

Enhanced One Health Surveillance during the 58th Presidential Inauguration—District of Columbia, January 2017

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ABSTRACT

Objective: In January 2017, Washington, DC, hosted the 58th United States presidential inauguration. The DC Department of Health leveraged multiple health surveillance approaches, including syndromic surveillance (human and animal) and medical aid station–based patient tracking, to detect disease and injury associated with this mass gathering.

Methods: Patient data were collected from a regional syndromic surveillance system, medical aid stations, and an internet-based emergency department reporting system. Animal health data were collected from DC veterinary facilities.

Results: Of 174 703 chief complaints from human syndromic data, there were 6 inauguration-related alerts. Inauguration attendees who visited aid stations ($n = 162$) and emergency departments ($n = 180$) most commonly reported feeling faint/dizzy ($n = 29$; 17.9%) and pain/cramps ($n = 34$; 18.9%). In animals, of 533 clinical signs reported, most were gastrointestinal ($n = 237$; 44.5%) and occurred in canines ($n = 374$; 70.2%). Ten animals that presented dead on arrival were investigated; no significant threats were identified.

Conclusion: Use of multiple surveillance systems allowed for near-real-time detection and monitoring of disease and injury syndromes in humans and domestic animals potentially associated with inaugural events and in local health care systems.

Key Words: emergency preparedness, syndromic surveillance, patient tracking, mass gathering

Since 1801, the District of Columbia has hosted the US presidential inauguration, which attracts thousands of visitors to the District of Columbia, northern Virginia, and southwestern Maryland (National Capital Region).¹ Events on this scale are at risk for bioterrorist attacks and other public health threats; therefore enhanced vigilance is necessary to rapidly detect and prevent disease transmission, mass injuries, or casualties. Because inaugurations are designated as National Special Security Events, the US Secret Service led the implementation of the operational security plan and coordination of local, state, and federal partners.² Protests and demonstrations were anticipated during both the 58th presidential inauguration on January 20, 2017, and the Women's March on Washington on the following day.

The DC Department of Health (DCDOH) served as the local agency responsible for coordinating public health surveillance, preparedness, and response during the inauguration.³ In October 2016, planning began for enhanced human and animal health surveillance and a coordinated epidemiologic and laboratory response in the event of an outbreak or bioterrorist event. Enhanced surveillance activities included syndromic surveillance of National

Capital Region human health care facility data, syndromic surveillance of DC veterinary facility data, and field-based, near real-time monitoring of patients visiting medical aid stations located at inaugural events and DC hospital emergency departments.

The purpose of this report is to describe DCDOH's One Health approach for human and domestic animal surveillance to rapidly detect and monitor health conditions in the DC metropolitan region of public health significance during the inauguration.

METHODS

DCDOH has participated in regional syndromic surveillance of emergency department (ED) chief complaint data since 2001, initially through use of the Electronic Surveillance System for the Early Notification of Community-based Epidemics II (ESSENCE II), later referred to as Aggregated National Capital Region (ANCR) ESSENCE.⁴ ANCR ESSENCE electronically captures patient visit data (eg, chief complaint, age, sex) in near real time from 56 National Capital Region health care facilities: 8 DC EDs; 13 southwestern Maryland EDs; and 18 EDs and 17 urgent care centers

located in northern Virginia.^{5,6} ANCR ESSENCE parses chief complaint text data and assigns records to 1 of 15 syndromes (eg, gastrointestinal, respiratory) or more specific subsyndromes (eg, influenza-like illness) on the basis of keyword queries. The alerts, which are generated by pre-established statistical algorithms as described by Burkom and Elbert, are displayed on time-series graphs when the case count for a syndrome or subsyndrome is significantly higher than that occurring during the preceding 28 days.⁷

During the inauguration, ANCR ESSENCE was used to detect unusual or increased predefined illness or injury syndromes and subsyndromes as had been done during past inaugurations.^{8,9} Epidemiologists at DCDOH, the Maryland Department of Health, and the Virginia Department of Health collaborated to develop a surveillance protocol to allow definition and monitoring of custom, inauguration-specific queries that supplemented syndromes routinely captured in ANCR ESSENCE. Topics of the 2017 inauguration-specific queries included a syndrome defined by terms associated with mumps, because an active mumps outbreak was occurring at the time, and a syndrome category for any chief complaint that included inauguration-related terms (ie, *inauguration*, *president*). E-mails were sent to hospital administrators in the District of Columbia and Maryland at least 2 weeks before the inauguration requesting that ED staff add the term *inauguration*, or *inaug*, to the chief complaint for patients who reported attending inauguration-related events. The email included attachments for instructional signs that could be posted in EDs to remind staff to add the terms *inauguration* or *inaug* to the chief complaint.

