CSTE
COUNCIL OF STATE AND TERRITORIAL EPIDEMIOLOGISTS

APPLIED EPIDEMIOLOGY RECOMMENDATIONS FOR MASS GATHERINGS PREPAREDNESS AND RESPONSE

World Cup 2026

INTRODUCTION

This document was developed by the Council of State and Territorial Epidemiologists (CSTE) with input from members of the Public Health Response and Incident Surveillance at Mass Gatherings (PRISM) Workgroup, and in collaboration with the Centers for Disease Control and Prevention (CDC). It provides recommendations and resources related to the integration of applied epidemiology methods, tools, staff, and resources into mass gatherings planning and operations, focused specifically on World Cup 2026.

PURPOSE AND SCOPE

Applied epidemiologists play a key role in preparing for and responding to mass gatherings, and the public health impacts of mass gatherings. that may occur as a result. This document:

- Provides considerations and recommendations for epidemiologists in state, Tribal, local, and territorial (STLT) public health agencies to consider in planning and response related to World Cup 2026 that are also applicable to mass gatherings broadly.
- Provides resources to assist in public health surveillance and monitoring as a part of planning and response for World Cup 2026 that are also applicable to mass gatherings broadly.

This document includes several sections with specific recommendations and examples from the field in the areas of:

- Integrating Epidemiology into Planning and Operations
- Data Sources and Systems
- Diseases and Conditions of Interest Prioritization
- Syndromic Surveillance
- Wastewater Surveillance
- Travelers' Health
- Worker Health and Safety

While outside the scope of this recommendations document, the intersection of applied epidemiology and public health emergency preparedness and management at STLT and federal agencies cannot be overstated. Epidemiologists and epidemiological methods, tools, and resources are integral parts of the emergency management cycle. The CSTE Disaster Epidemiology Subcommittee crosswalked select epidemiology methods, tools, and resources with the CDC PHEP Capabilities, CDC Readiness & Response Framework, and Federal Emergency Management Agency (FEMA) Core Capabilities. Additional resources related to administrative preparedness in public health include:

- Four Strategies to Advance Administrative Preparedness in Public Health (ASTHO)
- Administrative Preparedness and the Public Health Workforce: Suggested Strategies for Health Departments (NACCHO)

Collaboration between public health epidemiologists and public health laboratories is vital to routine and enhanced preparedness and response activities. The Association of Public Health Laboratories (APHL) has developed a Public Health Laboratory Readiness Checklist for Major Events that should be

considered when developing surveillance plans and integrating epidemiology into mass gatherings planning and response.

The recommendations and resources included in this guidance build upon existing resources, methods, and systems and are intended to provide insight into public health action and intervention. The World Health Organization (WHO) Public Health for Mass Gatherings: Key Considerations is a comprehensive guidance document that should be referenced throughout the planning process. Robust and integrated public health surveillance is key to maintaining situational awareness and contributing to a common operating picture before, during, and after mass gatherings, including World Cup 2026.

This document may be reviewed, when possible, based on evaluation of mass gatherings and evolving needs and resources based on the event of interest.

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About World Cup 2026

The FIFA World Cup 2026 will be jointly hosted by the United States, Canada, and Mexico, with matches occurring from 11 June through 19 July 2026. The 23rd World Cup will also be the largest, featuring 104 fixtures between teams representing 48 countries (Table1); 78 matches will be held in the United States.

Table 1: World Cup Matches by Host City

United States Match Information		
City	**State**	**Number of Matches**
Atlanta	Georgia	8 (5 group stage + R32 + R16 + SF)
Boston	Massachusetts	7 (5 group stage + R32 + QF)
Dallas	Texas	9 (5 group stage + 2 R32 + R16 + SF)
Houston	Texas	7 (5 group stage + R32 + R16)
Kansas City	Missouri	6 (4 group stage + R32 + QF)
Los Angeles	California	8 (5 group stage + 2 R32 + QF)
Miami	Florida	7 (4 group + R32 + QF + Third Place Match
East Rutherford	New Jersey	8 (5 group + R32 + R16 + FIFA World Cup Final)
Philadelphia	Pennsylvania	6 (5 group stage + R16)
San Francisco Bay Area	California	6 (5 group stage + R32)
Seattle	Washington	6 (4 group stage + R32 + R16)
Canada Match Information		
Toronto	Ontario	6 (5 group stage + R32)
Vancouver	British Colombia	7 (5 group stage + R32 + R16)
Mexico Match Information		
Mexico City	Mexico City	5 (3 group stage + R32 + R16)
Guadalajara	Jalisco	4 (group stage)
Monterrey	Nuevo Leon	4 (3 group stage + R32)
R32 = Round of 32; R16 = Round of 16; QF = Quarterfinal SF = Semifinal		

With matches in 11 local jurisdictions within nine states in the United States, 48 team hubs (locations for team hotels and training facilities) in match and non-match hosting jurisdictions, and a number of official and unofficial large watch parties and other festivities throughout the United States, there is a need for inter- and intra-jurisdictional collaboration for public health surveillance and response.

1. Integrating Epidemiologists into Planning and Operations

During mass gatherings, epidemiologists play a critical role in ensuring the health and safety of attendees and surrounding communities. The primary function of the epidemiologist is to establish and implement an enhanced public health surveillance plan tailored to the event. This plan should be aligned with core public health surveillance principles and address the following elements:

- Systems and processes to ensure rapid detection of potential public health threats
- Validation of potential threats through epidemiological investigation and analysis
- Communication strategies to ensure timely dissemination to decision-makers and response teams

In preparation for a mass gathering such as the World Cup 2026, epidemiologists should be involved throughout the planning process. This includes formal integration into the Incident Command System (ICS) organizational structure for the event, which will facilitate more seamless coordination and communication with other involved partners and agencies. Epidemiologists' functions are typically included in the Planning or Operations sections of an Incident Management Team (IMT).

1A. Recommendations

Recommendation: Ensure epidemiologists are trading in the National Incident Management System (NIMS).

Epidemiologists should participate in training and exercises ranging from tabletop to full-scale exercises related to mass gatherings alongside jurisdictional partners. Epidemiologists should work with exercise planning staff and teams to ensure public health surveillance activities are included in exercises, regardless of the topic of interest (e.g., infectious disease event, mass fatality management, etc.).

Recommended training for epidemiologists involved in emergency preparedness and response include:

- ICS-100: Introduction to the Incident Command System
- ICS-200: ICS for Single Resources and Initial Action Incidents
- ICS-700: National Incident Management System, An Introduction
- ICS-800: National Response Framework: An Introduction
- ICS-300: Intermediate ICS for Expanding Incidents
- ICS-400: Advanced ICS for Command and General Staff

Recommendation: Include one or more units focused on public health surveillance and epidemiologic investigation within ICS. The inclusion of surveillance and epidemiological investigation units within a jurisdiction's ICS structure ensures epidemiologists are a part of the overall planning and response effort. These units may be placed in the Planning, Operations, or Intelligence sections; activities often include:

- Establishing the scope of public health surveillance for the event
- Establishing specific roles for disease control during events

- Identifying useful data sources
- Validating signals and alerts within surveillance systems
- Communicating alerts to other teams within the response to inform and initiate response activities

Epidemiologists should be embedded in virtual or physical emergency operations centers (EOCs) and be actively involved in daily briefings and monitoring of commonly used data sources. Potential roles of epidemiologists in the EOC may include:

- Disaster Epidemiologist (Disaster Epidemiology Branch Manager, Branch Director)
- Shelter Surveillance Unit Leader, Specialist
- Epi Branch Data Specialist
- Mortality Surveillance Unit Leader, Mortality Data Specialist, Staff
- Vector Control Unit Leader, Staff
- Syndromic Surveillance Epidemiologist
- Infectious Disease Epidemiologist
- Vaccine-preventable Disease Epidemiologist
- Injury Prevention Epidemiologist
- Other subject matter expert epidemiologists as needed

Epidemiologists may also be involved in on-site operations during mass gatherings as a liaison between event staff and emergency operations personnel.

