

# EVALUATION OF AMBULANCE CROSS BORDER OPERATIONS

*by*

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## **DISCLAIMER AND ACKNOWLEDGMENTS**

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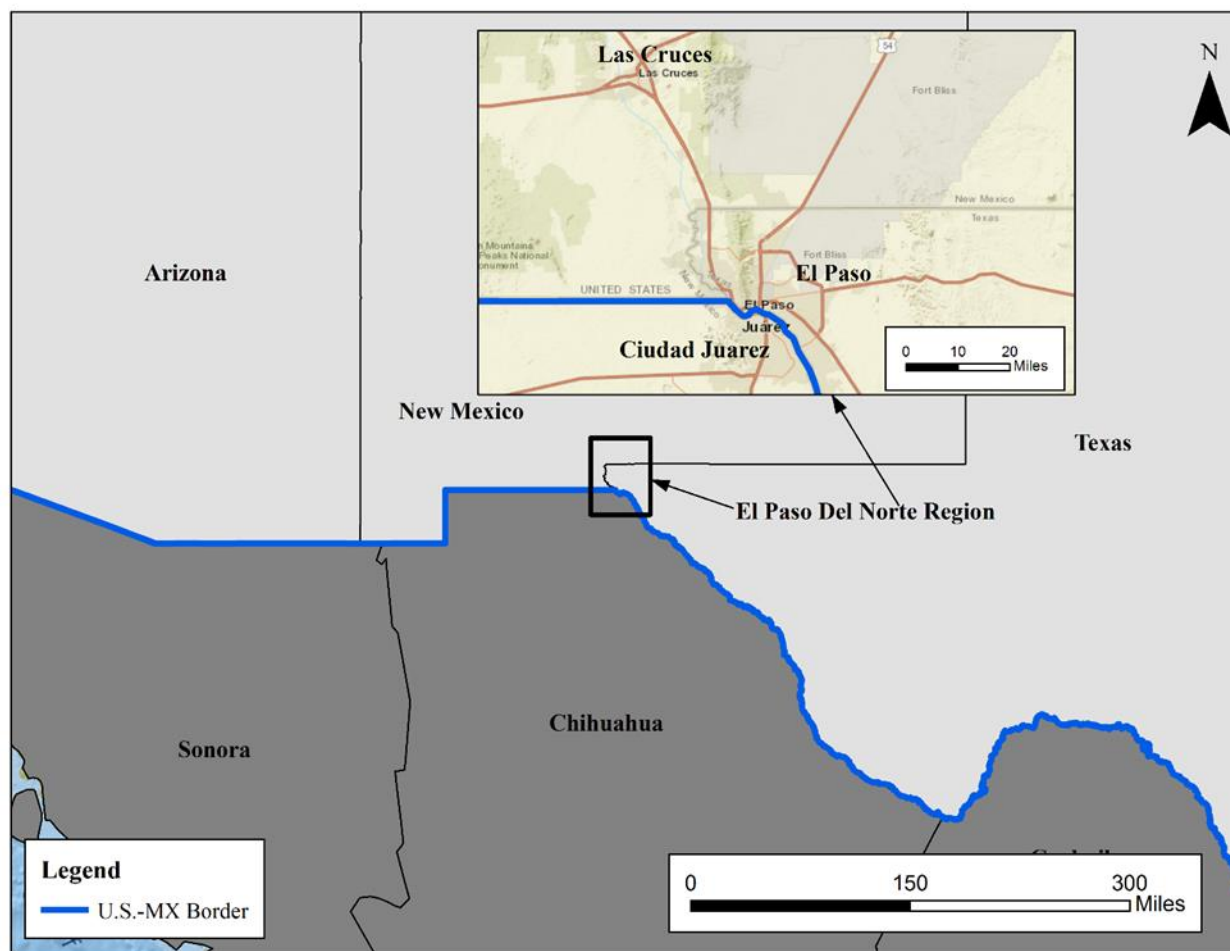
## CHAPTER 1: INTRODUCTION

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The United States–Mexico International Border Region is a territory that extends from the Gulf of Mexico to the Pacific Ocean. As stated in the La Paz Agreement, it includes 62 miles north and south of the international boundary of each country (1). The region crosses the states of California, Arizona, New Mexico, and Texas on the U.S. side. On the Mexican side, the region crosses part of the states of Tamaulipas, Nuevo León, Coahuila, Chihuahua, Sonora, and Baja California. In 2010, approximately 15 million people were living in the U.S.-Mexico binational metropolitan region (2).

Binational metropolitan regions consist of two or more different municipalities from two different countries presenting a continuous transnational conurbation. The cities on the Mexican side of the border are typically manufacturing centers, while the cities on the U.S. side provide services related to the manufacturing industry. This situation generates many commute trips from the United States to Mexico and vice versa every day. The North American Free Trade Agreement, established on January 1, 1994, significantly increased both the industrial and economic activity in Mexican border cities and their economic interdependence with the United States. The high commuting activity of the border sometimes generates the necessity of transporting U.S. citizens and residents from Mexico to the United States for emergency medical care through a land port of entry (LPOE). LPOEs are the only transportation infrastructure linking these binational metropolitan regions. Recently, they have experienced high congestion levels and protracted vehicle crossing times. These delays were aggravated after 9/11 terrorist attacks and the effect of the war on drugs in Mexico (3).

The El Paso–Ciudad Juárez binational metropolitan region, shown in Figure 1, is one of the largest binational metropolitan areas located along the U.S.-Mexico border (4). The American Community Survey estimated the population of El Paso County at 835,593 in 2015 (5). On the Mexico side, the Instituto Nacional de Estadística y Geografía estimated the population of Ciudad Juárez at 1,391,180 in 2015 (6). Consequently, approximately 2.5 million people live in this binational area.