During the enhanced syndromic surveillance period, defined as January 13 through 27, 2017, a DCDOH epidemiologist reviewed ANCR ESSENCE data daily. During January 13 through 18, a baseline was established for illness and injury syndromes recently included for the 2017 inauguration surveillance period. Data collected during January 22 through 27 allowed the monitoring of syndromes whose signs or symptoms might appear after the inauguration period (eg, diseases with longer incubation periods). During January 19 through 21 (the “inauguration period”), ANCR ESSENCE data were monitored to identify inauguration-related syndromes in near real time. ANCR ESSENCE alerts were investigated to determine their public health significance. The health care facilities associated with the alerts were contacted to obtain additional details. An enhanced surveillance report summarizing surveillance findings and the outcomes of investigations was e-mailed to a pre-established list of National Capital Region stakeholders once daily throughout the enhanced surveillance period.

During January 19 through 21, 2017, thirty-eight medical aid stations were established at the following locations: the National Mall (n = 16), the US Capitol (n = 7), the parade route (n = 9), the inaugural balls (n = 4), the downtown

walking route (n = 1), and the National Cathedral (n = 1). Aid stations were staffed by trained medical volunteers and personnel from the US Department of Health and Human Services, Department of Defense, National Park Service, and DCDOH. DCDOH volunteers used handheld electronic devices (“patient trackers”) to collect patient demographic and chief complaint data as inauguration-related patient visits occurred. Data were electronically transmitted to DCDOH in near real time via the HC Standard[®] Software Suite (Global Emergency Resources, LLC) and accessed by DCDOH epidemiologists by means of a secure, web-based interface. The DCDOH Health Emergency Preparedness and Response Administration collaborated with DCDOH epidemiologists to develop a list of predefined chief complaint categories (ie, syndromes) that field staff used to classify patient visits (eg, gastrointestinal illness, cardiovascular). De-identified data were categorized by syndrome and monitored by DCDOH staff to identify any unusual events or disease clusters on the basis of time, location, and syndrome type.

In part to validate data reported by ANCR ESSENCE, the DC Emergency Healthcare Coalition was asked to gather inauguration-related patient visit data from all DC EDs (n = 8). The DC Emergency Healthcare Coalition developed an inauguration-related patient tracking module in its health information system (HIS), an internet-based platform used for information sharing and resource reporting. ED personnel used this new module to flag patient records related to the inauguration or the Women’s March on Washington. DCDOH received access to de-identified HIS patient data for inauguration or Women’s March related patient visits including patient age, sex, chief complaint, and disposition. Data were updated every 8 hours.

To complement human surveillance activities, DCDOH launched a web-based syndromic surveillance system for veterinary clinics in 2015 to monitor domestic animals as sentinels of bioterrorism.^{10,11} The system captures the frequency of specific zoonoses and weekly syndromic surveillance data based on clinical signs. During January 13 through 27, 2017, the enhanced surveillance period, DCDOH mandated that veterinary facilities provide daily, rather than weekly, reports of the number of visits grouped by species into the following clinical categories (syndromes): central nervous system, peripheral nervous system, upper respiratory, lower respiratory, gastrointestinal (excluding intestinal parasites), fever of unknown origin, nontraumatic hemorrhagic, dermatologic (infectious), and dead on arrival. One clinical sign per animal was captured. Data were analyzed daily by DCDOH staff by species, location, and syndrome category; summarized; and included in the daily DCDOH inauguration syndromic surveillance report. Active follow-up by DCDOH staff to collect unreported data was conducted for facilities that did not report voluntarily by the prescribed time each day. Animals that arrived dead on arrival at veterinary clinics were considered sentinel events and investigated.^{12,13}

TABLE 1

Number and Type of Chief Complaint–Based Syndromes Reported Among Persons Visiting National Capital Region Emergency Departments and Alerts Identified During Enhanced Syndromic Surveillance for the 58th Presidential Inauguration, District of Columbia, Maryland, and Virginia, January 13 through 27, 2017.