Recommendation: Develop rosters for response. Develop rosters of surveillance staff and epidemiologists for surge staffing and deployment in response to events. Considerations should be given to 24/7 coverage and rotations and shifts for staffing based on response needs.

Public health agencies should consider staffing needs for routine activities and outbreak response within the jurisdiction. In addition to specific roles within response operations, specialized skills for rostered staff should include:

- Data analytics
- Dashboard development
- Case investigation
- REDcap

Additionally, epidemiologists should be appropriately resource typed as a deployable resource according to NIMS and the FEMA National Qualifications System. Having resource-typed epidemiologists ensures they can be deployed to assist jurisdictions in response to large-scale events, including mass gatherings across state lines. CSTE has worked with FEMA to incorporate the CSTE Applied Epidemiology Competencies in both the Epidemiologist and Epidemiological Response Team resource-typed definitions and qualifications that can be requested during response operations.

1B. Existing Systems and Resources

NIMS training courses

The FEMA Emergency Management Institute houses several trainings on NIMS.

Foundations of Public Health Preparedness

Housed on CDC TRAIN, the Foundations of Public Health Preparedness training series reviews general concepts of public health preparedness for public health practitioners.

CSTE Emergency Preparedness and Response Training for Public Health Epidemiologists

CSTE Emergency Preparedness and Response Training for Public Health Epidemiologists includes self-guided training and materials intended to increase capacity for epidemiologists to participate in outbreak and emergency response and other preparedness and response activities.

CDC Public Health Emergency Management

CDC's National Center for Environmental Health (NCEH) developed the Public Health Emergency Management module of its Disaster Epidemiology training course. This module provides an overview of public health emergency management and planning for disaster response and recovery.

1C. Examples of Integrating Epidemiology into Planning and Operations in Action

Texas State Medical Operation Center (SMOC)

The Texas State Medical Operation Center (SMOC) serves as the Emergency Support Function #8: Public Health & Medical Services (ESF-8) lead to provide operational support and coordination of state-level ESF 8 response activities to support the State Emergency Operations Center (SOC), under the Texas Division of Emergency Management. The SMOC provides functions in emergency response in four key areas: 1) coordination and control; 2) communications; 3) resource allocation; and 4) recovery. Following Hurricane Harvey, four surveillance units and a Disaster Epidemiology Branch were created and staffed. The SMOC's Disaster Epidemiology Branch includes units for shelter surveillance, mortality surveillance, syndromic surveillance, and environmental health surveillance.

2. Data Sources and Systems

To prepare for a mass gathering event, jurisdictions should review and evaluate data sources and systems to determine where enhancements are needed. While resources to build new systems may not exist, there may be opportunities to add a new variable to capture related to the mass gathering event, create direct connections or application programming interfaces (APIs) with other data sources, or establish more frequent data updates.

Surveillance systems can be case-based or event-based. Case-based systems collect structured data on individuals with a condition (e.g., salmonella), whereas event-based systems collect less structured information about events that could negatively affect mass gatherings (e.g., report of a potential measles exposure in a public location such as a grocery store or airport).

2A. Recommendations

Recommendation: Evaluate data and analysis systems and processes to identify gaps or potential opportunities to enhance public health surveillance and reporting. Public health agencies access and use a variety of data for routine surveillance; mass gatherings may necessitate the inclusion of additional data streams and variables or the development of new dashboards for response agencies or the public.

Many jurisdictions may have existing systems that use multiple data streams for visualization and analysis to improve situational awareness. Data sources may include public safety data (e.g., 911 fire and police calls), non-emergency 311 calls, and weather. Combined with public health surveillance systems, these can help quickly identify new threats during a mass gathering event.

Recommendation: Incorporate historical data from external data sources. Incorporating historical data from external data sources. When possible, use at least five years of historical data from external data sources.

Historical data can help users understand normal fluctuations in data sources and can help establish a baseline. This can help public health professionals differentiate true signals of concern that should be investigated from standard noise in the data.

Recommendation: Understand reporting cadence of all data systems. Understand the timeliness and completeness of all data systems used to inform situational awareness.

Each data system has its own reporting cadence that can be influenced by mandatory reporting requirements, time required to complete an analysis (e.g., laboratory test, case interview), and infrastructure for data reporting. Prior to World Cup 2026, it is important to understand how often data are updated and the approximate time it takes for records to be reported and entered into the surveillance system. For example, many public health surveillance systems for notifiable conditions may start showing records for a condition on the day it was diagnosed, but there may be data or investigation processes that need to take place over the next several days. Some systems may have the ability to be updated on a more frequent cadence to support mass gathering events. It is important to start identifying when each system is updated and what the expected reporting cadence is during World Cup 2026.

Recommendation: Determine the duration for monitoring. Determine how long enhanced monitoring should occur before and after the event.

- For World Cup 2026, consider two weeks prior to the first match and two weeks after the final match has been played in your jurisdiction for the period of interest.

All data systems should be operational several weeks before the event to understand the current situation in your jurisdiction, establish a baseline, and address any last-minute challenges. Jurisdictions should monitor these systems throughout the event and should consider continuing to monitor them through the incubation period of any prioritized diseases or conditions of concern after the event has concluded.

2B. Existing Systems and Resources

Table 2 provides a list of data sources and systems outside of traditional public health surveillance sources that jurisdictions may consider using to augment public health surveillance and support monitoring public health events.

Table 2: Examples of Existing Data Sources for Use during Mass Gatherings Planning and Response

Data Source	Purpose	Example*
EMS Data	Monitor number of calls and conditions of interest; include ambulance transport and other calls for services by responders	
On-site Medical Tents or Mobile Health Units	Monitor on-site medical encounters, including illness and injury, and monitor where patients are transferred	EMTrack
Hospital Capacity and Healthcare Utilization	Monitor hospital preparedness (e.g., number and type of beds, ventilators, and blood available and occupied)	EMResource
911 Dispatch Call Data	Monitor number of calls and conditions of interest, such as injury, civil unrest, or other behavioral calls for assistance	
Surveillance Systems for Reportable Conditions or Outbreaks, including Case, Electronic Laboratory Reporting (ELR), and Electronic Case Reporting (eCR) Data	Cases and clusters of reportable diseases; outbreaks	
Laboratory Information Systems	Data from state public health laboratories or reference laboratories	
Vital Statistics	Monitor mortality trends	
Poison Center (e.g., National Poison Data System)	Monitor exposure incidents, particularly related to chemical exposure/ingestions and other agents of concern	
Foodborne Illness Monitoring and Response Systems	Monitor illness around World Cup events in restaurants or food trucks inside and around World Cup venues; coordination of multi-state outbreaks of foodborne illness	311, FDA Safety Reporting Portal, USDA Food Complaint Form; System for Enteric Disease Response, investigation & Coordination (CDC SEDRIC)
Global Health Surveillance Platforms	Maintain situational awareness related to global disease activity and trends, including from countries where visitors may be traveling	CDC Travelers Health Notices; BlueDot, GIDEON
Environmental Sampling	Air monitoring for special agents of concern, including radiological data	BioWatch, EPA RadNet
Weather & Climate Data	Evaluate risk for heat-related, air quality-related illness or other meteorological hazards	National Weather Service, NOAA, AirNow.gov, heat.gov
Social Media or Digital Surveillance	Trending searches, interest by region	Google Trends
Vector Surveillance	Monitor local mosquito abundance, identification of vector-borne diseases in	Weekly reports from state or local health departments or

	sentinel chickens, or testing of reported dead birds for West Nile Virus in your geographic region	vector control agencies