**Figure 1. El Paso–Ciudad Juárez Binational Region.**

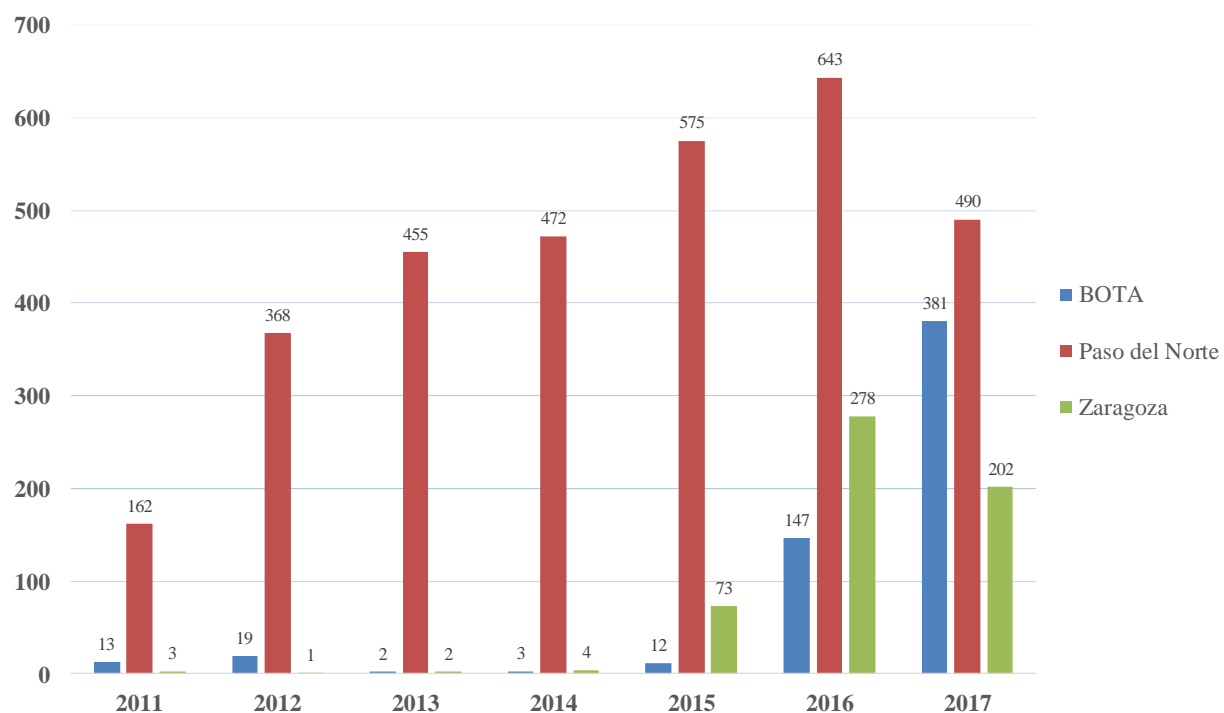
According to the U.S. Department of Transportation (7), more than 12 million passenger vehicles and 6.8 million pedestrians used these LPOEs to travel from Ciudad Juárez to El Paso in 2015 (8). The City of El Paso (U.S.) and Ciudad Juárez (Mexico) are connected by four LPOEs. All LPOEs are congested during peak hours (3). These LPOEs are:

- The Paso del Norte: used by pedestrians that travel from Ciudad Juárez to El Paso and vice versa, as well as passenger vehicles and busses that travel northbound (NB) from Ciudad Juárez to El Paso.
- The Stanton Street: used by pedestrians, passenger vehicles, and buses traveling southbound (SB) only from El Paso to Ciudad Juárez.
- Zaragoza – Ysleta (Ysleta): used by pedestrians, passenger vehicles, buses, and commercial vehicles traveling from Ciudad Juárez to El Paso and vice versa.
- The Bridge of the Americas (BOTA): used by pedestrians, passenger vehicles, buses, and commercial vehicles traveling from Ciudad Juárez to El Paso and vice versa.

The El Paso Fire Department (EPFD) receives hundreds of emergency calls (i.e., calls to 911) every year from these LPOEs since 2013 (9). Patients suffering from severe trauma or acute cardiovascular disease require quick response and expedited transportation to a medical facility that can provide adequate and timely treatment. Time is critical for conditions such as stroke and

heart attack. For example, every year more than 795,000 people in the U.S. suffer strokes. The Heart Disease and Stroke Statistics 2015 states that stroke is a major cause of death and a leading cause of serious long-term disability in the United States. With the advent of newer, effective treatments for stroke, it is crucial that patients are treated within the first hours from the symptom onset. Expedited treatment decreases the disability for patients and imposed costs on the healthcare system (10).

Figure 2 summarizes the annual emergency calls to EPFD from any of the LPOEs that connects that connects Ciudad Juárez and El Paso. Data are from January 2011 to November 2017. As can be observed, the number of emergency calls increased from 173 in 2011 to more than 1,000 in 2016 and 2017. Figure 2 shows that most emergency calls are made from Paso del Norte LPOE.



**Figure 2. Number of Calls to 911 from El Paso–Ciudad Juárez LPOEs.**

However, these numbers may not reflect the real magnitude of the problem because according to United States Customs and Border Protection (CBP) officials in the El Paso–Ciudad Juárez region, in many cases patients are transported across the border in private vehicles. Specifically, friends or relatives frequently transport these patients, because it is widely understood by the public that ambulances do not have priority over passenger vehicles at LPOEs. As a result, the exact number of critical-care patients transported from Ciudad Juárez to El Paso is unknown and likely underestimated. If a protocol to prioritize ambulances over passenger vehicles is in place, the public would likely rely more on ambulance services, and emergency calls registered would grow. The development of an operational protocol for ambulances to navigate cross border operations may significantly reduce the time required for suitable patient transportation to provide the appropriate treatments. The operational protocol could prioritize ambulances over



other vehicles when U.S. citizens or residents need to be transported to the U.S. to receive emergent care.

This report consists of seven chapters including the present one that serves as the introduction. Chapter 2 presents the results of reviewing relevant literature for ambulance cross-border operation protocols in binational regions worldwide. Chapter 3 describes current ambulance cross-border operations in the El Paso–Ciudad Juárez binational region. Chapter 4 presents the patient transport times measured in the El Paso–Ciudad Juárez binational region. Chapter 5 proposes strategies that could reduce patient transport time in the El Paso–Ciudad Juárez binational region. Chapter 6 documents the results of the workshop with stakeholders. Finally, Chapter 7 presents the proposed El Paso–Ciudad Juárez Cross-Border Operations Protocol that resulted from the workshop.

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## CHAPTER 2: INTERNATIONAL PRACTICES IN AMBULANCE CROSS BORDER PROTOCOLS

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Researchers conducted an extensive literature review to identify ambulance cross-border operation protocols currently in place worldwide. The literature reviewed included journal articles, presentations, websites, and conference proceedings, among other sources of information. This chapter consists of three sections. Each section documents ambulance cross border operations protocols currently implemented in: Europe–Asia, South America, and North America.