Syndrome Category	Baseline Period (January 13–18, 2017)		Inaugural Period (January 19–21, 2017)		Postinaugural Period (January 22–27, 2017)	
	Chief Complaints	Alerts	Chief Complaints	Alerts	Chief Complaints	Alerts
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Total	78 523 (100.0)	1 (100.0)	32 275 (100.0)	4 (100.00)	63 905 (100.0)	1 (100.0)
Botulism-like	60 (0.076)	0 (0.0)	15 (0.046)	0 (0.0)	30 (0.047)	0 (0.0)
Cold weather–related ^a	7 (<0.01)	0 (0.0)	4 (0.012)	0 (0.0)	4 (<0.01)	0 (0.0)
Dehydration ^a	130 (0.17)	0 (0.0)	59 (0.18)	0 (0.0)	125 (0.20)	1 (100.0)
Disease conditions of interest ^{a,b}	262 (0.33)	0 (0.0)	119 (0.37)	0 (0.0)	226 (0.35)	0 (0.0)
Fever	2322 (3.0)	0 (0.0)	949 (2.9)	0 (0.0)	1636 (2.6)	0 (0.0)
Gastrointestinal illness	6215 (7.9)	0 (0.0)	2398 (7.4)	0 (0.0)	4454 (7.0)	0 (0.0)
Hazardous materials exposure ^a	14 (0.018)	1 (100.0)	6 (0.019)	0 (0.0)	5 (<0.01)	0 (0.0)
Hemorrhagic illness	47 (0.060)	0 (0.0)	12 (0.037)	0 (0.0)	26 (0.041)	0 (0.0)
Inauguration-related illness ^a	0 (0.0)	0 (0.0)	6 (0.019)	3 (75.0)	1 (<0.01)	0 (0.0)
Influenza-like illness	1707 (2.2)	0 (0.0)	639 (2.0)	1 (25.0)	1273 (2.0)	0 (0.0)
Injury	4523 (5.8)	0 (0.0)	1729 (5.4)	0 (0.0)	3141 (4.9)	0 (0.0)
Interpersonal violence ^a	243 (0.31)	0 (0.0)	104 (0.32)	0 (0.0)	185 (0.29)	0 (0.0)
Localized lesion	387 (0.49)	0 (0.0)	152 (0.47)	0 (0.0)	281 (0.44)	0 (0.0)
Lymphatic illness	257 (0.33)	0 (0.0)	83 (0.26)	0 (0.0)	171 (0.27)	0 (0.0)
Mental health ^a	1458 (1.9)	0 (0.0)	666 (2.0)	0 (0.0)	1104 (1.7)	0 (0.0)
Mumps ^{a,c}	0 (0.0)	0 (0.0)	1 (<0.01)	0 (0.0)	1 (<0.01)	0 (0.0)
Neurological	300 (0.38)	0 (0.0)	144 (0.446)	0 (0.0)	203 (0.32)	0 (0.0)
Other	52 388 (66.7)	0 (0.0)	22 084 (68.4)	0 (0.0)	44 881 (70.2)	0 (0.0)
Rash	694 (0.88)	0 (0.0)	251 (0.78)	0 (0.0)	537 (0.84)	0 (0.0)
Respiratory	7200 (9.2)	0 (0.0)	2792 (8.6)	0 (0.0)	5526 (8.7)	0 (0.0)
Sudden death	134 (0.17)	0 (0.0)	62 (0.19)	0 (0.0)	95 (0.15)	0 (0.0)

^aDesignates a syndrome category that was exclusively added for this enhanced surveillance activity and monitored in addition to prespecified syndrome categories already in the syndromic surveillance system.

^bThe “disease conditions of interest” syndrome category includes an array of emerging infectious diseases (eg, Ebola virus) and bioterrorism agents (eg, tularemia) that are rarely reported in chief complaints.

^cThe “mumps” syndrome category was included because it is a rare event and to capture any cases associated with an ongoing mumps outbreak that was occurring in the United States during the inaugural period.

