

The 6 E Framework of Public Health Preparedness for Mass Gatherings—Lessons Learned From Super Bowl LIII, Fulton County, Georgia, 2019

Neil C. Murthy, MD, MPH, MSJ; David P. Holland, MD, MHS; Allison T. Chamberlain, PhD, MS; Sasha Smith, MPH; John Callahan, MPS; Wendy Smith, MPH, MA

ABSTRACT

Context: On February 3, 2019, Atlanta, Georgia, hosted Super Bowl LIII, which is classified as a National Special Security Event. The festivities comprising this major sporting event brought approximately half a million people to Atlanta, which posed significant challenges to the local public health community. As the lead local agency for public health planning, preparedness, and response efforts, Fulton County Board of Health (FCBOH) needed to address multiple specific tasks based on core functional areas outlined in the Emergency Support Function (ESF) 8 (eg, bioterrorism preparedness and epidemiological surveillance).

Program: To prepare for the Super Bowl, FCBOH developed a systematic approach to ensure community-wide public health preparedness for mass gatherings. This approach came to be known as the 6 E framework, which consists of (1) engaging stakeholders, (2) examining current capabilities and identifying gaps, (3) establishing roles and responsibilities, (4) executing plans to fill gaps, (5) exercising plans, and (6) evaluating impact.

Implementation: We define each step of the 6 E framework and present practical examples of how FCBOH implemented each step when preparing for the Super Bowl. Challenges that FCBOH faced and the lessons learned in the process are illustrated. The 6 E framework provides a systematic approach to community preparedness and allows local health departments to tailor the approach to serve local public health needs.

Evaluation: The successful implementation of the 6 E framework allowed for stakeholders at the federal, state, and local levels (including law enforcement) to effectively coordinate an epidemiological investigation and response when 4 staff members reported gastrointestinal symptoms after eating at a feeding station.

Discussion: Preparation for the Super Bowl required months of diligent cross-sectoral and cross-jurisdictional partnership building, and the 6 E framework can help other local public health jurisdictions prepare to host major mass gatherings.

KEY WORDS: disaster planning, emergency preparedness, public health surveillance

Author Affiliations: Preventive Medicine Residency Program, Division of Scientific Education and Professional Development, Centers for Disease Control and Prevention, Atlanta, Georgia (Dr Murthy); Office of Medical and Preventive Services (Dr Holland), Office of Epidemiology (Dr Chamberlain and Ms Sasha Smith), and Office of Emergency Preparedness (Mr Callahan and Ms Wendy Smith), Fulton County Board of Health, Atlanta, Georgia; Department of Medicine, Division of Infectious Diseases (Dr Holland), and Department of Epidemiology, Rollins School of Public Health (Dr Chamberlain), Emory University, Atlanta, Georgia.

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On February 3, 2019, Atlanta hosted one of the largest sporting events in the United States—Super Bowl LIII. Although the game itself is one of the most anticipated and watched television events, the Super Bowl consists of a week-long series of parties and concerts culminating in the championship game. Because of its significance and high visibility, the Super Bowl requires enhanced coordination between federal, state, and local authorities to ensure public safety and security.

The US Department of Homeland Security (DHS) designates certain mass gatherings as National Special Security Events (NSSEs), which, by virtue of their

Correspondence: Neil C. Murthy, MD, MPH, MSJ, Centers for Disease Control and Prevention, 1600 Clifton Rd, NE MS V24-5, Atlanta, GA 30329 (nmurthy@cdc.gov).

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political, economic, social, or religious importance, are events of such national significance that they may be targets of terrorism or other criminal activity.¹ Furthermore, DHS uses the Special Event Assessment Rating (SEAR) system to quantify several risk factors related to threat and vulnerability to determine an event's attractiveness as a terrorist target.¹ DHS classifies the Super Bowl as an NSSE and SEAR level 1 event, indicating the potential for terrorist activity to significantly affect the event.