### 2.1. EUROPE–ASIA

Healthcare cooperation between Sweden and Denmark border region is focused on improving the medical treatment quality through the exchange of experience between staff, joint education, research coordination, development of clinical methods, overcoming the equipment scarcity (e.g., hospital beds), etc. (11; 12).

The Netherlands–Belgium–Germany border region faces the following challenges: 1) multilevel authorities in Germany and Belgium struggle with the uniformity of policy establishment process; 2) competence of ambulance staff varies from country to country; 3) communication issues due to different radio frequencies, equipment, and language; and 4) financial issues since Dutch ambulance services are more expensive than the Belgium ones (11).

In the German–Austria border region, healthcare cooperation is based on personal and informal agreements between decision makers (13). The decision makers face similar issues as noted on Belgium–Dutch-German border: different sirens in use, administration of medicine variations, payments, and the rules of traffic conduct (11).

Sweden–Norway–Finland region includes road and air medical service cooperation agreements. The agreements include upgrade of alarm procedure between Sweden and Finland, extension of radio communications, development of more detailed maps in border areas, and improved collaboration and knowledge exchange. If the incident occurs on Norway territory, and the Swedish paramedics are closer to the emergency location, they are allowed to cross the border and take care of the patient. There are several improvements proposed by the authorities: assign managers from each region responsible for continuity, develop and follow up of the cooperation between regions, and complete and implement guidelines (14; 15).

In 2004, Spain and Portugal signed an agreement to allow patients and medical staff to move between the two countries freely. The main goal was to encourage hospitals in the border region and to facilitate access to health care (16).

Extensive research work has been done in EU with a focus on documenting healthcare system differences between member states and sign cooperation agreements to facilitate to transport patients across borders. However, there are no check points or inspection booths at the border in the EU. Hence, protocols used to expedite ambulance cross-border operations in EU have limited applicability at the U.S.-Mexico border.

In the case of Asian binational regions, the literature consulted did not reveal any ambulance cross-border operation protocol between Hong Kong and China or Malaysia and Singapore.

## **2.2. SOUTH AMERICA**

In South America, initiatives to expedite ambulance cross-border operations are scarce and with limited applicability at the U.S.-Mexico border. Argentina and Chile signed an agreement on emergency vehicles (fire, ambulance, etc.) border crossing operations. Emergency vehicles are allowed to cross the border without unnecessary stops (17). Brazil and Paraguay signed a border health agreement, but Brazil's border health services are overloaded with patients from Paraguay (18).

## **2.3. NORTH AMERICA**

The literature reviewed did not reveal any ambulance cross-border operation protocol currently in place to prioritize ambulances over the rest of the vehicles along the U.S.-Mexico border. However, there is an initiative currently implemented in the San Diego-Tijuana binational metropolitan region that could be used to expedite ambulance cross-border operations at other binational regions along this border. This initiative, denominated the Fast Pass program, is designated for U.S. tourists (including medical tourism) who visit Baja California and have to cross the border on the way back to the United States. Fast Pass is a single-use pass dedicated lane that is not affiliated with U.S. authorities. Therefore, these lanes only facilitate patient vehicle traffic on a section of the Tijuana municipal road network leading to the LPOE. The facility is operated by the City of Tijuana. In order to use it, vehicles must have U.S. or Canadian license plates. On average, the Fast Pass lane claims to reduce passenger vehicles wait times by 30 minutes when traveling from Tijuana (Mexico) to the United States (19).

Regarding U.S.-Canada border, in 2015, Canadian Interoperability Technology Interest Group and National Public Safety Telecommunications Council compiled a report on barriers, opportunities, and solutions for border area emergency responders (20). Some public safety agencies closely collaborate with officials at the border while others encounter difficulties. First responder organizations operating in rural areas have to deal with border crossings that are closed overnight. Reported issues that arose at the border are:

- Delays due to confusion at the border crossing when an emergency vehicle arrives unexpectedly.
- Lack of direct radio communication between the fire truck and border crossing station.
- U.S. law enforcement, fire, and emergency medical services (EMS) units are not able to access designated nationwide interoperability channels in the Very High Frequency and Ultra High Frequency band because of frequency use restrictions within 75 miles/120 km of the border.

Lambton County, Ontario, has a procedure with U.S. and Canada crossing authorities to expedite the passage of EMS units (20). Coordination of hospital-to-hospital transfers across the border involves the use of specific forms that identify the EMS crew and the patient to both authorities. This option allows a clearance check prior to the ambulance arrival at the checkpoint. Also, an agreement between the U.S. and Canada also permits certain critically injured patients in the Windsor, Ontario, area to be transported directly across the border to a Detroit area trauma center. This allows ambulances to bypass the closest hospital in Canada to reach a designated trauma center quickly. Best practices ambulance cross-border operations at the U.S.-Canada border can be summarized as follows:

- Cross border system sharing: use of gateway systems allows emergency services to communicate directly (e.g., data, video, voice).
- Model cross border agreements.
- Pre-check of first responders and EMS crew.
- Locally coordinate border crossing protocols.

U.S.-Canada border state authorities accomplished a lot in terms of emergency time response and level of cooperation. These practices could be adapted and tested at the U.S.-Mexico border.

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## CHAPTER 3: AMBULANCE CROSS BORDER OPERATION AT THE EL PASO–CIUDAD JUÁREZ REGION

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Researchers had meetings with stakeholders in the El Paso–Ciudad Juárez binational metropolitan region to document the ambulance cross-border operation process currently followed. The stakeholders were Mexican ambulance companies, Mexican Red Cross, U.S. CBP, and the EPFD.

Currently, the process of transporting a patient by Mexican paramedics from Ciudad Juárez to hospitals in El Paso starts when the Mexican ambulance departs from the patient pick-up location to one of the LPOEs that connect Ciudad Juárez with El Paso. Mexican ambulances transport patients across the border via BOTA or Ysleta LPOEs. Once the Mexican ambulance arrives at the entrance of the BOTA LPOE, they wait in line with the rest of the passenger vehicles (see Figure 3a). Sometimes, Mexican ambulances use SB lanes to avoid delay compromising traffic safety as shown in Figure 3b. Mexican ambulances use almost in all cases BOTA because of its proximity to the University Medical Center of El Paso (UMC), the only Level I Trauma Center in the region.



