

DHS SCIENCE AND TECHNOLOGY

S&T Support to Combat Opioid Smuggling

Advanced Development for Security Applications Workshop Customs and Border Protection
(ADSA-CBP-01)

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**Homeland
Security**

Science and Technology

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So What? Who Cares?

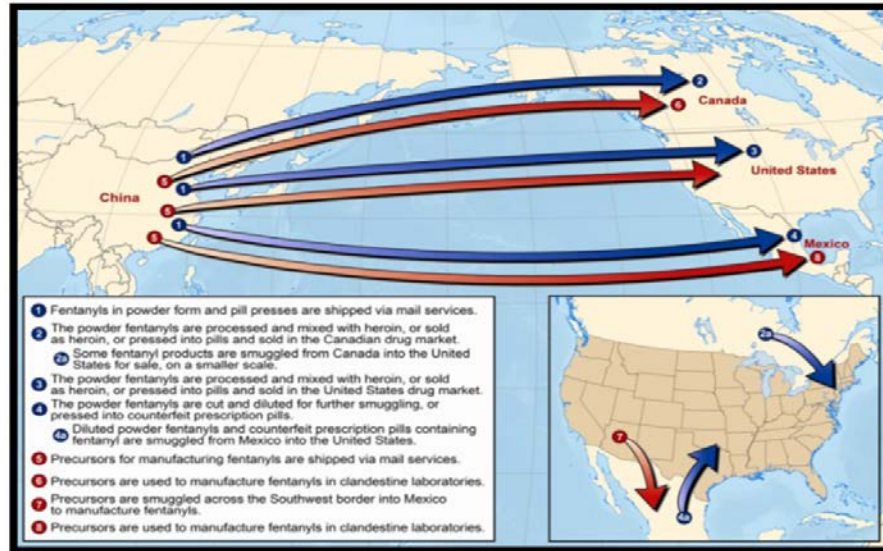
- Mission: Secure America's borders from the illicit entry of dangerous materials without impeding legitimate trade and commerce
 - *Prohibited item(s): Narcotics and other chemicals of concern*
 - *Entry: borders and international mail*
- Problems needing solutions
 - *Ability to detect small quantities of synthetic opioids (e.g., fentanyl)*
 - *Confidence in high-throughput, non-intrusive methods*
 - *Increased PD, decreased PFA, reduced secondary inspection times/cost*
- S&T is collaborating with CPB—and invite others to work with us
 - *BAA – look for topics in LRBAAs and open BAAs*
 - *CRADAs*
 - *Whitepaper submissions*

Opioid Epidemic

- 1990s: Opioid prescriptions increase, with widespread misuse of both prescription and non-prescription opioids (e.g., heroin)¹
- 2000s: U.S. prescription rates for opioids are **40 percent higher** than in other developed countries²
- 2016: Opioids involved in 42,249 deaths, 5x higher than in 1999¹
 - 2nd year in a row, US life expectancy drops due to drug overdose deaths²
 - Fentanyl-related deaths doubled from 2015 to 2016, an increase of **540 percent** since 2013³
- 2017: U.S. President and Health and Human Services (HHS) Secretary (Acting) declared a nationwide *public health emergency* regarding opioid use^{4,5}

