing).
- (3) Update – no immediate or future action is required at this time.

Message authorization will require that PHIN messages be prepared by the Director, Health Authority, or their designee using the ICS (Incident Command System) General Message Form 213. The content must be approved prior to transmission by the Director or designee. The Director, Health Authority, or their designee will select the specific contacts, messaging types and message format (e-mail, fax, or auto dialer).

The PHIN Administrator or designee will transmit all messages according to the specifications included in the message request. A record of transmission must be logged and submitted to the original requester of the message by the PHIN Administrator or designee.

2. EMSsystem

EMSsystem is a Web-based communication program which enables designated users with a password and log-in to share information and assets between hospitals, first responders, and local health departments. EMSsystem network infrastructure includes multiple parallel servers and geographically distinct secure data servers. The program is structured to disseminate information through three optional modules: EMResource, EMTrack, and EMCredential.

EMResource 3.0 assists with medical inventory and resource management systems through collaboration of emergency responders and hospitals. Real-time communications can be facilitated by healthcare professionals such as physicians, nurses, EMS providers, and medical informatics. Bed tracking and availability, emergency department capacity, behavioral health and dialysis bed status are among the resources that can be monitored. Also additional specific incident resources can be maintained such as decontamination capability, ventilators, and pharmaceuticals.

EMTrack focuses on patient and evacuee tracking systems as well as management of mass casualties in large scale events. This module is a browser-based system which can offer the ability to track patient transport, evacuee movement, special medical needs, and shelter in place scenarios. Patients can be entered through “scan-and-go” technology in order to assist with the management of surges and evacuations. Scanning capability is accomplished through one or more mobile data collection units (using RFID or barcode) through a wireless cellular (802.11) or satellite networking system. EOC’s can view, report, and manage transport activities in day-to-day use or during mass casualty incidents.

EMCredential is an ESAR-VHP/NIMS compliant volunteer registry and credentialing system for the management of volunteers during emergency response. This module registers, verifies credentials, notifies, and manages volunteers that are called upon to support large scale emergencies. Credential verification can be in either real-time or on-demand formats. Also administrative support functions can provide customizable registration forms and search tools.

The server and communications infrastructure supporting EMS systems is an ASP (Application Service Provider). Through the ASP data is aggregated and maintained in a centralized database. This architecture provides an additional level of redundancy and backup of the system allowing for flexible, secure access by authorized users. Web services interface facilitates sharing of resource management and event-related data with operational systems. Depending on regional needs, these systems may include CAD systems, Crisis Information Management Systems (CIMS) or other operational systems.

3. WebEOC

WebEOC is a Web-based program designed to deliver real-time emergency information to local and state emergency operation centers and their agency partners (i.e., hospitals and local health departments). TCPH’s WebEOC designated users can utilize password and log-in to access the program from any secure Web-based server to monitor emergency medical event status through drop-down information and dialogue boxes referred to as “dashboards.”

These dashboards include: Medical, Available Blood Board, ER Patient Log, Critical Meds, ER Discharge Patients, ER Interfacility Transfer, Medical Significant Events, Significant Events, and a Forms Library. The Medical dashboard relays information on patient bed and operating room status as well as decon and ventilator status for local hospitals. The blood board relays available blood supply in terms of RBC’s, FFP’s and Platelets. Critical meds dashboard reports inventory for pharmaceuticals.

ER Discharge and Interfacility Transfer shows patient discharge summary and lists transport and receiving details. The significant events dashboards post real time bulletin reports for up to date reporting.

In addition to the information exchange dashboards there are form libraries that make available HICS and ICS reporting forms applicable to various incident scenarios. GIS mapping is also available to plot location details for an immediate area. Chat rooms and message bulletin boards also provide the platform for additional communication relay in real time.

Overall WebEOC's architecture is a standard three tier with Microsoft SQL Server 2000 as the database, Microsoft IIS 6.0 as the Web server, and clients have access through Microsoft Internet Explorer Version 5.5 or above.