Figure 3a. Wait in line with the rest of the vehicles





Figure 3b. Use SB direction

**Figure 3. Ambulance Cross-Border Operations at BOTA LPOE.**

In cases where Mexican ambulances use the Ysleta LPOE to cross the border, they wait in line with the rest of the vehicles (see Figure 4a) or they use the Secure Electronic Network for Travelers Rapid Inspection (SENTRI) Lanes as shown in Figure 4b.



Figure 4a. Wait in line with the rest of the

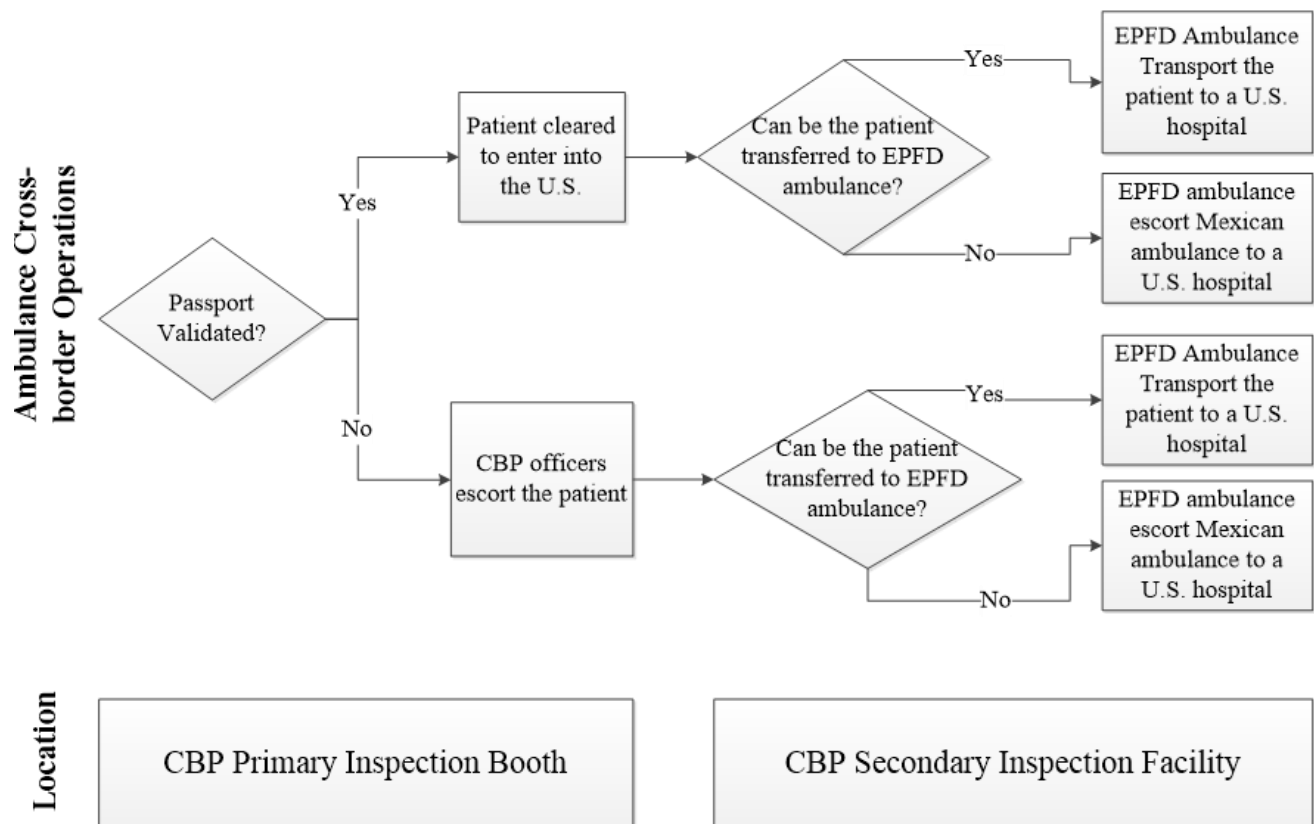


Figure 4b. Use SENTRI Lanes

#### Figure 4. Ambulance Cross-Border Operations at Ysleta LPOE

As soon as CBP officers realize an ambulance is approaching the inspection booth, they start diverting the traffic, so the Mexican ambulance can reach the inspection booth as quickly as possible. Once the ambulance reaches one of the CBP inspection booths, officers validate patients' passports, call 911, and an EPFD ambulance is dispatched. The Mexican ambulance is then directed to one of the CBP secondary inspection facilities, so the patient can be safely transferred to the EPFD ambulance. Finally, the EPFD ambulance takes the patient to a hospital in El Paso, and the Mexican ambulance returns to Mexico. If the CBP officer is unable to validate patients' passport, the patient is escorted by CBP officers to a hospital. If the patient is critically ill and cannot be transferred to the EPFD ambulance, the Mexican ambulance is escorted by an EPFD ambulance to the U.S. hospital. The process followed since the Mexican ambulance arrives to the CBP inspection booth until is transported to a hospital in El Paso is depicted in Figure 5.





**Figure 5. Ambulance Cross-Border Operations Process.**



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## CHAPTER 4: PATIENT'S TRANSPORTATION TIMES AT BOTA BORDER CROSSING

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Patient transport time (PTT) is defined as the time elapsed since Mexican paramedics pick up the patient, until the EPFD ambulance arrives to a hospital. PTT varies with ambulance departure time, location of the patient in Mexico, and LPOE used to cross the border. PTT results from the summation of three travel time components: time to border (TTB), crossing time (TCR), and time to hospital (TTH). These components are defined below:

- TTB. It starts in Mexico when the Mexican ambulance departs from the patient location to the LPOE, and ends when the Mexican ambulance reaches the entrance of the LPOE.
- TCR. It is the summation of wait time and transfer time. Wait time is the time elapsed since the Mexican ambulance reaches the LPOE entrance, until it arrives to the CBP inspection booth. The transfer time starts once the patient is admitted to the United States, the CBP officer calls 911 and sends the Mexican ambulance to the secondary inspection facility. Transfer time ends when the EPFD ambulance departs to the U.S. hospital.
- TTH. It is the time required by the EPFD ambulance to transport the patient from CBP secondary inspection facility to the U.S. hospital.

