
PERSPECTIVES FROM THE FIELD

An Automated COVID-19 Exposure Surveillance System for Emergency Medical Services Clinicians

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Abstract

Emergency Medical Services (EMS) clinicians, which include emergency medical technicians and paramedics, serve on the front lines of responding to the COVID-19 pandemic. EMS clinicians often face unknown and austere circumstances while providing emergency care in a myriad of settings. In an effort to protect EMS clinicians and inform EMS system clinical leaders, the State of Maryland has established an automated COVID-19 post-exposure surveillance system. The system provides encounter notifications to EMS system infection control officers through a linkage between the State's prehospital patient care reporting system and the state-wide health information exchange (HIE).

Keywords: Emergency Medical Services, COVID-19, Occupational Surveillance

Introduction

The State of Maryland has a uniquely integrated state-wide emergency medical services system that provides both air- and ground-based basic and advanced life support services to the residents and visitors of Maryland. As of July 1st, 2020 there were 18,919 EMS clinicians (emergency medical technicians and paramedics) and 1,608 EMS response vehicles (1) providing service to the 6,045,680 residents of Maryland (2). The State-wide emergency medical services system is overseen by the Maryland Institute for Emergency Medical Services Systems, or MIEMSS, an independent state agency with statutory authority for coordinating the system (3). MIEMSS provides a uniform electronic patient care reporting system for use during all prehospital emergency medical responses performed within the State. This system, known as the electronic Maryland EMS Data System (eMEDS®) collects NEMSIS® (the United States' National Emergency Medical Services Information System) (4) compliant data from every EMS response and houses it in a database managed by MIEMSS.

Since 2018 MIEMSS has had a data linkage with the state-designated health information exchange, the Chesapeake Regional Information System for our Patients or CRISP. CRISP's technology allows clinical information to move electronically among disparate health information systems. The goal of HIE is to deliver the right health information to the right place at the right time—providing safer, more timely, efficient, effective, equitable, patient centered care. Beyond EMS data, CRISP receives data from numerous sources in Maryland, including COVID-19 case and laboratory result data from the Maryland Department of Health (MDH). The ability to link

patient data across multiple data sources uniquely situates CRISP to support state partners, including EMS and public health, during the COVID-19 pandemic.

While little is known about EMS exposure risk for COVID-19, the rate of occupational injuries and exposures among EMS clinicians is roughly three times higher than the US national average for all occupations (5). In an effort to monitor risk among EMS clinicians MIEMSS worked with CRISP to develop a novel automated COVID-19 post-exposure surveillance system for EMS clinicians. EMS clinicians in Maryland are advised by MIEMSS to wear personal protective equipment that complies with the established guidelines of the United States' Centers for Disease Control and Prevention when encountering a patient where the potential for COVID-19 illness exists. This guidance includes N95 respirator, eye protection, gown, and gloves.

System Description

Following the completion of each prehospital emergency medical response within Maryland, an EMS clinician completes an eMEDS® report which is stored locally on a computer and then transmitted to the state-wide EMS information system upon completion of the report. Immediately following transmission to the state-wide database, each report that has complete demographic information and indicates patient contact is automatically sent to CRISP. CRISP uses this EMS data to automatically build a "roster" of patients that has been transported by each EMS jurisdiction in the previous 48 hours. Using this roster, CRISP notifies each EMS jurisdiction's infection control officer when a patient on this roster tests positive for COVID-19, utilizing

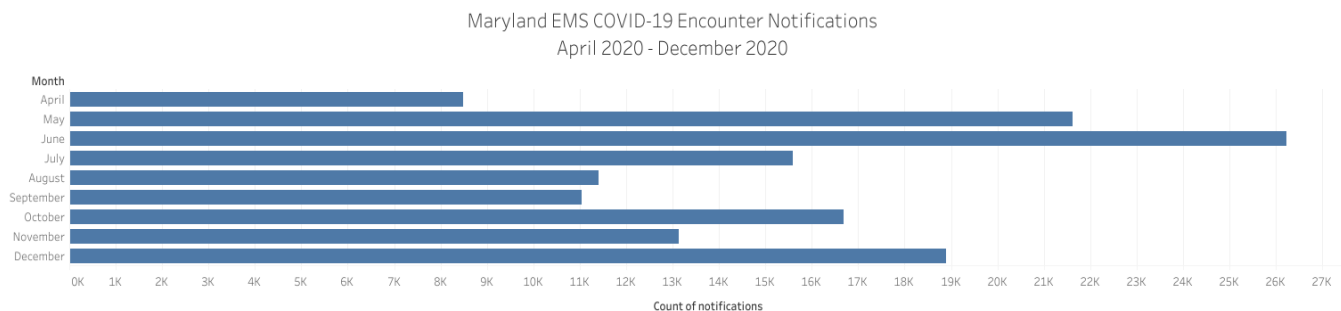
laboratory data reported to MDH and the official confirmed case list. Notifications are enabled through CRISP's Encounter Notification Service®, with messages delivered through Direct Secure Messaging or CRISP's secure web-based user interface, PROMPT. Each notification contains the patient's name, date of birth, date of the encounter, EMS unit call sign, and names / EMS license numbers of the EMS crew members that treated the patient.

This system allows the State's jurisdictional EMS infection control officers to have a better understanding of the occupational exposure risk of

their team members. An infection control officer can, within a reasonably short period of time, understand which EMS clinicians have transported a COVID-19 positive patient, allowing for enhanced monitoring of potentially exposed EMS clinicians by the employer.

The EMS clinician COVID-19 surveillance system has been continuously running since April 1st, 2020. During the time period from April 2020 – December 2020, 143,079 encounter notifications were triggered and sent to Maryland's jurisdictional EMS infection control officers.

Figure 1. Maryland EMS COVID-19 Encounter Notifications, April 2020 – December 2020



Conclusion

Further study, including a longitudinal analysis of the perceived value of these alerts among emergency medical services jurisdictions, is warranted to identify the value of this post-exposure surveillance system. The belief of the authors' is that such a system provides EMS system infection control officers with a valuable tool in identifying EMS clinicians with potential occupational exposures, allowing for longitudinal monitoring of EMS clinicians for symptoms of COVID-19 disease, which may facilitate earlier recognition of disease in EMS clinicians. This system, while capable of identifying post-exposure instances is not a replacement for primary protection including the use of personal protective equipment and the practice of good hygiene.

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How to cite this article: Naumann A & Tully K. An Automated COVID-19 Exposure Surveillance System for Emergency Medical Services Clinicians. *Global Biosecurity*, 2020; 3(1).

Published: May 2021

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