2C. Examples of Data Sources and Systems in Action

Chicago Department of Public Health's Response to DNC National Convention
During the 2024 Democratic National Convention, the Chicago Department of Public Health (CDPH) stood up a public health emergency operations center to conduct enhanced surveillance for emergency health threats. Following a three-day consecutive increase in wastewater levels of Salmonella within a sewer shed serving one of the Convention centers, CDPH searched for corroborating signals in a variety of additional systems, including ESSENCE, local 311, and on-site medical tents. One day after the DNC ended, Salmonella levels dropped to pre-event levels.

3. Prioritizing Diseases and Conditions of Interest for Public Health Surveillance and Intervention

Identifying and prioritizing diseases and conditions of interest specific during mass gatherings is a critical function of public health agencies and should occur alongside the continued monitoring of notifiable diseases and conditions. This process strengthens readiness, informs resource allocation, and supports the development of response strategies.

Developing prioritized lists of diseases and conditions provides a structured framework to assess readiness for mass gathering events, identify gaps in epidemiologic preparedness, and support decision-making in resource-constrained environments. As a part of the planning, identification, and prioritization process, resources and actions that may need to be address can include:

- Modifications to existing surveillance systems (e.g., new data streams, revised reporting cadence for information sharing with response IMT or partners, etc.)
- Data visualization and communication needs (e.g., dashboards, situation reports)
- Updates to surveillance system plans, procedures, and other documentation
- Training and education needs, such as hosting drills and exercises or updating website content
- Partner coordination outreach activities
- Resource allocation or pre-placement of resources (e.g., staffing, supplies)

It is important to remember different public health agencies may have disparate recommendations despite having similar risk profiles (e.g., local jurisdiction differs from state agency); these differences may be the result of organizational priorities, strengths and gaps in capabilities, jurisdictional roles, or other factors.

3A. Recommendations

Recommendation: Participate in jurisdictional risk assessment. Epidemiologists should participate in the jurisdictional risk and threat assessment process within their jurisdiction to ensure it includes diseases and conditions of interest. Epidemiologists should also review the most recently completed risk and threat assessment findings.

Many jurisdictions have existing threat or hazards assessments, including the FEMA Threat and Hazard Identification Risk Assessment (THIRA) or Public Health Hazard Vulnerability Assessment (PH-HVA). Risk assessments are a collaborative effort that require input from multiple partners including public health emergency preparedness (PHEP), emergency management enterprise partners, healthcare, transportation, law enforcement, and other partners within a jurisdiction.

In advance of large events, local emergency management agencies and event planners may also complete event-specific hazards, vulnerability, and capacity assessments. These resources can be helpful for informing broad categories of health hazards to include in an assessment, such as extreme weather, injury, or communicable disease.

Risk assessments may differ based on jurisdiction type and characteristics of the jurisdiction (e.g., county vs. state-level; frontier, rural, suburban, or urban); inter-jurisdictional collaboration is a vital part of overall risk assessment and planning activities.

Recommendation: Conduct literature review during event planning. Consider the existing literature and prior event findings, including after action reports and improvement plans (AAR/IPs) related to mass gathering surveillance and associated threats.

Reports of health impacts observed at previous events can be found in scientific, peer-reviewed published articles, grey literature, news articles, and other media. Reviewing these reports can provide insight on which specific diseases and conditions may be most likely to occur at a large event. For example, a literature review of health impacts at large international summertime sporting events found that the most frequent health impacts were related to heat exposure, alcohol or drug intoxication, and trauma.[1] Further, studies identified the spread of respiratory or gastrointestinal/foodborne illness was the most common communicable disease risk.[1,2]

However, sporadic outbreaks of vaccine-preventable diseases like measles and cases of rare or non-endemic diseases have been reported at multiple events.[2] While severe communicable disease outbreaks may be likely, the potential for widespread illness and strain on healthcare systems warrants inclusion in enhanced surveillance planning.

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[1] Gallien, Y., Fournet, N., Delamare, H., Haroutunian, L., & Tarantola, A. (2024). Epidemiological surveillance and infectious disease oubtkeras during mass international summertime sports gatherings: A narrative review. *Infectious Diseases Now*.

[2] Gautret, P., & Steffen, R. (2016). Communicable diseases as health risks at mass gatherings other than Hajj: what is the evidence?. *International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases*, *47*, 46–52. https://doi.org/10.1016/j.ijid.2016.03.007

Recommendation: Identify diseases and conditions of interest. Determine diseases and conditions of interest for public health surveillance during mass gatherings planning and response.

Epidemiologists should consider several factors when selecting diseases and conditions of interest for public health surveillance during mass gatherings, including the potential for importation of non-endemic diseases, local transmission, infectiousness and communicability of diseases, community demographics and health characteristics, event attendee health characteristics, and routine surveillance efforts; additional factors can be found in Table 3.

- Consult community disease containment plans and consider wrap-around services related to isolation and quarantine

Table 3. Considerations for Determining Diseases and Conditions of Interest

Considerations for diseases and conditions of interest for public health surveillance during mass gatherings planning and response		
Epidemiologic Factors	**System Impact**	**Operational Considerations**
Incidence and Prevalence	Strain on healthcare system	Available surveillance systems and data sources
Morbidity and Mortality	Strain on public health infrastructure, including ability to intervene to disrupt disease transmission	Reporting frequency and urgency
Importation Potential	Response intensity for triggers or alerts	Level of effort in response to triggers and alerts, including staff capacity

The CSTE PRISM Workgroup has developed a list of diseases and conditions of interest (Appendix 1) for consideration in planning efforts. This Appendix also contains chemical, radiological, and nuclear agents for consideration in planning; epidemiologists within public agencies should work closely with public health emergency preparedness, fire protection, law enforcement, and emergency management partners to ensure planning for chemical, radiological, and nuclear threats in addition to planning for biological hazards.

3B. Existing Systems and Resources

A more comprehensive list of available frameworks can be found in Appendix 2. In addition to formal frameworks, some public health agencies use a combination of existing risk assessment strategies or develop their own methodology to best meet planning needs. Appendix 2 also contains more detailed considerations for disease-specific risk assessments.

HHS ASPR TRACIE: Hazard Vulnerability/Risk Assessment Topic Collection

Department of Health and Human Services Administration for Strategy Preparedness and Response Technical Resources, Assistance Center and Information Exchange (HHS ASPR TRACIE) Hazard and Vulnerability/Risk Assessment Collection contains resources, including data sources, toolkits, guidance, and education and training materials to assist practitioners in conducting risk assessments.