In order to compute PTT, researchers identified 19 origins in Ciudad Juárez to account for various potential patient locations distributed citywide. Origins are hospitals, industrial areas, and the U.S. Consulate. Hospitals were also identified as origins to account for patients that may be transferred to a U.S. hospital. The U.S. Consulate is an origin because of the elevated number of U.S. citizens that work in this location. Finally, industrial areas were identified as origins because of their high population density of U.S. residents during working hours. On the other hand, the five main hospitals in El Paso were defined as destinations.

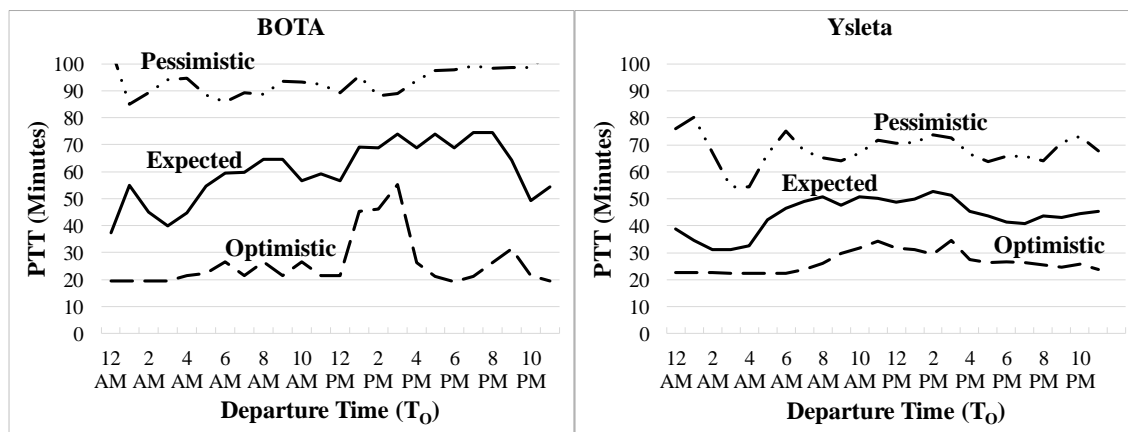
Travel times are computed using four sources: Google Maps Distance Matrix Application Programming Interface (API), CBP Border Wait Times System, Border Crossing Information System (BCIS), and EPFD ambulance dispatch data.

Researchers use Google Maps Distance API to collect TTBs and TTHs travel times of every origin and destination pairs coded. These data are obtained from road users cellular and GPS network devices (cellphones and smartphones). TTBs and TTHs travel times were collected every 15 minutes from September 15, 2017, to October 15, 2017.

On the other hand, data to compute TCRs are obtained from two sources. TCRs are wait times added to transfer times. In the case of Ysleta LPOE, wait times are obtained from the BCIS (21), which measures wait times for passenger vehicles using Bluetooth/Wi-Fi sensors deployed at LPOEs (22). In the case of BOTA LPOE, wait times are obtained directly from the CBP Border Wait Times System (<https://bwt.cbp.gov/index.html>). Wait times were collected every hour from September 15, 2017, to October 15, 2017. Transfer time data were obtained from the EPFD, the only ambulance operator that can respond to emergency calls from LPOEs in El Paso. This data set contains the time elapsed since the CBP officer calls 911, until the ambulance departs to the U.S. hospital from the CBP secondary inspection facility. The EPFD provided historical data from January 2011 to November 2017.

The following paragraphs summarize the results of the PTT computation. Figure 6 presents PTTs for patients transported from Ciudad Juárez to El Paso via BOTA or Ysleta LPOEs. Specifically,

Figure 6 presents optimistic (10<sup>th</sup> percentile), pessimistic (90<sup>th</sup> percentile), and expected (mean or 50<sup>th</sup> percentile) scenarios for PTT on the y-axis, and ambulance departure time in Ciudad Juárez on the x-axis. If a Mexican ambulance crosses the border via BOTA LPOE, PTT is situated between 35 and 75 minutes for expected scenario, between 20 and 55 minutes for optimistic scenario, and between 85 and 100 minutes for pessimistic scenario. In the case of Ysleta, PTT oscillates between 32 and 52 minutes for expected scenario, between 23 and 35 minutes for optimistic scenario, and between 55 and 80 minutes for pessimistic scenario. As can be observed, expected, pessimistic, and optimistic scenarios are smaller for the entire day when Ysleta is used to cross the border. Also, PTT variability is bigger at BOTA LPOE, where there is a difference between minimum and maximum PTT of 80 minutes (see Figure 6). When ambulances use Ysleta LPOE, the difference between minimum and maximum PTTs is one hour. Finally, Figure 6 shows that maximum PTT is experienced when the ambulance departure from 1 p.m. to 7 p.m. if the patient is transported via BOTA, and from 6 a.m. to 3 p.m. if the patient is transported via Ysleta.