Importation of synthetic opioids

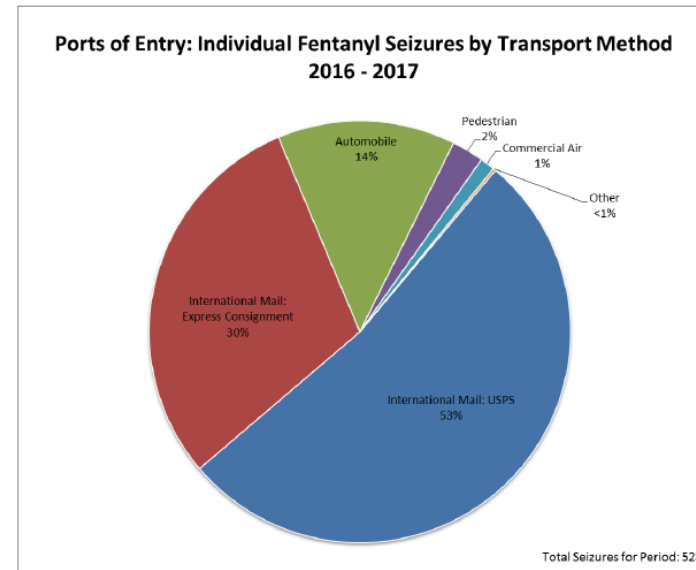
- Importation of synthetic opioids presents a major **law enforcement challenge**
- Most synthetic opioids (~90%), like fentanyl, are made illicitly in China⁶
 - One kilogram of fentanyl from China costs ~\$3,000 to \$5,000 and can generate **over \$1.5 million** in revenue through illicit sales in the U.S.⁷
 - Drug trafficking organizations are “cutting” other drugs, like heroin and cocaine, with fentanyl to maximize profits
- Two primary ways to smuggle into the U.S.:
 - Ports of entry such as land border crossings, cargo ports, and airports
 - International mail, via express consignment (private) carriers or the U.S. Postal Service



Source: DEA Fentanyl Briefing Guide for First Responders

DHS CBP's Critical Role

- DHS Customs and Border Protection has the mission to prevent the entry of these illicit substances into the US
 - ~ **1,476 lbs.** seized in FY 2017⁸ >> ~ **1,218 lbs.** of illicit fentanyl have already been seized in FY 2018⁹
 - **18** unique fentanyl analogues; **9** unique synthetic opioids, not from the fentanyl class¹⁰
- Seizures at land POEs on the southern border are greater in weight but smaller in number at mail facilities
 - Opioids via mail directly from China can have purities over 90 percent and be worth much more than the fentanyl seized at the border¹¹
- Only **7** fentanyl seizures took place at other POEs during 2016 and 2017¹²



Source: HSGAC Minority Staff Report "Intercepting Illicit Opioids at Ports of Entry: COMBATING THE OPIOID EPIDEMIC"

Current Capabilities

- *Advance Information and Targeting*
 - National Targeting Center
 - Automated Targeting System (ATS)
 - Types of information
 - Law enforcement and intelligence
 - Interagency partner data
 - Advanced Electronic Data (mail, cargo)
 - Precursor chemicals and equipment (e.g., pill presses)
- *Detection Capabilities*
 - Non-intrusive Inspection Equipment
 - X-ray and gamma ray imaging systems
 - Canines
 - Field testing
 - Handheld analyzers (Raman and Fourier transform infrared spectroscopy)
 - Laboratories and Scientific Services Directorate (LSSD) Field Triage Reachback Program
- Nevertheless, synthetic opioids present unique challenges to detection, limiting interdiction/supply chain reduction efforts

Opioids challenge traditional detection approaches

Problem

- Fentanyl and analogs are flooding across borders, including mail handling facilities
- Current systems cannot reliably detect small quantities of fentanyl(s), and keep pace with speed of commerce
- Limited testing of COTS/GOTS technology available against opioid threat
- Field agents must manually screen to inspect anomalies

Cause

- Increased potency and varieties of synthetic opioids
- Increased market demand for synthetic opioids
- Large profit margins for drug trafficking organizations
- Failure to forecast recent growth in inbound international mail volume



Source: CBP Newsroom "O'Hare's CBP is first Line of Defense against Drugs"



Source: New Hampshire State Police Forensic Lab

S&T Synthetic Opioid Detection Program Overview

Operational Need

- The 2018 *President's Commission on Combating Drug Addiction and the Opioid Crisis* declared fentanyl/opioid detection a **major priority** and stated "Our inability to reliably detect fentanyl at our land borders and at our international mail handling facilities creates untenable vulnerabilities."
- CBP and partner agencies (e.g., USPS) need improved screening capabilities at facilities handling international mail and express consignment to better detect and interdict synthetic opioids entering the US through mail routes.
- The Program will help fulfill requirements established by the INTERDICT Act (Public Law 115-112)

Program Goals

- The program goal is to advance capabilities to detect and interdict synthetic opioids by identifying and developing 1) process improvements, 2) analytics, and 3) technologies that enable more packages to be screened at the speed of commerce and more effective and efficient targeted inspection of those packages suspected of containing synthetic opioids, and improved safety.