4. E-Team

E-Team is a Web-based software program designed for emergency event management. Designated TCPH users utilize login and password to access the program from any secure Web base server and create their own user profile. In the context of the initial event a first response agency will create a "Quick Incident Report Form." Once the incident is reported then collaborating agencies will respond with critical information to periodically update the program through situation reporting, resource and asset management, duty logs, targeted alerts, and GIS mapping.

Users can modify menus and forms in order to view data relevant for their organizational needs. For instance, TCPH can set up a "Quick Menu" in order to prioritize hospital and shelter status over other reporting tabs. Geo-Location tabs place the incident location onto the GIS maps. Distribution and data sharing forms allow users to designate what groups to share information with: law enforcement, command groups, or exercises.

For TCPH incident form number eight is medical and health specific in its scope of reporting. This area includes: public water systems, food contamination, sewage/waste problems, quarantine areas, animal control, infectious disease, mental health, HazMat, evacuation, and shelter issues. This section allows reporting of information that can assist in the distribution and acquisition of resources, and to assist with situational awareness. A "Hospital Report" is designed to give a synopsis of the status and capabilities of local hospitals. In addition to the Medical and Health form is form number nine, Mass Care and Shelters which provides specific reporting on shelter status.

To assist with event tracking the Event Report is a management controlled form that groups related incidents. Events can include emergencies and planned activities. Critical information can be relayed from the Events Section to include details on “who’s in charge” and “event location.” An action plan template can be inserted to help manage the completion of critical tasks. Additional components which can be affected by an emergency incident are also available for status reports: transit, utilities, and road closures.

5. LE/FR

The Law Enforcement / First Responder (LE/FR) Notification and Alerting System is a Web-based content management tool intended to help ensure the health and safety of those on the front lines of response to local or regional emergencies. Those personnel already on or promptly called to the often dangerous scenes of emergency events represent a key communications audience, one that public health has historically found difficult to reach.

The LE/FR Notification and Alerting System lets a designated administrator prepare appropriate content for notifications that can be sent securely and instantly to dispatchers at participating LE/FR agencies, which currently include the Tarrant County Emergency Operations Center (EOC), Tarrant County Sheriff’s Office, Arlington Police Department and Arlington Fire Department.

In a manner similar to the Department of Homeland Security’s alert levels, the notifications are color coded and categorized by perceived importance or severity; they also reflect a chronology of each incident. Specifically, the first notification for an incident, a health advisory, is yellow. The second notification, a health alert, is red. The third notification, a health update, is blue. The final type of notification, normal status, is green. Not all incidents will be expected to generate each type of notification. Some health advisories won’t be followed by health alerts if an event is investigated and the system administrator finds that no further information or action is warranted.

Content for each type of notification is intentionally brief. The message format is structured to communicate only the most relevant, actionable information so LE/FR personnel can take measures to protect themselves during acts of bioterrorism or other emergency situations. In a plague outbreak, for example, the notifications would alert responders to the situation and call for the use Personal Protective Equipment (PPE) such as an N95 mask. Supporting details are available to users who follow links to access more information.

Because the system uses Web portal technology, each participating agency has its own view of the information, with content customized for that agency's needs. Another key feature of the system is its ability to let users communicate with the Tarrant County Public Health department and other agencies using both general and context-sensitive messaging mechanisms. The system can also deliver audible alerts so dispatchers know when to view and respond to incoming notifications. All content is accessible in a notifications archive; users can search all content using their choice of search criteria.

The system, when fully developed, will ultimately have pre-scripted messages the Health Authority can call up to more easily prepare messages that describe a broad variety of threats (chemical, biological, radiological, nuclear and explosive) at various stages as well as the appropriate LE/FR personnel responses to such threats as they unfold.

C. National Electronic Disease Surveillance System (NEDSS)

The National Electronic Disease Surveillance System (NEDSS) is an electronic database used by public health at the federal, state, and local levels. Laboratory, clinical, and public health surveillance data is transferred efficiently and securely over the Internet, making it possible to gather and analyze information quickly and accurately. NEDSS is primarily designed to facilitate the reporting and tracking of notifiable disease conditions.