OUTCOMES

Human Syndromic Surveillance

During the January 13 through 27, 2017, enhanced surveillance period, the daily number of National Capital Region ED patient visits ranged from 7120 (January 14) to 15 001 (January 17); 11 691 patient visits were reported on Inauguration Day. Six inauguration-related alerts occurred during the enhanced surveillance period: 1 for influenza-like illness, 1 for hazardous materials exposure, 1 for dehydration, and 3 for the inauguration-related term query (Table 1). The inauguration-specific query was associated with the chief complaints of weakness (n = 1), injury (n = 1), bleeding (n = 1), and cough with shortness of breath (n = 1). The inauguration-related query also captured 2 chief complaints, 1 of muscle pain and 1 of weakness, with the term “Women’s March” included, which would suggest an association with attendance

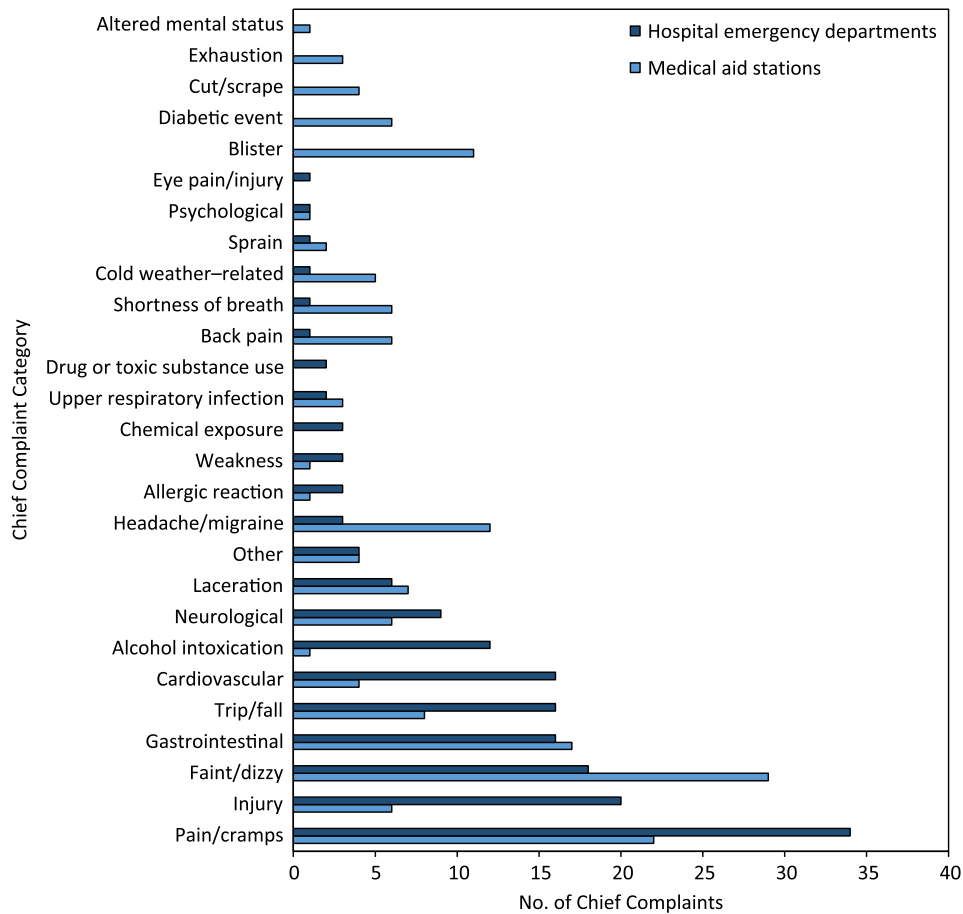
to this event. Upon investigation, none of the alerts were determined to be of public health significance.

Medical Aid Station and Emergency Department Inauguration-Related Patient Visit Surveillance

Patient visit information was available for 36 of 38 (94.7%) aid stations. A total of 164 patient visits were captured: 24 (14.6%) on January 19 and 140 (85.4%) on January 20. Data for January 21 were unavailable. During January 19 and 20, among patients with known demographic information, most patients were female (n = 95; 63.8%) and were 18 to 64 years old (n = 99; 61.1%). As shown in Figure 1, faintness or dizziness was the most frequently reported chief complaint (n = 29; 17.7%) among inauguration-related patient visits. Chief complaint data were missing for 2 patient visits,

FIGURE 1

Number and Type of Chief Complaint^a Among Patients Who Visited Medical Aid Stations^b and Hospital Emergency Departments, District of Columbia, January 19 to 21, 2017^c



^aChief complaint categories are ordered by the number of patient visits per chief complaint category reported by hospital emergency departments.
^bPatient chief complaints captured at medical aid stations available for January 19 and 20, 2017, only.
^cDuring January 19 to 21, 2017, the number of chief complaints captured was 162 at medical aid stations and 180 at hospital emergency departments.

thus chief complaint data were available for 162 patient visits (98.8%). During January 19 and 20, eighteen (11.0%) patients were transported to a hospital from a medical aid station.