Festivities comprising Super Bowl LIII week brought approximately half a million people to Atlanta, which posed significant challenges for the local public health community.^{2,3} Fulton County Board of Health (FCBOH) served as the lead agency for public health planning, preparedness, and response efforts for the Super Bowl, because most of the activities were within Fulton County's jurisdiction. In addition, as an authority board of health, FCBOH has the power to adopt and enforce rules and regulations in all matters pertaining to health within Fulton County, provided such rules and regulations are not in conflict with the rules and regulations of the Georgia Department of Health. FCBOH took the lead on the following tasks based on the National Response Framework's Emergency Support Function (ESF) 8 core functional areas⁴:

1. Preparing for a possible bioterrorism event and subsequent point of dispensing* (POD) mobilization;
2. Communicating and disseminating risk messages to the public;
3. Providing support to Family Assistance Centers to help with family reunification;
4. Ensuring public health responder safety and security for all deployed personnel;
5. Implementing enhanced epidemiological surveillance;
6. Coordinating with the environmental health unit to conduct site inspections;
7. Coordinating with the food defense unit to ensure the safety of food supply chains; and
8. Coordinating with coroners or medical examiners to help develop a mass fatality plan.

Given the extensive list of tasks that had to be accomplished, FCBOH needed a systematic approach to ensure community-wide public health preparedness for mass gatherings. FCBOH developed and implemented an evaluation process known as the 6 E framework, which consists of (1) engaging stakeholders,

(2) examining current capabilities and identifying gaps, (3) establishing roles and responsibilities, (4) executing plans to fill gaps, (5) exercising plans, and (6) evaluating impact (Figure 1). This 6 E framework is an iterative process that provides a systematic program evaluation approach for community preparedness. It also allows local health departments to tailor the evaluation approach to serve local public health needs. Our purpose is to introduce the 6 E framework and to provide practical examples of how FCBOH implemented each step when preparing for the Super Bowl. The framework can serve as an example to promote community engagement, build cross-sectoral partnerships, and ensure community preparedness and resiliency when local public health departments are tasked with hosting an NSSE or SEAR 1 event.

First E: Engaging Stakeholders

Preparation for the Super Bowl required months of diligently strengthening cross-sectoral and cross-jurisdictional partnerships during each stage of the preparedness process. Stakeholders can be categorized by jurisdiction or by response agency.

Stakeholders by jurisdiction

Because metropolitan Atlanta is spread over 5 distinct and autonomous public health districts, it was necessary to include representatives from each of these jurisdictions and the Georgia Department of Public Health (DPH). During November 2017 to January 2019, epidemiologists from all 5 metropolitan health districts and DPH met quarterly or monthly to discuss how to handle the expected influx of people and to develop a specific surveillance plan that could be shared with Regional Emergency Coordinators at the US Department of Health and Human Services Region 4. Furthermore, FCBOH worked with the Department of Homeland Security (DHS) to create a timeline outlining the logistics and process of notifications, alerts, and response operations if there were a BioWatch Actionable Result (ie, an alert concerning for an intentional release of a bioterrorism agent, such as inhalational anthrax) (Figure 2).[†] This logistics timeline was developed to give situational awareness to partner jurisdictions that were ready to assist in a response. The metropolitan health districts and DPH developed plans for enhanced syndromic surveillance;

*Point of Dispensing (POD) stations are community locations where medical countermeasures, such as vaccinations, can be rapidly dispensed to the public during a public health emergency.

[†]The BioWatch program is a federal program run by DHS in many major American cities that aims to detect the release of a bioterrorism agent in the ambient air (such as inhalational anthrax). BioWatch air samplers are strategically located in major metropolitan areas and operate 24 hours a day, 365 days a year.