**Figure 6. Total Ambulance Travel Time from Ciudad Juárez to El Paso.**

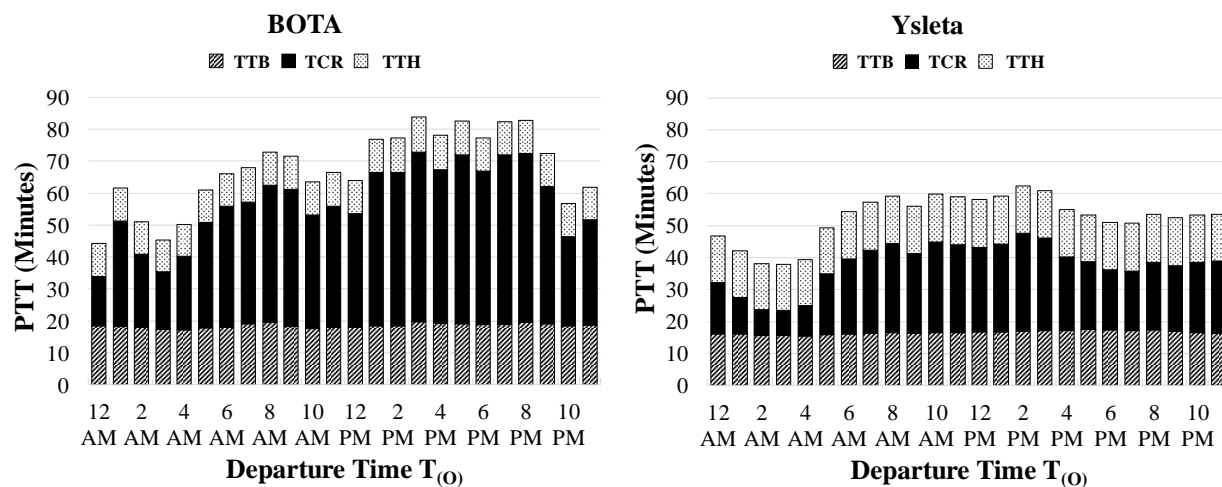
Table 1 presents the results obtained for each PTT time component (i.e. TTB, TCR, and TTH) in terms of their central tendency, variability, and contribution to PTT. Specifically, Table 1 provides the mean and standard deviation of each component. Mean measures the central tendency of each travel time, and standard deviation measures their variability or statistical dispersion. In other words, mean is the expected travel time, and the standard deviation indicates the variation of the travel times with respect to the mean. In the case of BOTA, TCR is the component that contributes the most to PTT. It is also the component with the highest variability. On the other hand, at Ysleta, all three PTT components have a similar contribution to PTT. However, TCR is also the component with the biggest variability. This means that TCR is the least predictable PTT component.

**Table 1. Travel Time Statistics.**

Statistic	TTB	TCR	TTH
<b>BOTA</b>			
Mean	19.10	27.27	11.3
Standard Deviation	7.88	17.40	5.13
<b>Ysleta</b>			
Mean	16.2	15.77	15.4
Standard Deviation	5.04	12.96	3.33

Finally, Figure 7 presents the contribution to PTT of each component for the expected scenario when BOTA and Ysleta are used. In case of patients transported via BOTA, the expected TTB remains around 19 minutes for the entire day. However, the TCR varies from only 10 minutes at midnight, to more than 40 minutes from 1:00 p.m. to 9:00 p.m. TCR is the component that contributes the most to PTT and also the one with the biggest variability. TTH remains around 11 minutes for the entire day.

In case of patients transported via Ysleta, the expected TTB remains around 16 minutes for the entire day. However, the TCR varies from only 9 minutes at night, to 20–25 minutes from 9:00 a.m. to 4:00 p.m. TCR is the component with the highest variability when Ysleta is used. TTH remains around 15 minutes for the entire day as shown in Figure 7.



**Figure 7. Weight of PTT Component.**

Figure 7 showed that the three PTT components behave differently along the day and for each LPOE. TTB is similar for both LPOEs. This reveals that traffic conditions in Ciudad Juárez do not significantly impact ambulance operations when heading to these two LPOEs. TCR is significantly longer at BOTA LPOE due to high congestion levels at this facility. Finally, TTH is lower when the patient is transported via BOTA because three of the five hospitals considered in this study are located within 5 miles from BOTA. In fact, the closest U.S. hospital to the border is located less than 2 miles away from BOTA. Prolonged TCRs at BOTA are translated into longer PTTs when this LPOE is used to cross the border. However, Ciudad Juárez ambulance operators interviewed confirmed that BOTA LPOE is the most commonly used to transport patients across the border. This could be explained by the fact that several hospitals in Ciudad Juárez are located near BOTA and access to the entrance of Ysleta LPOE is more difficult for ambulances. Therefore, BOTA is the best option to transport the patient across the border when patients are transferred from one these medical facilities in Ciudad Juárez.

TTB depends on traffic conditions in Ciudad Juárez, and TTH depends on traffic conditions in El Paso. These two components cannot be controlled. However, TCR could be reduced significantly if communication channels between Mexican ambulances, CBP, and EPFD ambulances are established. Mexican ambulances could inform CBP officers at departure time, so they could give priority to ambulances at LPOEs reducing wait time. Moreover, if EPFD is informed about the location of the Mexican ambulance, EPFD ambulances can arrive to CBP secondary inspection at the same time than Mexican ambulance reducing transfer time to almost

zero. A significant reduction of TCR would increase odds of survival and full recovery of patients being transported across the border.

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## **CHAPTER 5: POTENTIAL AMBULANCE CROSS-BORDER OPERATION STRATEGIES TO REDUCE PATIENT TRANSPORT TIME IN EL PASO-CIUDAD JUÁREZ REGION**

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The implementation of an ambulance cross-border operations protocol could allow a significant reduction of PTT when patients need to be transported across the U.S.-Mexico border to receive emergency medical care. The protocol will mainly consist of two sets of strategies: the establishment of permanent communication channels between all parties involved, and the definition of traffic-management strategies at LPOEs to facilitate ambulance traffic operations.

PTT could be significantly reduced if a communication channel were established between Mexican ambulances, Aduanas Mexico, CBP, and EPFD. If CBP and Aduanas Mexico were notified in advance that a patient was being transported to the border, they would be able to clear specific lanes at LPOEs to facilitate the arrival of the Mexican ambulance at the border. In cases in which NB lanes are very congested, one of the SB lanes could be temporarily reversed for ambulance use (e.g., with traffic cones, portable dynamic message signs [DMSs]). Generally, traffic on SB lanes is much lighter than NB lanes. Similarly, transfer time could be also reduced if the EPFD ambulances were constantly informed about the Mexican ambulance location. So, both ambulances can arrive at the same time to the patient transfer point (CBP secondary inspection facility). Consequently, transfer time would be reduced to just a few seconds.

Stakeholders in the El Paso–Ciudad Juárez region agreed that there is a need to develop and implement a protocol to expedite the transportation of patients from Ciudad Juárez to the United States. Similar protocols could be implemented at any binational metropolitan area along the U.S.-Mexico border.

This chapter presents a set of strategies that can be adopted as part of the final protocol. The strategies are grouped into traffic operation strategies and communication strategies. Researchers developed these strategies based on the international practices presented in Chapter 2, along with the inputs from stakeholders. These strategies were presented to stakeholders in a workshop, so they could decide which ones could be used as part of the El Paso–Ciudad Juárez Ambulance Cross-Border Operations Protocol.