World Health Organization (WHO) Strategic Toolkit for Assessing Risks (STAR):
The WHO Strategic Toolkit for Assessing Risks (STAR) is a comprehensive toolkit for assessing public health risks as related to emergency preparedness and disaster risk management activities.

WHO Mass Gatherings COVID-19 Risk Assessment Tool – Sports Events:
The WHO Mass Gathering COVID-19 Risk Assessment Tool- Sports Events tool provides guidance for public health authorities and event organizers for conducting risk assessments to determine the overall risk of disease spread associated with a mass gathering.

3C. Examples of Prioritizing Diseases and Conditions of Interest for Public Health Surveillance and Intervention in Action

Public Health Ontario: Hazard Identification and Risk Assessment for Infectious Disease Requests Worksheet:
Public Health Ontario has developed a worksheet, Hazard Identification and Risk Assessment for Infectious Diseases Requests, as a part of its hazard identification and risk assessment efforts that can be used prior to mass gatherings.

Mass Gatherings in Qatar 2022 World Cup
The publication, *Mass Gathering in Qatar 2022 World Cup. What should be especially monitored?,* details the disease risk prioritization process focused on the 2022 FIFA World Cup, held in Qatar from 20 November – 18 December 2022. Researchers used a mixed methodology to determine risk level and likelihood of disease transmission.

Enhanced Syndromic Surveillance during Festival of Pacific Arts in Solomon Islands 2012
During the Festival of Pacific Arts in the Solomon Islands in 2012, public health practitioners implemented enhanced syndromic surveillance through expanding sentinel sites and regularly monitoring syndromes.

Infectious Diseases Prioritization for 2012 Olympic and Paralympic Games
The publication, Infectious Diseases Prioritization for event-based surveillance at the European Union Level for the 2012 Olympic and Paralympic Games, published in 2014, details planning efforts for public health surveillance related to the 2012 Olympic and Paralympic games in the United Kingdom from27 July – 9 September, 2012. A collaborative team consisting of experts from the United Kingdom's Health Protection Agency (HPA) and the European Centre for Disease Prevention and Control (ECDC) was established. The team determined 71 diseases and conditions of interest and further refined that list to 27 high-priority diseases and conditions for enhanced surveillance.

4. Syndromic Surveillance

Syndromic surveillance (SyS) supports early-warning detection and monitoring for public health preparedness during mass gatherings. It provides near real-time information on health encounters that is not dependent on laboratory confirmation, unlike many reportable diseases. During large-scale events such as World Cup 2026, temporary population surges, increased international travel, and environmental

stressors can alter healthcare-seeking behavior and disease patterns. SyS allows public health agencies to identify changes in emergency department and urgent care visits that may indicate emerging concerns, such as foodborne outbreaks, heat-related illness, or clusters of respiratory symptoms.

For mass gatherings, SyS enhances situational awareness through timely monitoring of priority syndromes, including respiratory and gastrointestinal symptoms, injuries, substance-related events, and exacerbations of chronic conditions. These data help agencies distinguish expected event-related increases in healthcare utilization from unusual patterns that may require further investigation.

When integrated into planning and response operations, SyS informs daily briefings and supports coordination across jurisdictions. Establishing clear monitoring strategies prior to the event helps STLT public health agencies integrate event-based surveillance with routine syndromic surveillance activities and support effective public health response.

4A. Recommendations

Recommendation: Develop a pre-event strategy. Develop a pre-event strategy and mass-gathering-specific syndromic surveillance plans well in advance of the event. This includes identifying priority syndromes based on match schedules, anticipated weather conditions, seasonal trends, and local risk profiles.

Recommendation: Establish a baseline for reference. Review historical syndromic data from comparable timeframes or previous large-scale events within the jurisdiction to establish a baseline. Understanding typical visit volumes and seasonal patterns is critical for identifying true anomalies during the tournament.

Recommendation: Incorporate workflows into routine monitoring. Create event-specific queries and monitoring workflows to support daily or more frequent review during the event period. Establish standardized criteria for what constitutes a signal to ensure consistent interpretation across teams and jurisdictions.

- This could include adding specific identifiers such as “FIFA26”, “WorldCup, or similar.

Recommendation: Define clear escalation pathways. Define clear escalation pathways and formal processes for communicating syndromic signals to epidemiology leads, emergency operations center staff, and partner agencies. This should include:

- Pre-identified points of contact and expectations for follow-up
- Integrating syndromic surveillance with other data sources and communications pathways, including EMS, Urgent Care Centers, and wastewater surveillance
- Establishing daily situational reports and incident management teams to share data across jurisdictional and agency partners

Recommendation: Coordinate with participating facilities to verify data. Assess data timeliness and completeness from healthcare facilities near match venues, team hubs, and watch party sites prior to the event. Establish communication pathways with these facilities to enable rapid clinical clarification of automated alerts when needed.

4B. Existing Systems and Resources

National Syndromic Surveillance Program (NSSP) Community of Practice (CoP):
The National Syndromic Surveillance Program (NSSP) Community of Practice (CoP) promotes knowledge sharing, training, innovation, and timely exchange of syndromic surveillance data among state and local public health agencies and partners and supports access to standardized syndrome definitions that strengthen situational awareness and coordinated public health response to events.

NSSP CoP Knowledge Repository
The NSSP CoP Knowledge Repository contains resources developed by the NSSP CoP for the syndromic surveillance community on a wide range of topics including mass gatherings surveillance.

Additional syndromic surveillance resources can be found in Appendix 3.

4C. Examples of Syndromic Surveillance in Action

California
Establishing Statewide Policy and Continuity: California's transition to the California Syndromic Surveillance (CalSyS) program reflects ongoing efforts to establish a centralized statewide syndromic surveillance infrastructure under legal authority SB 159. While this framework supports planning and coordination for mass gathering preparedness, syndromic surveillance data availability and completeness continue to evolve across jurisdictions. Event-based monitoring strategies are being developed within this context to align with existing governance structures and current data coverage. As California has not yet conducted syndromic surveillance for an event of this scale, this example reflects planning considerations.

Washington
Advanced Integration for the 2026 World Cup: As a host jurisdiction for World Cup 2026, Washington's RHINO program is actively supporting advanced planning efforts for mass gathering surveillance. Current activities include scenario-based planning exercises such as extreme heat events occurring during match play and the use of syndromic surveillance outputs to support situational awareness for emergency management coordination. These efforts strengthen integration between public health surveillance and statewide response operations.

Oregon
Scalable Templates for Multi-Jurisdictional Events: Oregon provides a strong example of scalable syndromic surveillance for multi-jurisdictional events. During the 2017 solar eclipse, the state supported monitoring across a large number of concurrent local events by providing local health departments with standardized ESSENCE query templates and reporting guidance. This example demonstrated that states can maintain statewide situational awareness by empowering local partners with consistent tools.

5. Wastewater Surveillance

Wastewater surveillance is a passive surveillance system that measures pathogen levels in wastewater to evaluate community-level infection trends and has been used in mass gatherings including the 2022 FIFA World Cup to monitor for SARS-CoV-2, enterovirus, and poliovirus.[3] Wastewater monitoring also has utility for smaller gatherings; at the Southern Decadence festival in New Orleans, SARS-CoV-2 and mpox were both monitored due to the recent pandemic and the increased number of individuals at-risk for mpox present for the festival.[4]

Wastewater data are timely, with results typically available 5-7 days following collection, and can show changes in disease trends before trends are observed in clinical data. Information from wastewater surveillance can be used to prepare healthcare providers and hospital systems for upcoming increases in visits and hospitalizations resulting from an influx of visitors.