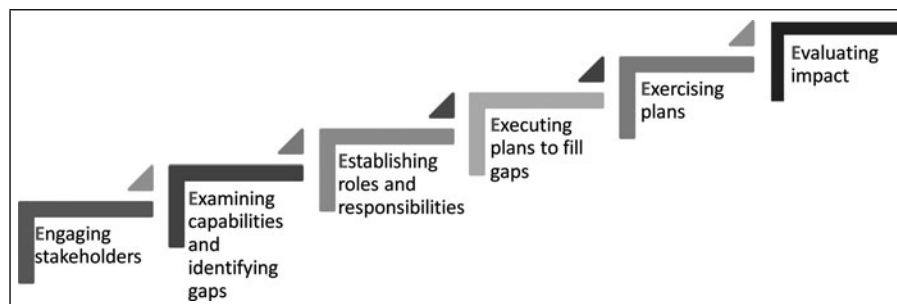


FIGURE 1 The 6 E Framework of Public Health Preparedness for Mass Gatherings

hospital, emergency department, and hotel notifications; and environmental health inspections.⁵⁻⁷ These close partnerships among federal, state, and local health departments across multiple jurisdictions ensured transparency of operational plans, ease of information sharing, and consistency of messaging.

Stakeholders by response agency

Stakeholder engagement required partnerships not only among jurisdictional public health agencies but also with other stakeholders that do not primarily serve public health roles (eg, the Federal Bureau of Investigation, Atlanta Police Department, Atlanta Fire and Rescue, Georgia Department of Agriculture, US Environmental Protection Agency, and Georgia Emergency Management Agency). The Super Bowl presented a unique challenge, because multiple partners from different disciplines needed to rapidly share information with others to ensure regional situational awareness and to request vital resources (eg, supplies and staffing for PODs).

One example of stakeholder engagement among different disciplines was the close partnership among FCBOH, Atlanta Fulton County Emergency Management Agency (AFCEMA), and Atlanta Fire and Rescue. FCBOH partnered with AFCEMA to identify venues in downtown Atlanta that could serve as POD locations. When FCBOH needed assistance regarding the flow of people at PODs and the capacity of designated venues, AFCEMA referred FCBOH to Atlanta Fire and Rescue. While FCBOH provided public health knowledge and expertise regarding personnel and resources, Atlanta Fire and Rescue strategically addressed logistics of POD operations and crowd management at downtown Atlanta venues. Super Bowl POD preparation plans were strengthened by this close collaboration among 3 different agencies, and preparation plans would not have been robust if these 3 agencies had worked separately.

Second E: Examining Current Capabilities and Identifying Gaps

The process of examining current capabilities and identifying gaps helped FCBOH evaluate its resources and request external assistance before Super Bowl week started.

FCBOH has a long history of hosting many high-profile mass gatherings, most notably the 1996 Summer Olympic Games.⁸ More recently, FCBOH hosted a similar, but smaller, sporting event in the same stadium 13 months before the start of the Super Bowl. FCBOH used lessons learned from after-action reviews of this smaller event to develop its Super Bowl plans. Some gaps identified from the previous event included the following:

- Lack of detailed technical and logistical plans for POD operations, documenting how many people can flow through each POD, appropriate staffing of PODs, and the process to request mutual aid if needed.
- Need for stronger communication channels with the public and between FCBOH and Georgia DPH to exchange information and request resources in the event of an emergency.
- Need for enough environmental health staff available to inspect all anticipated food vendors.
- Need to effectively ensure the safety and security of deployed public health personnel conducting inspections of food vendors, which was especially challenging, given that FCBOH lacked enough infrastructure to support occupational health.

If a jurisdiction does not have a previous, similar event, jurisdictions can identify capabilities and gaps through a diligent review of their organization's ability to support all ESF 8 activities. By reviewing these mission areas and the logistical and financial resources available to accomplish those tasks, local health agencies can identify and address any gaps in their preparedness activities and request external assistance before the start of a mass gathering.⁹