### **5.1. COMMUNICATION STRATEGIES**

The following bullets provide potential communication strategies:

- Establish communication channels (i.e., radio, phone, email) between Mexican ambulances, CBP, and EPFD to coordinate when ambulances are transporting patients across BOTA LPOE.
- Smartphone and tablet application could be developed for all the parties involved, for easy share of information.

### **5.2. TRAFFIC OPERATION STRATEGIES**

5.3. The following bullets provide potential traffic operation strategies:

- DMSs to display information about paramedic arrival (e.g., “Clear the most Left Lane Paramedics on the Way”) can be placed close to the international border crossings.
- Lane Control Signs (LCSs) to indicate a particular lane in SB direction is closed so there is no conflict between passenger vehicles traveling SB and the Mexican ambulance traveling NB.
- Use of SENTRI/Express Lane, if medical staff, patient, and ambulance are enrolled in the Trusted Traveler Program.

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## CHAPTER 6: WORKSHOP

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Researchers organized a workshop to present the results of the study and ask stakeholders for input on potential strategies to reduce PTT. The workshop invitation is included in the Appendix. The workshop was held on August 8, 2018. Table 2 lists the workshop attendees and provides the name of the agency they represent and their contact information.

**Table 2. Workshop Attendees.**

Name	Agency	Phone	Email
<b>Don Janes</b>	UMC	(915) 588-1893	<a href="mailto:donald.Janes@umcelpaso.org">donald.Janes@umcelpaso.org</a>
<b>Gustavo Tavaréz</b>	EPFD	(915) 212-5635	<a href="mailto:tavarezgg@elpasotexas.gov">tavarezgg@elpasotexas.gov</a>
<b>Ken Berumen</b>	EPFD	(915) 241-1438	<a href="mailto:berumenk@elpasotexas.gov">berumenk@elpasotexas.gov</a>
<b>Victor R. Reyes</b>	CBP/OFO	(915) 730-7290	<a href="mailto:victor.r.reyes@cbp.dhs.gov">victor.r.reyes@cbp.dhs.gov</a>
<b>Gisele Puente</b>	Ambulancias UMAM	(656) 360-3489	<a href="mailto:ambulanciasumam@yahoo.com">ambulanciasumam@yahoo.com</a>
<b>Gustavo Rodriguez</b>	Texas Tech	(973) 568-1207	<a href="mailto:gustavo.j.rodriguez@ttuhsc.edu">gustavo.j.rodriguez@ttuhsc.edu</a>
<b>Gustavo Mejia Valdez</b>	Aduana Mexico (Ciudad Juárez)	(492) 164-3000	<a href="mailto:gustavo.mejiav@sat.gob.mx">gustavo.mejiav@sat.gob.mx</a>

### 6.1 CURRENT PROCESS

The following bullets summarize the stakeholders' input on the current ambulance cross border operations process:

- In most cases, UMAM ambulances use BOTA to transport patients across the border. BOTA is the closest port of entry (POE) to UMC, and the majority of the patients are transferred to this hospital. At BOTA, Mexican ambulances can easily return to Mexico once the patient is transferred to the EPFD ambulance.
- CBP is interested in knowing the immigration status of patients picked-up by EPFD ambulances at the POEs. Specifically CBP is interested to know how many of them are U.S. citizens, permanent residents, visa holders, and how many of them have no documents at all.
- CBP verifies patient's passports/documents in less than a minute while EPFD is on the way to the POE. However, if the patient has no documents the process become more complex and CBP officers escort the patient to the hospital until the patient is identified.
- UMAM does not transport patients that do not have required documentation to enter into the United States.
- The number of patients transported by UMAM has decreased in the last few years. During last year, UMAM has transported approximately 75 patients. Around 30 percent of the patients transported by UMAM suffer strokes or heart attacks.
- Almost all the transfers for UMAM are for maquiladora managers. UMAM also work for the U.S. Consulate in Ciudad Juárez.
- CBP stated that most of the patients are transported by private vehicle, and present non-serious emergencies (strokes/heart attacks are not common). Many of them are pregnant women.

- UMAM stated that people believe that private vehicles are faster than ambulances. Sometimes, patients or their relatives do not want to pay for the ambulance and they use private vehicles.
- In some cases, patients are taken to Mexican hospitals first. However, some hospitals in Juárez do not have the necessary equipment, so they are transferred to El Paso.
- Delays at Ysleta-Zaragoza POE occur at the entrance of the facility before paying the toll. According to UMAM ambulances, the use of this POE to transport patients in critical condition is not an option.
- The Regional Medical Officer of the U.S. Embassy at Mexico City contacted UMAM ambulances to request information on protocols in place to transport U.S. citizens working in the U.S. Consulate in Ciudad Juárez across the border in the case of a medical emergency.
- EPFD does not standby for receiving schedule transfers. EPFD responds to pick up patients when called upon through the 911 system.
- CBP calls 911 as soon as ambulance arrives to the inspection booth.
- Aduanas and CBP have an exclusive communication channel (i.e., radio) already in place.
- The most difficult part was getting the ambulance to the CBP, due to traffic conditions on the bridge.

## 6.2 POTENTIAL STRATEGIES TO REDUCE PATIENT TRANSPORT TIME

The following bullets summarize the stakeholders' input on potential strategies to reduce PTT:

