

# Evaluation of a public health surveillance system using emergency medical service logs— U.S. – Mexico Land Border, El Paso, Texas, 2009

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## Background

- The Centers for Disease Control and Prevention (CDC) Quarantine Stations are responsible for limiting the introduction of infectious diseases into the United States and to prevent their spread.
- El Paso Quarantine Station (ELPQS) has jurisdiction of all ports of entry (POEs) in west Texas and New Mexico, and along the entire U.S.-Mexico border in both states.
- Detection and reporting of travelers with reportable infectious diseases at international POEs rely on passive inspection by Customs and Border Protection (CBP) officers.
- The primary focus of CBP is law enforcement, and officers have minimal public health training.
- ELPQS implemented FirstWatch®, a web-based system that monitors and reports emergency call response data from the El Paso emergency responders.
- Quarantine station personnel reviewed response records for land border travelers with symptoms and signs of potential reportable diseases and requested a final diagnosis from the receiving hospital.
- When a traveler was diagnosed with a reportable disease, it was reported to local or state health departments in west Texas and southern New Mexico. The Mexican health authority was also contacted when necessary.

## Objectives

- To assess the ability of FirstWatch® Surveillance System in detecting reportable infectious diseases at the four major POEs (Paso del Norte, Bridge of the Americas, Stanton, and Ysleta) in El Paso, TX
- To determine if FirstWatch® can serve as a practical active surveillance system and enhance current passive illness detection at the POEs

## Methods

- Used the CDC guidelines for surveillance evaluation to assess the following attributes: simplicity, flexibility, data quality, acceptability, predictive value positive, representativeness, and timeliness
- Surveyed local, state, and federal stakeholders to better understand the implementation, management, and effectiveness of the system
- Reviewed one year of FirstWatch® notifications for data quality, demographic information, chief complaint, and final diagnosis
- Compared FirstWatch® reports with those reported through the illness reporting system used at the CDC Quarantine Stations (Quarantine Activity Reporting System [QARS]) to determine if CBP officers were reporting potential reportable infectious diseases to ELPQS staff

## Results

- From January 1, 2009, through December 31, 2009, ELPQS received a total of 585 alerts via FirstWatch®.
- The medical officer recommended follow up for 86 patients.
  - A reportable infectious disease was identified in 9 (10.5%) of the 86, a non-reportable infectious disease in 31 (36.0%), and a non-infectious or unknown condition in 46 (53.5%).
  - Only two (2.3%) of 86 ill travelers had been previously reported to ELPQS by CBP officers.
- During the same time, ELPQS received 27 illness reports from CBP officers at the local POEs covered by El Paso emergency responders.
  - Two (7.4%) of the 27 had reportable infectious diseases, 16 (59.3%) had non-reportable infectious diseases, and 9 (33.3%) had non-infectious conditions.

Table 1. Demographics of land border travelers requesting emergency medical services at ports of entry, El Paso, TX

	Alerts in QS database (n=450)	Followed up alerts (n=85)	Reportable conditions (n=9)
Average Age	40	30	19
Male	58.8%	55.3%	55.6%
Female	41.2%	44.7%	44.4%
Transferred from Mexican ambulance	34.2%	35.3%	44.4%
Sought care from healthcare provider in Mexico	8.2%	17.6%	0.0%

Table 2. Final diagnosis of ill land border travelers with reportable conditions detected by FirstWatch®

Reportable conditions	Total cases
H1N1 influenza	5
Coccidioidomycosis	1
Invasive <i>Streptococcus pneumoniae</i>	1
Legionellosis	1
Hepatitis C	1

Figure 1. Final diagnosis of ill land border travelers in El Paso, TX detected by FirstWatch®, 2009

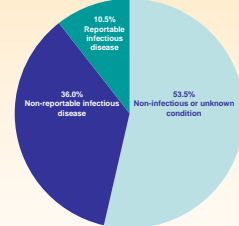
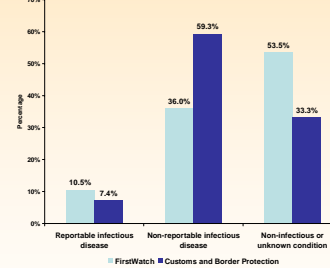


Figure 2. Final diagnosis of ill land border travelers in El Paso, TX detected by FirstWatch® or reported by Customs and Border Protection, 2009



## System Attributes

### Simplicity

- Each emergency medical services dispatch call is automatically compiled into an electronic event report with the chief complaint, port of entry, a brief narrative, and patient demographics.
- ELPQS staff recently discussed with FirstWatch® the logistics of using file transport protocol (FTP) to download raw data from each alert.

### Flexibility

- Working with FirstWatch® and El Paso Fire Department, ELPQS was able to create unique alert categories based on signs and symptoms of reportable diseases that can be redefined as needed to improve data sensitivity and specificity.
- The categories are gastrointestinal, respiratory, skin rash or lesion, fever, and hemorrhagic fever.

### Representativeness

- FirstWatch® data is representative of acutely ill border crossers who request an ambulance and require higher level of care in the US.

## System Attributes (continued)

### Acceptability

- Acceptability of this system among users is high.
- Many stakeholders reported that this system enhances disease surveillance among border crossers and complements illness reports received from CBP.
- Some stakeholders expressed concerns about the cost and resources required to maintain this system.
- Many infection control practitioners and local stakeholders were not aware of the use of this surveillance system in the El Paso area.

### Data quality

- Each call dispatched to the POE may involve multiple patients but is assigned one incident number. ELPQS received duplicate incident numbers for 33 (7.3%) alerts.
- Most of the alerts requiring follow up had patient demographics entered. However, hospitals had challenges locating patient records due to errors in the EMS report.
- 48 of the alerts did not have a chief complaint entered. The patient narrative and assessment may lack other pertinent medical information (past medical history, vital signs, etc.) needed for the medical officer to gain a diagnostic impression.

### Predictive value positive

- The PVP of FirstWatch® for detecting reportable diseases among border crossers is 1.5%.
- The PVP of the medical officer's recommendations to rule out reportable disease among travelers detected by FirstWatch® is 10.5%.
- The PVP for CBP notifying ELPQS of travelers with reportable disease is 7.4%.

### Timeliness

- If the medical officer suspected a highly infectious disease the receiving hospital would be contacted immediately for admitting diagnosis and patient prognosis.
- FirstWatch® is a system that collects data electronically near real-time with a maximum delay of 12-16 hours after an incident occurred.
- ELPQS staff reviewed alerts within 24 hours of receipt.
- Medical records for final diagnosis were requested from hospitals on a weekly basis.
- Most medical records requests were processed the same day.
- In some cases the health department had not yet received the disease notification from the hospital when contacted by ELPQS.

## Conclusions

- FirstWatch® greatly enhances surveillance of reportable conditions among land border travelers in the El Paso area.
- The system detected reportable conditions among acutely ill travelers who were not identified by CBP officers.
- Positive attributes of FirstWatch® included flexibility, acceptability, and timeliness.
- Simplicity and representativeness were relative strengths.
- Data quality and predictive value positive were limitations in this system.
- The ELPQS should investigate the feasibility of continuing this surveillance and using other electronic methods, such as file transfer protocol (FTP), to download data from FirstWatch® alerts into a database file.

## Acknowledgements

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