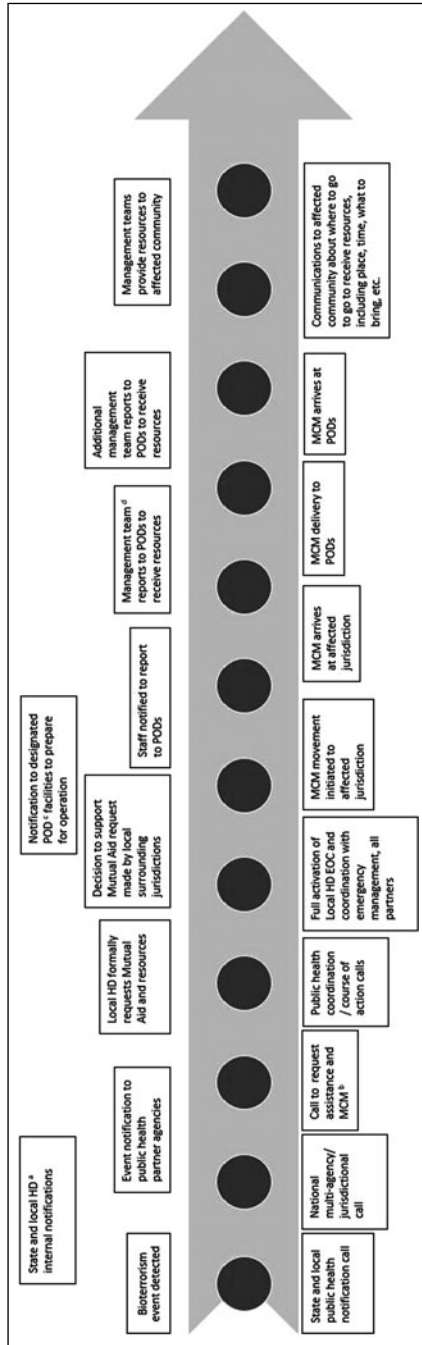


FIGURE 2 Sequence of Anticipated Response Activities Following Detection of a Bioterrorism Event^e

Abbreviations: HD, health department; POD, point of dispensing.

^aHealth department;

^bMedical countermeasure.

^cPoint of dispensing.

^dManagement teams work in 12-Hour POD shifts.

^eTimeline of above activities should ideally occur within 12-14 hours after a bioterrorism event is detected.

Third E: Establishing Roles and Responsibilities

Roles and responsibilities of all partners described in the first E needed to be established early on to ensure clarity of purpose and to avoid duplication of efforts. As prescribed by state and local legislation, many of these roles and responsibilities were explicitly delegated to certain entities. Other roles were delegated either by self-assertion or by voluntary enlistment (Table). To coordinate all response activities for the Super Bowl, FCBOH activated its emergency operations center (EOC) for 10 days from January 26 to February 4, 2019. Regardless of how roles and responsibilities were established, FCBOH convened a daily phone call during all 10 days of the EOC activation with all external partners engaged in ESF 8 tasks to share information and to ensure accountability. In addition, the Incident Commander at FCBOH (or designee) would liaise with the Medical Branch of the Unified Area Command to exchange information and to provide situational awareness (Figure 3).

Fourth E: Executing Plans to Fill Gaps

This stage provided FCBOH the opportunity to take actions to address the identified gaps, often relying on stakeholders in the process. For example, because FCBOH did not have enough personnel trained in

incident command system (ICS) principles to staff the operations section chief position in the EOC, FCBOH turned to neighboring health jurisdictions from across North Georgia to request external assistance to help staff the EOC. Similarly, FCBOH requested more environmental health personnel from DPH to assist with food vendor site inspections, because the substantial number of food vendors overwhelmed its local environmental health capacity.

In addition, FCBOH realized that notifications for major sentinel events requiring public health action (such as a bioterrorism event or an epidemiological outbreak) were done on an unsystematic ad hoc basis. Public health communication channels between the Atlanta metropolitan health districts needed to be strengthened. This identified the need for a formal reporting algorithm across health districts for sentinel events to be shared among epidemiologists or emergency preparedness personnel during a major mass gathering. FCBOH developed a formal reporting algorithm to outline how preliminary epidemiological information should be shared among public health personnel across the neighboring health districts in the event of a sentinel event. This algorithm ensured that the entire reporting process was clear and that all epidemiologists and emergency preparedness personnel from the neighboring health districts explicitly knew what kind of crucial information needed to