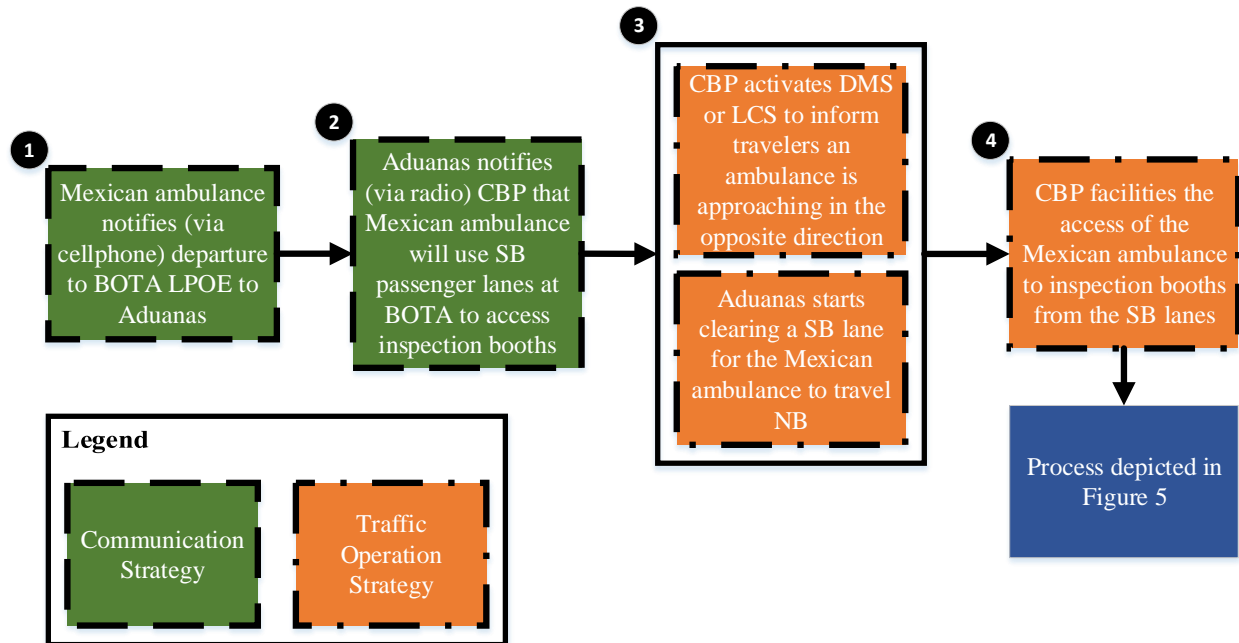
- UMAM suggested sending a report to EPFD specifying the condition of the patient. EPFD stated they must first ask its communications department to see how beneficial that would really be.
- CBP cannot afford to have officers leave their booths to put cones to prepare a lane for an ambulance. However, the use of DMSs or LCSs to warn drivers traveling SB that an ambulance is coming could be an option worth to be tested.
- Express lanes are another way to get across quickly in the case of the Stanton POE. However, this option should be discussed with the toll operator (Fideicomiso de Puentes Fronterizos de Chihuahua).
- Mexican ambulances can notify Aduanas when they pick-up a patient that needs to be transported to the United States. Then, Aduanas can inform the Mexican ambulance about traffic conditions at LPOEs and suggest which one should be used. Once the LPOE is selected, Aduanas could start clearing a SB lane (if needed) for the ambulance to use.
- Aduanas and CBP have an exclusive communication channel (i.e., radio) already in place. This channel could be used by Aduanas to inform CBP that a Mexican ambulance is approaching to U.S. inspection booths using the opposite direction at BOTA. Then, CBP could activate DMSs or LCSs (if they exist).



## CHAPTER 7: EL PASO–CIUDAD JUÁREZ AMBULANCE CROSS-BORDER OPERATIONS PROTOCOL

During the workshop, a set of communication and traffic operation strategies was selected as the best ones in terms of feasibility of implementation and effectiveness. These conform the proposed the El Paso–Ciudad Juárez Ambulance Cross-Border Operations Protocol shown in Figure 8. Stakeholders agreed that BOTA LPOE is the best option for transporting patients in critical condition across the border to a hospital in El Paso.

As shown in Figure 8, Mexican ambulances could notify Aduanas when they pick-up a patient that needs to be transported to the United States. Mexican paramedics would call from their cellphone to Aduanas at the moment the ambulance departures to BOTA LPOE. Then, Aduanas will use an exclusive radio communication channel with CBP to inform that a Mexican ambulance will travel NB using SB lanes. Once CBP is informed about the situation, Aduanas Mexico would start clearing the SB lane that the Mexican ambulance will use to travel NB. At the same time, CBP would activate DMSs or LCSs, if they exist, to inform passenger vehicles traveling SB that an ambulance is approaching in the opposite direction. CBP officers would also facilitate the access of the Mexican ambulance to the inspection booth located at the NB lanes. After the Mexican ambulance arrives to the CBP primary inspection booth, the process to follow will be the same as the one presented in Figure 5.



**Figure 8. El Paso–Ciudad Juárez Ambulance Cross-Border Operations Protocol.**

The implementation of this protocol would significantly reduce TCR, the travel time component that contributes the most to PTT and also the one with the biggest variability (see Table 1). TCR could be reduced even more if Mexican ambulance and EPFD ambulance could coordinate the arrival to CBP secondary inspection facility to reduce transfer time to almost zero.

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## APPENDIX


### Please Join Us for an Invitation-Only Workshop

#### Ambulance Cross-Border Operations in the El Paso-Ciudad Juarez Region: Potential Strategies to Reduce Patient Transport Time

**Tuesday, August 21, 2018**  
**9 a.m. to 12 p.m. MT**  
**(Mountain Time).**

**Texas A&M Transportation Institute–El Paso Office**  
4050 Rio Bravo, Suite 212  
El Paso, TX 79902.

**Please RSVP by August 17 to**  
David Salgado,  
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Tel: +1-915-521-8114.



**Background:**

- The economic interdependence between El Paso and Ciudad Juarez generates millions of cross-border trips every year.
- Cross-border commuters that work in Ciudad Juarez and reside El Paso may suffer a medical emergency in Mexico. Most of these people prefer to be treated at a hospital in El Paso.
- In 2016, El Paso Fire Department received 1,068 calls requesting ambulances from the Ports-of-Entry that connect El Paso and Ciudad Juarez.
- Almost 100 of these calls requested an ambulance to transport patients in critical condition.
- Patients suffering from severe trauma or acute cardiovascular disease require quick response and expedited transportation to a medical facility that can provide adequate and timely treatment.



**Call to Action:**  
Researchers at the Texas A&M Transportation Institute (TTI) and Texas Tech University Health Sciences Center El Paso interviewed various stakeholders to understand the current state-of-the-practice in ambulance cross-border operations in the El Paso-Ciudad Juarez region.

**Findings include:**

- There are no formal procedures in place to expedite ambulance cross-border operations.
- Strategies to improve communication between stakeholders and to give priority to ambulances over other vehicles at Ports-of-Entry would help to reduce patient transport time.

**Agenda Items:**

- Present current state-of-the-practice in terms of number of calls received by El Paso Fire Department from Ports-of-Entry, ambulance cross-border operation procedures, and patient transport time.
- Identify and discuss strategies to reduce patient transport time from Ciudad Juarez to El Paso across the border.



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**Figure 9. Workshop Invitation.**