Six of eight (75%) DC EDs entered inauguration-related patient information into the HIS module; the other two EDs did not report any event-related patient visits. Of the 185 patient visits reported, complete demographic and chief complaint data were available for 180 (97.3%) patient visits. Thirteen (7.2%) patients visited EDs on January 19, seventy-seven (42.8%) patients visited EDs on January 20, and eighty-eight (48.9%) patients visited EDs on January 21. One hundred eleven (61.7%) patients were female and 130 (71.1%) were 18 to 64 years old. Among those with known chief complaints, pain or cramps (n = 34; 18.9%) and injury (n = 20; 11.1%) were reported most frequently (Figure 1).

Most patients (n = 147; 81.7%) were treated and discharged. No unusual syndromes were identified.

Veterinary Syndromic Surveillance

Daily reporting compliance among veterinary facilities varied from 45.0% to 95.0%. A total of 533 clinical signs (1 per domestic animal visit) were reported during January 13 through 27, 2017, with 374 (70.2%) in canines, 155 (29.1%) in felines, 2 (0.38%) in avian species, and 2 (0.38%) in rabbits. Of the clinical signs reported, the most common syndrome categories were gastrointestinal (n = 237, 44.5%) and dermatologic (n = 126, 23.6%), as shown in Table 2. Ten investigations were conducted for the 10 animals that were dead on arrival, but no unusual diseases or conditions were detected. These dead-on-arrival animals were geriatric pets that died at home, animals

TABLE 2

Number and Type of Clinical Signs Among Domestic Animals Visiting Participating Veterinary Clinics and Alerts Identified During Enhanced Syndromic Surveillance for the 58th Presidential Inauguration, District of Columbia, January 13 through 27, 2017^a

Characteristic	Baseline Period (January 13-18, 2017)		Inaugural Period (January 19-21, 2017)		Postinaugural Period (January 22-27, 2017)	
	Chief Complaints	Alerts	Chief Complaints	Alerts	Chief Complaints	Alerts
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Total	272	3	72	3	192	4
By species						
Canines	184 (67.6)	1 (33.3)	58 (80.6)	1 (33.3)	132 (68.6)	0 (0.0)
Felines	85 (31.3)	1 (33.3)	14 (19.4)	2 (66.7)	59 (30.7)	3 (75.0)
Other ^b	3 (1.1)	1 (33.3)	0 (0.0)	0 (0.0)	1 (0.52)	1 (25.0)
By syndrome category						
Dead on arrival ^c	3 (1.1)	3 (100.0)	3 (4.2)	3 (100.0)	4 (2.1)	4 (100.0)
Dermatologic	68 (25.0)	0 (0.0)	19 (26.4)	0 (0.0)	19 (26.4)	0 (0.0)
Fever of unknown origin	8 (2.9)	0 (0.0)	1 (1.4)	0 (0.0)	1 (1.4)	0 (0.0)
Gastrointestinal illness	123 (45.2)	0 (0.0)	31 (43.1)	0 (0.0)	1 (1.4)	0 (0.0)
Nontraumatic hemorrhagic illness	4 (1.5)	0 (0.0)	1 (1.4)	0 (0.0)	31 (43.1)	0 (0.0)
Neurological (CNS)	27 (9.9)	0 (0.0)	3 (4.2)	0 (0.0)	7 (9.7)	0 (0.0)
Neurological (PNS)	5 (1.8)	0 (0.0)	3 (4.2)	0 (0.0)	4 (5.6)	0 (0.0)
Upper respiratory	23 (8.5)	0 (0.0)	4 (5.6)	0 (0.0)	3 (4.2)	0 (0.0)
Lower respiratory	11 (4.0)	0 (0.0)	7 (9.7)	0 (0.0)	3 (4.2)	0 (0.0)

Abbreviations: CNS, central nervous system; PNS, peripheral nervous system.

^aAnimal syndromic surveillance was only captured from veterinary clinics located in the District of Columbia.

^bIncludes 2 rabbits and 2 avian species.