TABLE
Roles and Responsibilities of Partnering Entities for Super Bowl LIII, Fulton County, Georgia, 2019

Entity	Role and Responsibility	How Role Was Established
Georgia Department of Public Health	<ul style="list-style-type: none"> Coordinating surveillance activities between jurisdictions and assessing health trends at a regional level Maintaining and routinely updating WebEOC,^a the common access online portal involved in maintaining epidemiological situational awareness 	Self-assertion
US Department of Homeland Security	<ul style="list-style-type: none"> Maintaining BioWatch^b surveillance activities 	Self-assertion
Georgia Public Health Laboratory	<ul style="list-style-type: none"> Reporting results of BioWatch sensors to FCBOH 	Self-assertion
Fulton County Medical Reserve Corps	<ul style="list-style-type: none"> Providing surge capacity in the event of a public health emergency 	Voluntary enlistment ^c
Multiple, local health departments across Georgia	<ul style="list-style-type: none"> Ensuring continuity of operations at FCBOH emergency operations center Ensuring all positions with FCBOH's incident command system were filled (based on expertise and availability of staff)^d 	Explicit delegation
Fulton County Board of Health	<ul style="list-style-type: none"> Leading all Emergency Support Function #8 activities and coordinating response efforts with external partners 	Self-assertion

Abbreviations: EOC, Emergency Operations Center; FCBOH, Fulton County Board of Health.

^a<https://www.juware.com/webeoc>.

^b<https://www.dhs.gov/biowatch-program>.

^cThis roster of volunteers included FCBOH's own members and members from other health districts and often consisted of students from local universities.

^dFCBOH's Office of Emergency Preparedness created a 2-week calendar of EOC service opportunities at the outset of the enhanced surveillance period. EOC roles and shifts were assigned to specific internal and external staff based on existing expertise, availability, and event requirements.