While community participation in wastewater surveillance is often limited by the type of sewage treatment occurring, as lagoon and septic systems can complicate sample collection and the staff capacity at the treatment plants, it can be implemented in any community that is served by municipal wastewater collection systems. Currently, 1,500 communities representing 150 million people (45% of the U.S. population) are covered by wastewater monitoring.[5] It can be an ethical way to collect information about pathogens impacting a community because it can provide surveillance coverage regardless of healthcare access or other barriers to testing and can provide community-level perspective on presence of pathogens rather than individual-level diagnoses. It and allows for public health to support community health without using private health information.

In action, wastewater monitoring data during mass gathering events can help local public health agencies identify trends, direct public health investigation and prevention efforts to areas most needed and provide additional insight into diseases spread that complement other public health surveillance data.

5A. Recommendations

Recommendation: Coordinate with wastewater facilities. Identify sewersheds with wastewater testing available that serve the areas where people will be congregating in your jurisdiction during the event. This will be a larger area than just the stadium, as people may find lodging and seek other entertainment in a wide radius around where the event takes place.

Recommendation: Determine pathogens for monitoring. Work with lab and epidemiology subject matter experts to select the pathogens that are important for the response. Considerations that should be taken into account are the countries that will be playing, staying, and viewing the games in your area.

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[3] El-Malah, S. S., Saththasivam, J., K, A. K., Abdul Jabbar, K., Gomez, T. A., Wahib, S., Lawler, J., Tang, P., Mirza, F., Al-Hail, H., Ouararhni, K., Abdul Azis, T. K., Abu Raddad, L. J., Chemaitelly, H. S., Abu Halaweh, H. A., Khalife, S., Bertollini, R., & Mahmoud, K. A. (2024). Leveraging wastewater surveillance for managing the spread of SARS-CoV-2 and concerned pathogens during FIFA World Cup Qatar 2022. *Heliyon, 10(9),* e30267. https://doi.org/10.1016/j.heliyon.2024.e30267

[4] Brighton, K., Fisch, S., Wu, H., Vigil, K., & Aw, T. G. (2024). Targeted community wastewater surveillance for SARS-CoV-2 and Mpox virus during a festival mass-gathering event. *Science of The Total Environment, 906*, 167443. https://doi.org/10.1016/j.scitotenv.2023.167443

[5] https://www.cdc.gov/nwss/pdf/CDC_Wastewater_Surveillance.pdf

Recommendation: Establish a baseline for reference. Review historical data from comparable timeframes or previous large-scale events within the sewersheds that you are monitoring. Understanding typical pathogen detections and seasonal patterns is critical for identifying situations where pathogens may be circulating more than usual. This should often include some way to normalize the data for how much human waste is included.

Recommendation: Establish a response framework. Define formal processes for communicating wastewater signals to epidemiology leads, emergency operations center staff, and partner agencies. This should include pre-identified points of contact and expectations for follow-up such as an investigation to identify possible sources of a concerning detection based on other data/information.

5B. Existing Systems and Resources

CDC National Wastewater Surveillance System

CDC's National Wastewater Surveillance System (NWSS) provides the public health infrastructure to monitor infectious diseases through wastewater across the country. For more information: https://www.cdc.gov/nwss/index.html

Data to Action: The Public Health Value of Wastewater Surveillance

Data to Action: The Public Health Value of Wastewater Surveillance is a CSTE-led webinar featuring academic partners discussing wastewater surveillance projects and how epidemiologists use wastewater surveillance data tracking of SARS-CoV-2.

Wastewater SCAN Dashboard

Wastewater SCAN, based in Stanford University and in partnership with Emory University, has partnered with Verily to monitor infectious diseases through municipal wastewater systems.

5C. Examples of Wastewater Surveillance in Action

Kansas: Coordination of wastewater testing and reporting for World Cup 2026

In 2025, Kansas surveyed state and local epidemiologists and healthcare teams about wastewater monitoring pathogen prioritization during World Cup 2026. Kansas was then able to coordinate with the lab to enhance testing efficiency through multiplexing, eliminating the need for additional staff. The list was then shared with Missouri, launching a response plan for every pathogen based on either the concentration and trend of common pathogens or the detection of rare or out-of-season pathogens. This plan included contextual information about pathogen shedding during disease progression. Currently, the wastewater data is being combined with syndromic surveillance data to form a "snapshot" dashboard that will display the last four weeks of data, giving users the ability to quickly view recent pathogen circulation. These resources aim to provide users with a clear understanding of circulating pathogens and alert them of changes in exposure to pathogens during the games.

Nevada: Wastewater surveillance and Formula 1 Grand Prix

Las Vegas, Nevada conducted wastewater surveillance for their Grand Prix event and saw increased opioid detection, influenza, RSV, and norovirus in wastewater. Wastewater surveillance for this event was done two weeks prior to the event to establish a baseline. During the event, samples were collected every 24 hours. Wastewater surveillance also occurred two weeks after the event.

Additional wastewater surveillance resources and jurisdictional examples can be found in Appendix 4.

6. Travelers' Health

Maintaining the health of travelers and residents in jurisdictions hosting events is a key function of applied epidemiologists during all phases of mass gatherings planning and response. An influx of travelers raises the possibility of the importation of diseases, and mass gatherings can serve as amplifying events for the spread of those diseases. This temporary increase in population has the potential to bring new diseases and other health risks to communities hosting mass gatherings, including straining healthcare capacity and emergency services. These health risks will depend on the nature and number of visitors and the countries from which they travel, as well as the normal travel patterns throughout the United States. Population surges and increased travel can lead to unexpected shifts in disease patterns and healthcare utilization when compared to baseline.

In general, public health-led entry screening or post-arrival symptom monitoring of travelers arriving in the United States is not recommended. These efforts would require significant resources and further strain the public health system during response and provide little-to-no public health value.

6A. Recommendations

Recommendation: **Maintain situational awareness of regional and global disease activity**. Public health agencies should maintain situational awareness of disease activity outside of your jurisdiction, including regional and global health threats, before, during, and after mass gatherings. Relevant traveler health-related information should be included in epidemiology situation reports.

Recommendation: Review existing guidelines for counting cases in travelers. Review CSTE Revised Guidelines for Determining Residence for Disease Notification Purposes.

- Cases of nationally notifiable diseases occurring in residents of foreign countries will be identified in national notifications but will not be included in state-specific counts or rates of nationally notifiable diseases.

Recommendation: Consider communications and information sharing protocols. Consider internal and external communications and information sharing efforts.