^cDead on arrival was considered a sentinel event and an alert.

that suffered a physical trauma, and an animal that was poisoned by rodenticide.

LESSONS LEARNED

DCDOH successfully implemented enhanced human and domestic animal disease surveillance in the National Capital Region during the 2017 presidential inauguration. Following an investigation of identified alerts, no unusual disease or injury clusters were detected during the inaugural period and no deaths associated with the inauguration or the Women's March were identified. Our surveillance approach required early planning and close collaboration with nearby jurisdictions, federal agencies, and human and animal health care facilities. A review of the literature did not identify any other One Health mass gathering surveillance initiatives applying this 4-pronged health surveillance approach, thus our experience may represent a novel approach in these settings.

Our enhanced surveillance strategies had several limitations. Data from the syndromic surveillance systems currently do not provide real-time data. While enhanced ED HIS and medical aid station data were reported several times per day, data reported from ANCR ESSENCE or the veterinary

facilities could be delayed by 24 hours, which would prevent rapid identification and follow-up of unusual illnesses or clusters of patients with similar chief complaints. However, all alerts noted during data review were investigated immediately. Although detailed review of syndromic data in the "other" category (68.5% of all chief complaints) revealed no apparent clustering associated with the inauguration, it is possible that the aggregation of chief complaints in this category might have lessened our sensitivity to detect small increases in specific health conditions that were reported within the "other" category. Veterinary facilities varied in their compliance with daily reporting deadlines, and in some cases DCDOH epidemiologists had to actively follow up to collect data. Veterinary facilities submitted reports manually and DCDOH frequently contacted facilities to obtain missing reports; thus, the process was cumbersome and potentially increased data entry errors. The system could be improved by automating it with ANCR ESSENCE.

During past National Special Security Events, such as the 2013 presidential inauguration and the 2015 papal visit to the District of Columbia, DCDOH requested that EDs add identifying terms to chief complaints to capture event-associated cases.^{3,9} As noted previously, this approach was ineffective, possibly due to lack of widespread ED staff

awareness, inability to manually add terms to the chief complaint, or time constraints. This issue was partially addressed by augmenting the ANCR ESSENCE reports with inauguration-related patient visit data reported using the DC Emergency Healthcare Coalition's HIS, a tool that the hospital staff were accustomed to using for patient tracking during emergencies and some special events. However, the capacity to conduct follow-up investigations based on HIS data was limited because data were de-identified. Additionally, HIS data were only available for DC EDs, because similar HIS platforms do not exist in the EDs in neighboring jurisdictions. Lastly, there was a noted discrepancy between the number of inauguration-related patient visits captured in ANCR ESSENCE ($n = 6$) and those captured with HIS ($n = 185$), although the data were from the same 8 DC EDs. Using HIS allowed us to identify and monitor patient visits associated with the inauguration and highlighted the benefit of a multipronged surveillance approach given the limited entry or assessment of inauguration-related patient data in ANCR ESSENCE. Similar enhanced surveillance approaches should be considered by other jurisdictions, but early communication with and training of health care facility staff is essential to establish enhanced surveillance and ensure that data use and sharing agreements are in place.

The challenges of patient tracking following patient visits at temporary health care facilities established at mass gatherings are well documented.^{14,15} Lack of a standardized technology for data collection presented a unique challenge to patient tracking during this inauguration. Medical aid stations were staffed by different agencies, each using different data capture systems. Because there was no unified central data repository, DCDOH volunteers needed permission to be colocated at all aid stations to capture information on inauguration-related patient visits with patient trackers. Furthermore, inauguration-related patient data were likely underreported because entering data into patient trackers can be time-consuming and volunteers may have failed to enter the data during busy periods.

Despite these challenges and limitations, by using this 4-pronged, One Health surveillance approach, DCDOH likely increased sensitivity of capturing incident disease and injury syndromes associated with inaugural events. This One Health surveillance model will be utilized and improved during future National Special Security Events in the National Capital Region and can be adopted by other local and state health authorities during high-profile events held in their jurisdictions.

Disclaimer

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. The authors declare no competing interests or conflicts of interest.

This investigation did not undergo institutional review board approval because it was not research involving human subjects. Use of trade names is for identification only and does not imply endorsement by the Public Health Service or by the US Department of Health and Human Services.

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Supplementary material

To view supplementary material for this article, please visit <https://doi.org/10.1017/dmp.2019.38>

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