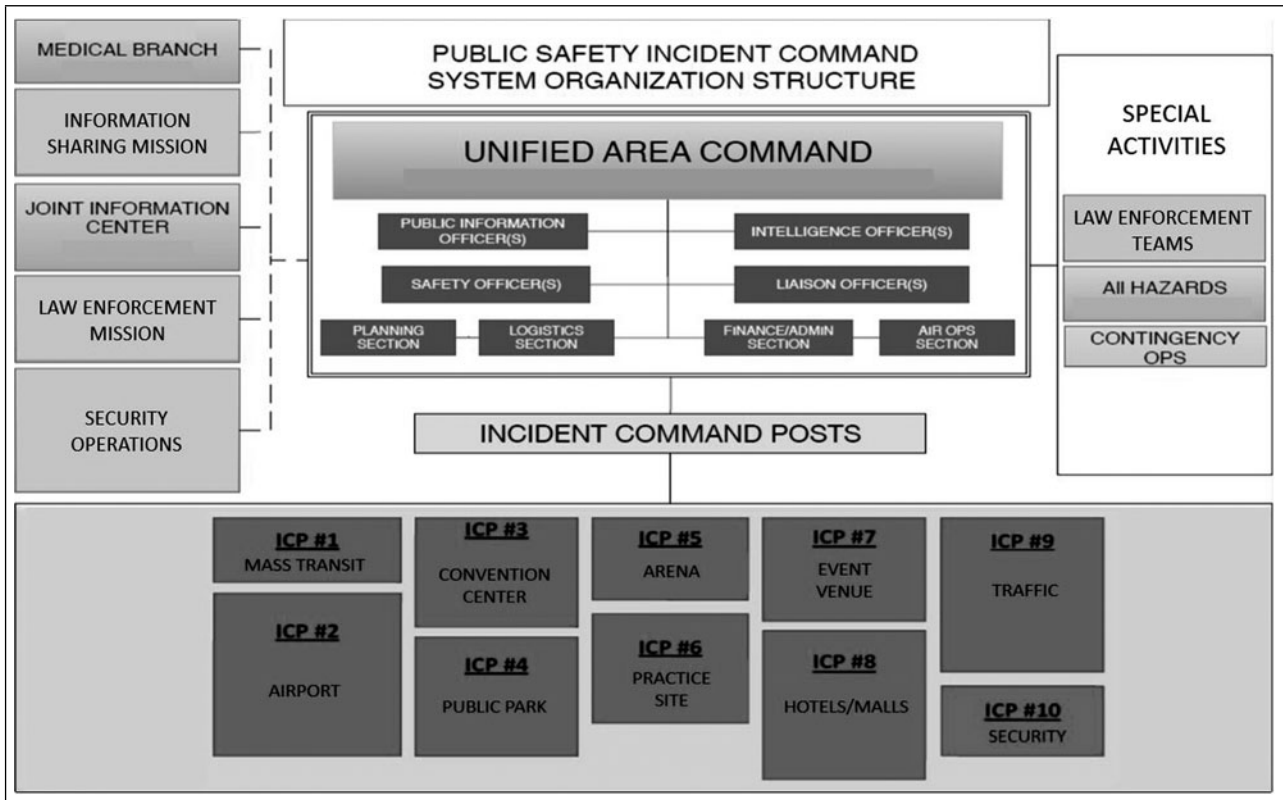


FIGURE 3 Public Safety Incident Command System Organization Structure, Super Bowl LIII, Atlanta, Georgia
Abbreviations: ICP, incident command post.

be shared and with whom they needed to share it with (see Supplemental Figures 1 and 2, available at <http://links.lww.com/JPHMP/A707>). By reinforcing communication and notification pathways, the algorithms set the standard of what was expected in terms of information sharing during a public health emergency.

In addition, FCBOH implemented DPH's Surge Public Health Emergency Response (SUPHER) telephone system in the event a public health emergency occurred. The SUPHER system is a telephone hotline with scalable capacity that provides callers with crucial public health information through prescribed messages.¹⁰ FCBOH trained Medical Reserve Corps volunteers to staff this telephone line to ensure that FCBOH was ready to respond to public inquiries during an emergency.

Finally, to ensure the safety of deployed personnel, FCBOH appointed a physician to serve as safety officer within the ICS structure at the EOC. The safety officer used the Responder Safety, Tracking, and Resilience surveillance system to check in daily on the health of personnel deployed in the field.^{11,12} This officer reviewed and followed up on any warnings indicative of possible illnesses, by calling and speaking with the employee to determine whether the employee

needed to be relieved of work duties and seek further medical care.

Fifth E: Exercising Plans

Approximately 1 month before the Super Bowl, FCBOH developed 2 distinct scenario-based tabletop exercises. One was a foodborne outbreak among visitors to the metropolitan region that required an epidemiological investigation and strong public health response. The other was a public health emergency involving the release of inhalational anthrax in a public setting. These emergency scenarios were designed to challenge interjurisdictional communications, surveillance, and public health and hospital coordination. Furthermore, the inhalational anthrax scenario required coordination among public health agencies and law enforcement and required discussions about POD activation. Multiple stakeholders, including the Georgia National Guard's 4th Civil Support Team, Georgia Poison Control Center, AFCEMA, US Environmental Protection Agency, Georgia Department of Agriculture, all metropolitan health districts, and many other partners, attended these tabletop exercises. Both exercises were instrumental in refining

details, identifying remaining gaps, and fostering collaboration among multiple sectors.

The benefits of holding tabletop exercises close to the event start date were 2-fold. First, they brought together key stakeholders across multiple disciplines and jurisdictions who would need to work cohesively if a similar emergency occurred. This helped test and revise communication and coordination activities across jurisdictions that led to stronger, long-term partnerships across agencies. Second, they helped FCBOH reevaluate its capabilities and identify remaining gaps immediately before the Super Bowl. For instance, from the tabletop exercise, FCBOH saw that communication channels between food defense and environmental health operations could have been more robust, indicating an area that needed improvement for FCBOH.