- Public Information Sharing: develop key messages to disseminate essential information related to travelers' health. These messages should include information on points of contact for health department staff and services available within the jurisdiction
- Tailor messaging to specific venues and audiences (e.g., work with airport(s) in the jurisdiction on public health messaging on message boards in airport facilities)
- Identify translation services for investigations and inform epidemiologists and case and contact investigators on how to access and use them

- Distribute information to healthcare providers about common travelers' diseases and clinical management guidelines, including when and how to alert public health, if applicable

Recommendation: **Identify surveillance capabilities and systems.** Identify your jurisdiction's surveillance capability/systems and leverage the resources to supplement any traveler-focused surveillance. Related activities include:

- Confirm the frequency of reports, any specific disease of concern that might need to be included or flagged for surveillance
- Identify any key words or information related to travelers that should be included in the surveillance system when receiving specific information about travelers using healthcare systems or services in your jurisdiction (e.g., case interview questions about travel; syndromic surveillance fields that may contain travel history such as chief complaint or triage note).
- Run tests to ensure flow of communication and identify gaps in communication

Recommendation: **Review ill traveler reporting and response protocols**. Epidemiologists should review protocols for post-arrival disease reporting and investigation. This includes:

- Confirming staff training and capacity for response to reports of suspected high-consequence pathogens
- Ensuring after-hours communications are fully operational
- Confirming protocols for collaboration with CDC and out-of-jurisdiction public health agencies

6B. Existing Systems and Resources

Protocol for Health Department Notification to CDC Port Health Stations of Persons Who Recently Traveled while Infectious: CSTE, with the assistance of a consultant and with input and funding from CDC subject matter experts within the Division of Global Migration and Health (DGMH), recently developed a *Protocol for Health Department Notification to CDC Port Health Stations of Persons Who Recently Traveled while Infectious* to standardize a bidirectional notification framework for STLT public health agencies and CDC to collaborate on the reporting and investigation of illness in persons who traveled while infectious.

- Training series (CSTE Connect login required): https://learn.cste.org/courses-page/course/protocol-for-health-department-notification-to-cdc-port-health-stations-of-persons-who-recently-trav

CDC Travelers' Health Notices Website

CDC uses Travel Health Notices (THNs) to inform travelers about global health risks during outbreaks, special events or gatherings, and natural disasters, and to provide advice about protective actions travelers can take to prevent infection or adverse health effects.

Additional resources can be found in Appendix 5.

6C. Examples of Travelers' Health in Action

Global Health Situational Awareness in Kansas
The Kansas Department of Health has Domestic and International Infectious Disease Reports with international and local disease event information: https://www.kdhe.ks.gov/travelhealth#tab7141b095-7fc3-4be6-aaa4-518c3ec0e07c_2

Travel Clinical Assistant in Georgia
The Georgia Department of Health maintains a Travel Clinical Assistant (TCA) tool that provide post-travel clinical information on travel-related diseases for 231 countries:
https://dph.georgia.gov/TravelClinicalAssistant

7. Worker Safety and Health

Mass gatherings create unique occupational health risks due to the scale and density of activities, leading to strained resources and amplification of hazards. When considering worker safety and health, epidemiologists should work with partners to focus on the following areas:

- High exposure potential: Workers may be on-site for long hours, in high-density environments, or performing tasks that put them in close contact with crowds, potentially increasing injury or illness risk.
- Multiple hazard types: These range from infectious diseases and heat stress to slips, falls, crowd dynamics, and ergonomic stresses.
- Essential service continuity: If workers become ill or injured, essential functions (e.g., medical care, security, sanitation) can be compromised.

Epidemiologists play a role in training and education for workers and responders and should work alongside Safety Officers in planning and response to develop training plans for staff involved in mass gatherings. Importantly, occupational surveillance supports prevention: monitoring work-related injuries and illnesses helps identify trends, assess risks, and guide interventions to prevent future harm, which is a core tenet of occupational health surveillance.

7A. Recommendations

Recommendation: **Conduct risk assessment prior to an event**. Identify hazards across roles, including medical volunteers, security, catering staff, cleanup crews, etc.

Recommendation: **Conduct occupational health surveillance**. Occupational health surveillance helps detect early signs of outbreaks or unsafe work conditions. Consider monitoring trends by job type or activity. Utilizing the Emergency Response Health Monitoring and Surveillance (ERHMS) Framework for tracking before, during, and after event operations. In addition to on-site accountability, consider

- Injury and illness monitoring
- Determination of medical point(s) of contact to liaise with public health
- Evaluate the need for out-processing and follow-up monitoring

Recommendation: **Consider hierarchy of controls**. Use the NIOSH Hierarchy of Controls to identify preferred order or actions to best control hazardous workplace exposures. The hierarchy includes:

- Elimination
- Substitution
- Engineering controls
- Administrative controls
- Personal protection equipment

7B. Existing Systems and Resources

Emergency Response Health Monitoring and Surveillance (EHRMS) Framework
The ERHMS Framework provides recommendations for protecting emergency response and recovery workers in all phases of a response, including pre-deployment, deployment, and post-deployment.

Occupational Health Surveillance for Tracking Climate-related Impacts on Workers: Heat, Wildfires, and Floods
The Occupational Health Surveillance for Tracking Climate-related Impacts on Workers: Heat, Wildfires, and Floods was developed by the CSTE Occupational Health and Climate Change Workgroup in 2024. This resource can be used to accelerate occupational surveillance focused on heat, wildfires, and floods.

Preventing Heat-related Illness Resources for At-Risk Workers
A collection of multilingual tools and resources that can be shared with both outdoor and indoor workers who face health risks during extreme heat.

Additional worker safety and health resources can be found in Appendix 6.

7C. Examples of Worker Safety and Health in Action

Training to Prevent Falls in Construction Aims to Score at Local MA Soccer Tournament
The Massachusetts Occupational Health Surveillance Program (OHSP) organized short trainings on preventing falls in residential construction to be held during a local Hispanic soccer league tournament. OSHA and the Massachusetts Coalition for Occupational Safety and Health (MassCOSH) were also at the event, which included Spanish-speaking trainers.

Reducing Carbon Monoxide Poisoning Risk Among Food Truck Vendors in Wisconsin
Following an alert from the Wisconsin Poison Control Center regarding a potential work-related carbon monoxide poisoning, state and local health department staff shared information on proper training on generator use with food truck vendors. The information was also shared with the Green Bay Food Truck Coalition ahead of the NFL Draft in Green Bay, Wisconsin in April 2025.

Fulton County, Georgia and Super Bowl LIII (2019)
Super Bowl LIII was designated a National Special Security Event and brought approximately half a million visitors to Atlanta. The Fulton County Board of Health integrated responder safety into mass gathering operational planning by activating its Emergency Operations Center and embedding workforce protection within the ICS structure. A Safety Officer was assigned responsibility for workforce oversight. Fulton County implemented the Responder Safety, Tracking, and Resilience (R-STaR) system to monitor deployed personnel. Daily health check-ins were conducted, concerns were followed up directly, and personnel were relieved from duty or referred for medical care when appropriate. Structured tabletop

exercises were conducted prior to the event, and post-event after-action reviews evaluated workforce protection systems. This approach demonstrates that structured responder health monitoring can be operationalized during major mass gathering events.

Appendix 1. Priority Diseases and Conditions of Interest for Mass Gatherings

The CSTE PRISM Workgroup has developed this list of priority diseases and conditions of interest for STLT consideration in planning and response to World Cup 2026. The PRISM Workgroup created a "Priority Diseases and Conditions of Interest for Public Health Surveillance" form using Smartsheet and shared it with jurisdictions hosting World Cup matches in the United States and Canada to better understand which diseases and conditions are of interest for public health monitoring. PRISM Workgroup leadership then reviewed and condensed responses to create this list. A total of nine responses were shared by World Cup jurisdictions.

The overarching goal is to align surveillance targets to assist in maintaining situational awareness across jurisdictions during World Cup 2026.