Impact

- Outputs from this program will enhance CBP's ability to detect synthetic opioids throughout the mail flow process.
- This program supports an overall goal to increase the number of seizures/interdictions of synthetic opioids, like fentanyl, in small quantities, thereby reducing the overall supply of drugs entering the US.

Operational Requirements Analysis

- S&T is engaging with CBP OFO at IMFs and Express Consignment Facilities to:
 - Observe, document, understand CBP operations
 - Identify current technology, capability
 - Define and document mission requirements
 - Conduct Capability Needs Analysis
- Results will be documented in a Capability Analysis Report (CAR), which will support development of:
 - Operational requirements document, Key performance parameters, and key system attributes
- S&T also coordinating with other key stakeholders
 - United States Postal Service
 - DHS Immigration and Customs Enforcement
 - U.S. Coast Guard
 - U.S. Drug Enforcement Agency



**Customer
Engagement**



Requirements

S&T Technology Analysis

- Apply a Deliberate Approach to Addressing CBP's Needs
- **Technology Scouting:** Current COTS and developmental synthetic opioid detection equipment and capabilities
- **Technology Assessment:** Assess the baseline capability and the current ability of technologies to meet CBP's mission and operational requirements.
 - Non-Intrusive Inspection
 - Secondary Inspection
- **Key questions:**
 - Is there an **available** solution?
 - Is there an **adaptable** solution?
 - Is there a **developable** solution?
 - Technology Roadmap
 - R&D Plan



Tech Scouting



S&T Solution Development

- Apply systems engineering approach to integrate with existing “layered” system of technologies, including canines and targeting approaches
- DHS S&T will advance and/or develop technologies that can be deployed as a set of customizable solutions
 - Non-intrusive, automated scanning equipment
 - Advanced algorithms (machine learning, deep neural networks) for image analysis
 - Application of novel sensing methods
 - Handheld/portable presumptive identification equipment
 - Expansion of existing threat libraries
 - Big-data analytics to improve ability to uncover opioid supply chain networks
 - Badges/sensors for officer personal protection
- Goal is to enable a “platform” solution that will be flexible to adapt to emerging and future threats

Informed by Science

- How well does existing equipment detect opioids?
 - *Transportation Security Laboratory*: DT&E of primary screening technologies (large-bulk quantities) as well as secondary screening technologies (small-bulk and/or trace quantities for alarm resolution purposes) against opioid threat
- What can be detected?
 - *National Institute for Standards and Technology*: Determine the quantities and chemical signatures of trace residues and background levels that contaminate surfaces associated with the concealment of illicit drug materials and in operational environments.
 - *Battelle Memorial Institute*: Source term analysis and chemical headspace analysis to quantity and identity of detectable vapors and/or aerosols that can be expected for detection of opioids or their associated impurities.
- What should be detected?
 - *DHS S&T Chemical Security Analysis Center (CSAC)*: Develop an opioid data repository to support detection and medical research priorities.
 - Consolidated essential target data to include:
 - analog potency, toxicity, physical properties, analytical data,
 - medical treatment efficacy,
 - supply chain availability, interdiction metrics, trends, and legal status.



Current S&T Activities and Next Steps

- New S&T initiative in 2018
 - Focused on completing
 - Capabilities & Requirements Analysis
 - Tech Scouting & Market Research
 - Initial DT&E of existing technologies
 - In early stages
 - Prize Competition planning
 - Opioid Supply Chain and Research Analytics
 - Wearable Fentanyl Detector [SBIR]
- In FY 2019, focus will shift to rapid adaptation of existing technologies or innovation
- Illicit Drug Detection Standards Working Group

Questions?

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Sources

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- [12] CBP 2013 - 2017 Opioid Seizure Data.