Sixth E: Evaluating Impact

The final E in this framework is evaluating the impact of all preparation, planning, and execution activities. Ideally, this evaluation should occur concurrently as preparedness efforts are underway, but at the very least an evaluation should occur after the event is over. After Super Bowl LIII concluded, FCBOH met with all stakeholders to reflect on the planning process and discuss actions that worked and those that needed further refining. From these in-person meetings and online solicitations for feedback, FCBOH compiled an After-Action Report for Super Bowl LIII that will serve as institutional memory documenting FCBOH's experiences for future mass gatherings.

Discussion

Four major lessons emerged during this post-Super Bowl evaluation process. First, jurisdictional health districts need to strengthen existing partnerships to ensure that the mutual aid communication network is seamless during the months before a mass gathering event. Increased collaboration among jurisdictional stakeholders will help the public health community share resources and staff through mutual aid requests during all stages of planning, preparation, and execution.

Second, the National Response Framework's ESF 8 annex should include additional procedural guidance to explicitly clarify roles and responsibilities between public health and emergency medical services. During planning for Super Bowl LIII, emergency medical personnel developed their own plans and operations that were largely independent from public health activities. Although emergency medical personnel did participate in joint tabletop exercises and were therefore

aware of FCBOH's roles and responsibilities, both public health and emergency medical services would benefit greatly if there was more robust collaboration between the 2 fields so that information can be rapidly shared and operations can be coordinated to ensure an efficient response.

Third, public health planners need to integrate environmental health services during all stages of planning, preparation, and execution. Through collaborative pre-event planning meetings, joint operations and drills, and robust field communications, epidemiology and environmental health must go beyond routine siloed surveillance activities to ensure the public's safety during SEAR 1 events such as the Super Bowl.¹³⁻¹⁵

Finally, public health practitioners should incorporate tabletop exercises in future planning activities for mass gatherings. The tabletop exercises that were held during the final weeks before Super Bowl LIII were immensely helpful, since federal, state, and local partners had the opportunity to work cohesively and share operational plans. In addition, the tabletop exercises helped identify and orient partners before the Super Bowl, which facilitated a timely, robust, and coordinated epidemiological response when 4 first responders reported gastrointestinal symptoms after eating at a feeding station during the Super Bowl. These strong, cross-sectoral partnerships across disciplines and jurisdictions helped improve the epidemiologic and environmental health response to this outbreak and allowed for a coordinated response. Fulton County's experience at the local level aligns with the strategic vision of Federal Emergency Management Agency's Community Lifelines, which call for the unity of effort across diverse sectors within a community.¹⁶ The strong partnership engagement and systematic approach ensured FCBOH's preparation for this event and future events of a similar nature.

Conclusion

Super Bowl LIII presented multiple unique challenges, given the scale and complexity of this multiday mass gathering. Nevertheless, this major sporting event provided an opportunity for FCBOH to bolster interdepartmental and cross-sectoral partnerships to ensure the successful implementation of public health preparedness efforts. Public health planning activities for Super Bowl LIII needed to not only be developed organically from the local level but also needed close collaboration among federal, state, and local partners to ensure success. FCBOH's 6 E framework can serve as a model for other local public health jurisdictions, especially those situated within a multijurisdictional urban area. The 6 E framework can be a useful tool to

Implications for Policy & Practice

- The 6 E framework offers a systematic approach for local health departments to plan, prepare, and exercise for a major mass gathering in their jurisdiction.
- The 6 E framework provides a comprehensive approach to public health preparedness, while also allowing local health departments to adapt the approach to serve local public health needs.
- Collaboration among stakeholders and partners across sectors and jurisdictions is key to ensuring community preparedness and requires concerted buy-in before, during, and after the event.
- Roles and responsibilities from multiple stakeholders need to be established and communicated to ensure clarity of purpose and to avoid duplication of efforts.

ensure that all areas of preparedness are accounted for and addressed so that public health practitioners can learn from previous events and be ready to respond for the next major mass gathering.

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