Important Considerations for Use:

- This list does not replace the need for routine surveillance of reportable conditions and outbreaks
- This list should be modified – narrowed or broadened – based on jurisdiction-specific risk and public health agency capacity
- "Primary" refers to diseases and conditions that may be related to international travel and/or mass gatherings
- "Secondary" refers to diseases and conditions where cases are less likely to be related to mass gatherings, but response may still require significant public health resources.

Additional References from Literature:

1. Llorente-Nieto et al: Mass gathering in Qatar 2022 World Cup. What should be especially monitored?
2. Eurosurveillance Editorial Team: Health risks during the Cricket World Cup in the Caribbean: surveillance and assessment in the French départements
3. Economopoulou et al: Infectious diseases prioritisation for event-based surveillance at the European Union level for the 2012 Olympic and Paralympic Games
4. Ikenoue et al: Preparedness for infectious diseases during the Tokyo 2020 Olympic and Paralympic Games: advancing the health system beyond the games
5. Hoy et al: Enhanced syndromic surveillance for mass gatherings in the Pacific: a case study of the 11th Festival of Pacific Arts in Solomon Islands

Acknowledgements:
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Emily Laskowski, Washington

Infectious Diseases and Conditions of Interest	
Category	**Disease/Condition**
Respiratory	• COVID-19 • Seasonal influenza (A & B) • RSV • Novel Respiratory Viruses • Legionella • Tuberculosis
Vaccine Preventable Diseases	Primary: • Diphtheria • Hand Foot and Mouth • Hepatitis A • Hepatitis B • Measles • Meningococcal Disease • Mumps • Pertussis • Polio • Rubella Secondary: • Chickenpox
Vectorborne Diseases	Primary: • Chikungunya • Dengue virus • Malaria • Oropouche virus • St. Louis Encephalitis • West Nile Virus • Yellow Fever • Zika Virus Secondary: • Anaplasmosis • Babesiosis • Ehrlichiosis • Lyme Disease • Spotted Fever Rickettsiosis
Zoonotic Diseases	Primary: • Highly Pathogenic Avian Influenza (HPAI) Secondary: • Rabies • Leptospirosis • Trichinellosis

Bioterrorism Agents	• Anthrax • Botulism Toxin • Brucellosis • Burkholderia mallei (Glanders) • Burkholderia pseudomallei (melioidosis) • Yersinia pestis (Plague) • Psittacosis • Q Fever • Ricin Toxin • Smallpox • Tularemia
High Consequence Infectious Diseases/Pathogens of Concern	• Crimean-Congo Hemorrhagic Fever • Ebolavirus • Hantavirus • Hendra Virus • Lassa Fever • Marburg Virus • MERS-CoV • Mpox (Clade I and II) • Nipah Virus
Enteric Diseases	Primary: • Bacillus cereus • Foodborne botulism • Clostridium perfringens • E. Coli (including STEC) • Hepatitis E • Listeriosis • Norovirus • Paratyphoid Fever • Salmonella • Shigellosis • Staphylococcus Aureus • Typhoid Fever Secondary: • Cholera • Cryptosporidiosis • Cyclosporiasis • Giardiasis • Vibriosis
Sexually Transmitted Infections	Secondary: • HIV • Syphilis
Healthcare-acquired Infections/Antimicrobial	Secondary: • Candida Auris

Resistance	• Carbapenemase-producing organisms • Vancomycin-resistant Staphylococcus Aureus

Non-Infectious Disease Conditions of Interest	
Category	**Condition**
Injury Conditions	• Firearm injury • Animal bites/stings/encounters • Assault (by sharp object, by fight) • Blast injuries • Burns/scalds • Occupational-related injury (including Construction, other labor) • Contusion/Abrasion/Crushing injury • Crowd-control related (including stampede) • Drowning • Motor vehicle crash
Environmental Hazards	• Asthma • Cold-related illness • Dehydration • Heat-related illness • Pesticide poisoning
Alcohol & Substance Use	• Alcohol intoxication and poisoning • Drug overdose • Synthetic cannabinoids

CBRNE-related Priorities and Threats	
Category	**Agent of Interest**
Toxic Industrial Chemicals	• Chlorine • Ammonia • Phosgene • Hydrogen sulfide • Agricultural pesticides • Sodium fluoroacetate • Aniline dyes • Sodium nitrate
Nerve Agents	• Sarin (GB) • VX • Novichok-type agents
Pharmaceutical-based Agents	• Long-acting anticoagulants prior to blast attack • Methotrexate, mifepristone, misoprostol or other drugs which would affect pregnant women
Blister Agents	• Sulfur mustard (mustard gas)

	• Lewisite
Blood agents	• Hydrogen cyanide
Riot Control and Incapacitating Chemicals	• CS (tear gas) • CN • Pepper spray (OC)
Radiological Dispersal Devices (RDDs) and radioactive sources	• Cesium-137 • Cobalt-60 • Iridium-192 • Strontium-90 • Americium-241
Nuclear materials	• Highly enriched uranium (HEU) • Plutonium

Appendix 2. Risk Assessment Materials and Resources

Public Health Ontario: Hazard Identification and Risk Assessment (HIRA) for Infectious Diseases at FIFA World Cup 2026:
Ontario Agency for Health Protection and Promotion (Public Health Ontario). Hazard Identification and Risk Assessment (HIRA): Infectious Diseases at the World Cup 2026 Games in Toronto. Toronto, ON: King's Printer for Ontario; 2026. https://www.publichealthontario.ca/-/media/Documents/E/26/report-hira-infectious-diseases-fifa-world-cup-2026.pdf

Australian/New Zealand Standard- Risk Management

European Commission INFORM Methodology

International Standard ISO/DIS 31000 Risk Management Guidelines

Australian Government Environmental Health Risk Assessment

WHO Mass Gathering COVID-19 Risk Assessment Tool-Generic Events

WHO Mass Gathering COVID-19 Risk Assessment Tool-Religious Events

World Health Organization (WHO) Mass Gatherings COVID-19 Risk Assessment Tool – Sports Events:

The WHO Mass Gathering COVID-19 Risk Assessment Tool- Sports Events tool provides guidance for public health authorities and event organizers for conducting risk assessments to determine the overall risk of disease spread associated with a mass gathering.

WHO Mass Gatherings All Hazards Risk Assessment Tool

The Mass Gatherings All Hazards Risk Assessment Tool ("MG All Hazards RA Tool") supports Member States and mass gathering event organizers in identifying hazards related to the event, assessing and quantifying the overall risk, and accounting for precautionary measures that may reduce risk.

CDC Risk Assessment Framework:

CDC's Center for Forecasting and Outbreak Analytics (CFA) webpage detailing rapid risk assessment processes. US Centers for Disease Control and Prevention (CDC) Risk Assessment Framework

Appendix 3. Syndromic Surveillance Materials and Resources

Fleischauer A, Gaines J. Enhancing Surveillance for Mass Gatherings: The Role of Syndromic Surveillance. *Public Health Rep*. 2017 Jul 10;132(1 Suppl): 95S–98S
doi: 10.1177/0033354917706343. PMID: 28692398; PMCID: PMC5676502

Berry A. Syndromic surveillance and its utilisation for mass gatherings. *Epidemiol Infect.* 2018 Jun 22;147:e2
https://pmc.ncbi.nlm.nih.gov/articles/PMC6518567/

National Syndromic Surveillance Program (NSSP) Community of Practice (CoP):
The National Syndromic Surveillance Program (NSSP) Community of Practice (CoP) promotes knowledge sharing, training, innovation, and timely exchange of syndromic surveillance data among state and local public health agencies and partners and supports access to standardized syndrome definitions that strengthen situational awareness and coordinated public health response to events.