Epidemiologists use the NEDSS database to:

- Investigate, track and report cases involving notifiable disease conditions
- Transfer public health information to state and regional DSHS offices
- Retrieve historical data for tracking disease trends
- Generate internal productivity reports
- Contribute to the data pool for state and national disease surveillance

The focus of the NEDSS initiative is the development, testing, and implementation of information management technology standards that will support comprehensive integration of computerized health information systems for use in public health. The NEDSS standards focus on five important areas: 1) data architecture (data model, data definitions, and coding rules); 2) user interface; 3) information systems architecture (based on industry standards); 4) tools for interpretation, analysis, and dissemination of data; and 5) secure data transfer.

VI. Organization & Assignment of Responsibilities

A. Routine Operations

Ongoing surveillance and warning system functions in the Tarrant County Public Health Department will include the process of active data-gathering with appropriate analysis and interpretation of data that might relate to disease activity and threats to community 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, and overall situational awareness of disease activity.

Surveillance and warning systems analysis is conducted within Operations and is coordinated through Epidemiology. Planning section will also collaborate with the systems reporting to include interaction with PHIN, IT, and GIS.

B. Public Health Emergencies

In the event of a public health emergency Tarrant County Public Health Department adheres to National Incident Management protocols and implements ICS Unified Command procedures. External and internal call down alert is issued for health department directors and managers when the Department of Operations (DOC) is activated.

Under the direction of the Public Health Director or designee the Operations Section Chief will make coordination with the Chief Epidemiologist. The Chief Epidemiologist will in turn work closely with the Surveillance and Response Manager to monitor and report findings to Incident Command staff. Surveillance and Response will coordinate with Epidemiology staff regarding warning and surveillance systems analysis.

VII. Direction & Control

The Tarrant County Public Health Director or designee will provide general guidance for the direction and control function, pursuant to NIMS protocols, for all public health emergency operations within the county, including warning and surveillance operations.

Homeland Security Presidential Directive (HSPD-21) states: “The United States must develop a nationwide, robust, and integrated biosurveillance capability, with connections to international disease surveillance systems, in order to provide early warning and ongoing characterization of disease outbreaks in near real-time. Surveillance must use multiple modalities and an in-depth architecture... State and local government health officials, public and private sector health care institutions, and practicing clinicians must be involved in system design, and the overall system must be constructed with the principal objective of establishing or enhancing the capabilities of State and local government entities.”

VIII. Continuity of Operations

Tarrant County Public Health's Business Continuity Plan to Annex H, appendix 11 - Recovery (COOP) outlines the continuity of essential services in the event an emergency prevents occupancy of its primary headquarters, or an event that limits operations through a reduction of human resources.

Emergencies, or potential threats, may adversely affect the ability of Tarrant County Public Health to continue to carry out essential services and operations. Infectious diseases, terrorist agents, and natural disasters, may contribute to high morbidity and mortality among our staff.

The objective of Tarrant County Public Health's COOP is to ensure the execution of essential services during a crisis and to provide for the safety and well being of the employees during an emergency. Critical operations must continue in the event of a sudden or ongoing and severe reduction in staff/human resources. The COOP lists the following components as critical for TCPH operations during an emergency:

- 1) Monitor the health status of the community.
- 2) Investigate and diagnose health problems and hazards.
- 3) Inform and educate people regarding health issues.
- 4) Mobilize partnerships to solve community problems.
- 5) Enforce laws and regulations to protect health and safety.
- 6) Link people to needed personal health services.

The above services will directly correlate to the specific threat or emergency occurring within the context of activation. The first and second components are inclusive of warning and surveillance system implementation (RODS, ESSENCE, Bio-Sense, and NEDSS). These systems will be maintained in a state of high alert during emergency operations. If a catastrophic incident should affect any critical electronic infrastructures necessary for the operation of these systems, then InformationTechnology (IT) will make recovery operations a high priority. This will also involve any emergency site relocation (ESR) efforts as well for these operational systems.

IX. Administration & Support

A. Tracking of expenditures and costs will take place in accordance with procedures outlined in the basic plan and public health SOG's.

B. Requests for reimbursement of disaster costs will take place in accordance with procedures outlined in the basic plan.