NSSP CoP Knowledge Repository:
The NSSP CoP Knowledge Repository contains resources developed by the NSSP CoP for the syndromic surveillance community on a wide range of topics including mass gatherings surveillance.

Rnssp Markdown Templates (https://cdcgov.github.io/Rnssp-rmd-templates/templates/):
The Rnssp R package is a catalog of data processing and analytics tools, templates, and functions commonly used across the National Syndromic Surveillance Program at CDC. Its goal is to improve code reproducibility, standardize and document reusable functions, facilitate the sharing of routine reports across the NSSP CoP.

State Emergency Department	Text Analysis Dashboard
ESSENCE CCDD Categories	ED ICD-10 Category Volumes
Syndrome Definition Evaluation	Word Alerts Report
Data Quality Filter Matrix	State Data Quality Report
Lab Pathogen Surveillance	Lab Reason for Testing
Lab Year Over Year Trends	ICD-19 Discharge Diagnosis Code Usage and Features

Dashboards: CDC and partner-developed dashboards may be used to support visualization and routine monitoring of syndromic surveillance indicators during mass gathering events. These dashboards can be found in the NSSP ESSENCE library.

Common Terms and Conditions: Standardized terminology and shared definitions, as developed through the NSSP CoP, can support consistent interpretation of syndromic surveillance data across jurisdictions.

Appendix 4. Wastewater Surveillance Materials and Resources

Wastewater Monitoring: How Does It Work? https://www.cdc.gov/nwss/pdf/Wastewater-COVID-infographic-h.pdf

Using Wastewater Surveillance Data to Support the COVID-19 Response — United States, 2020–2021 | MMWR

Additional Examples of Wastewater Surveillance in Action:

West Virginia

In 2023, West Virginia created a mobile wastewater monitoring laboratory to gather COVID-19 and norovirus data while hosting the National Scout Jamboree event. Wastewater testing offered an efficient approach to daily testing of more than 15,000 individuals. Wastewater testing did not identify any outbreaks, and participants could be reassured that the event was safe from COVID-19 and norovirus.

Kansas Wastewater Dashboard: http://datainsights.kdhe.ks.gov/WastewaterPathogenMonitor/

Integrating Applied Epidemiologists into World Cup Planning Webinar Series: Wastewater Surveillance for Large Planned Events
During a session of the CSTE Integrating Applied Epidemiologists into World Cup Planning Webinar Series, presenters from Las Vegas, Nevada, and the State of Texas shared their experiences in using wastewater surveillance during mass gatherings and planning efforts for World Cup 2026.

Milwaukee, WI and Chicago, IL

In 2024, Wisconsin and Chicago employed wastewater surveillance to monitor pathogens during the Republican and Democratic National Conventions, each attracting over 50,000 attendees. The RNC was held from July 15-18 in Milwaukee, Wisconsin and the DNC from August 19-22 in Chicago, Illinois.
To prepare, wastewater-based epidemiology (WBE) teams integrated WBE into incident management plans, prioritizing additional pathogens, optimizing lab workflows, and expanding sewer sampling networks near the venues. Sampling began six weeks prior to the events and continued daily during and after, allowing for detection of infections with longer incubation period. The efforts involved coordination with city health departments and academic partners for wastewater collection and analysis. A total of 112 samples were collected and analyzed for 11 pathogens, with results available within 12-36 hours. When pathogen thresholds were exceeded, additional surveillance methods were employed to confirm findings.

Appendix 5: Travelers' Health Resources and Resources

CDC Travelers' Health Notice Website:
CDC Travelers' Health Notices Website CDC uses Travel Health Notices (THNs) to inform travelers about global health risks during outbreaks, special events or gatherings, and natural disasters, and to provide advice about protective actions travelers can take to prevent infection or adverse health effects.

CDC Traveler-based Genomic Surveillance:
CDC's Traveler-based Genomic Surveillance system monitors trends in communicable pathogens or variants of public health importance identified at select airports through aircraft wastewater and anonymous traveler nasal swab sampling of arriving international travelers. If used and depending on the request of molecular testing, additional sample metadata will be available for the jurisdictions. Jurisdictions will be notified of pathogens or variants of public health importance; however, this information is not suitable for individual case finding or contact tracing. For more information on CDC's TGS program, visit: https://www.cdc.gov/traveler-genomic-surveillance/about/index.html

The Biothreats Emergence, Analysis and Communications Network (BEACON):
The Biothreats Emergency, Analysis and Communications Network (BEACON) is an open-source informal surveillance program designed to revolutionize global biothreats surveillance and response. Leveraging advanced artificial intelligence (AI), large language models (LLMs) and a network of globally based experts, BEACON rapidly collects, analyzes, and disseminates information on emerging infectious diseases affecting humans, animals, and the environment. Website information: Disease Events - BEACON

CDC Yellow Book:
CDC Yellow Book is a resource for healthcare professionals that compiles current travel health guidance for international travel. Contents include disease-specific information and context for public health considerations.

Protocol for Health Department Notification to CDC Port Health Stations of Persons Who Recently Traveled while Infectious: CSTE, with the assistance of a consultant and with input and funding from CDC subject matter experts within the Division of Global Migration and Health (DGMH), recently developed a *Protocol for Health Department Notification to CDC Port Health Stations of Persons Who Recently Traveled while Infectious* to standardize a bidirectional notification framework for STLT public health agencies and CDC to collaborate on the reporting and investigation of illness in persons who traveled while infectious.

- Training series (CSTE Connect login required): https://learn.cste.org/courses-page/course/protocol-for-health-department-notification-to-cdc-port-health-stations-of-persons-who-recently-trav

WHO Disease Outbreak News:
WHO provides Latest WHO Disease Outbreak News (DONs), which includes information on confirmed acute public health events or potential events of concern.

Appendix 6. Worker Safety and Health Materials and Resources

Emergency Response Health Monitoring and Surveillance System (ERHMS)
The ERHMS Framework provides recommendations for protecting emergency response and recovery workers in all phases of a response, including pre-deployment, deployment, and post-deployment.

Occupational Health Surveillance for Tracking Climate-related Impacts on Workers: Heat, Wildfires and Floods (2024)
Developed by the CSTE Occupational Health and Climate Change Workgroup, a workgroup of the CSTE Occupational Health Subcommittee; this resource can be used to accelerate occupational surveillance focused on heat, wildfires, and floods.

NIOSH Emergency Responder Health Monitoring and Surveillance Primer Offers step-by-step guidance for implementing ERHMS. Includes practical tools such as checklists, sample forms, and example questionnaires to support operational use.

Emergency Responder Health Monitoring and Surveillance National Response Team Technical Assistance Document (TAD) Provides detailed technical guidance and additional tools to assist agencies in implementing ERHMS across all operational phases.

Heat Illness Prevention Training and Planning
This training, developed by the University of Houston Clear Lake, is for employers, managers, and those responsible for developing and implementing health stress prevention programs. A train-the-trainer is provided as well as training for workers, pre/post-tests, and a model heat-illness prevention plan template. Available in both English and Spanish.

Preventing Heat-related Illness Resources for At-Risk Workers
A collection of multilingual tools and resources that can be shared.