Public Health Ontario | Santé publique Ontario

Hazard Identification and Risk Assessment (HIRA)

Infectious Diseases at the FIFA World Cup 2026 Games in Toronto

Report

January 2026

Public Health Ontario

Public Health Ontario is an agency of the Government of Ontario dedicated to protecting and promoting the health of all Ontarians and reducing inequities in health. Public Health Ontario links public health practitioners, frontline health workers and researchers to the best scientific intelligence and knowledge from around the world.

Public Health Ontario provides expert scientific and technical support to government, local public health units and health care providers relating to the following:

- communicable and infectious diseases
- infection prevention and control
- environmental and occupational health
- emergency preparedness
- health promotion, chronic disease and injury prevention
- public health laboratory services

Public Health Ontario's work also includes surveillance, epidemiology, research, professional development and knowledge services. For more information, visit publichealthontario.ca.

Disclaimer

Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Hazard Identification and Risk Assessment (HIRA): Infectious Diseases at the FIFA World Cup 2026 Games in Toronto. Toronto, ON: King's Printer for Ontario; 2026.

ISBN: 978-1-4868-9549-6

Table of Contents

Introduction

Purpose

Public Health Ontario (PHO) conducted a mass gathering (MG) HIRA to assess the potential likelihood and impact of infectious disease (ID) hazards while the City of Toronto hosts the Fédération Internationale de Football Association (FIFA) World Cup (FWC) 2026 games. The tournament will be a global event, and these findings were used to inform public health planning priorities, preparedness and response measures for potential ID hazards. Relevant audiences for this product include the local and provincial public health agencies, public health practitioners involved in planning or response activities, as well as other jurisdictional and international health authorities interested in MG risk assessments.

Risk Question

For the identified ID hazard group, what is the likelihood of the event of interest occurring during May 28, 2026, to August 2, 2026 (two weeks before and after the multi-site FWC tournament) and the impact to the public health capacity of Toronto and two neighbouring regions?

Scope

This assessment focused on ID hazards that may arise two weeks before, during, or two weeks after planned MGs as well as public health measures (PHMs) (i.e., non-pharmaceutical interventions to protect the health and well-being of communities)[1] and surveillance that can be implemented before and in response to potential ID hazards. Risk to public health capacity was assessed; environmental, non-ID, and bioterrorism hazards were out of scope for this HIRA and will be addressed through other risk assessment work.

Key Findings

- Based on the assessment completed on September 2, 2025, the following IDs or ID categories were assessed as having a moderate risk level for the FWC 2026 games:
    - Measles
    - Food and waterborne diseases
    - Coronavirus Disease 2019 (COVID-19)
- Food and waterborne illnesses are very common at MGs, as are respiratory illnesses, and have contributed to past public health investigations at Toronto MGs. Uncertainty around COVID-19 seasonality and circulating strains, and global measles activity and vaccination rates contribute to their potential for moderate risk at FWC 2026.

- All other IDs were rated at a low risk level considering outbreaks at past MGs, Ontario trends and existing preparedness, planning and response capacity. While other IDs were estimated as low risk, they still require planning and preparedness activities to mitigate potential exposures and impacts.
- Several planning considerations were recommended including:
    - Pre-event assessment activities monitoring local and global epidemiology trends
    - Planning for potential surge capacity for outbreak activities and public health investigations
    - Considering the feasibility and utility of enhanced surveillance during the tournament
- Public health planning should consider pre-/during/post-event targeted risk communications and educational messaging for visitors and local populations (e.g., respiratory etiquette, up-to-date vaccinations, hygiene practices), as well as promoting awareness on anticipated illnesses, risk factors, and infection control and prevention (IPAC) guidelines among frontline healthcare workers (HCWs).

Background

The FWC 2026 tournament will take place from June 11 to July 19, 2026. It will be jointly hosted by 16 cities in three North American countries. The main host country of matches is the United States of America (US; 11 host cities), while Canada (Toronto, Ontario, and Vancouver, British Columbia) and Mexico will be the auxiliary hosts. The City of Toronto will host six matches in the tournament starting June 12, 2026, and the last match in Toronto will be on July 2, 2026.

Compared to previous FWCs, FWC 2026 will have an additional 16 national teams participating (total of 48 teams). Although co-hosts (US, Canada, and Mexico) automatically qualified, at the time of completing this HIRA many other national teams were still in the process of qualifying for this tournament, and the anticipated number and nationalities of visitors was uncertain at the time. Due to the regional qualifying format for FWC, teams will represent all world regions. FWC draws large numbers of spectators and visitors to host cities (e.g., over one million visitors travelled to Qatar for the Qatar 2022 World Cup and over 1.8 million people joined live broadcasting events at the local FIFA Fan Festival park).[2]

International MGs pose a risk for the spread of IDs among participants, attendees, and local populations, which may lead to onward global spread. Multiple factors contribute to the level of risk including, but not limited to, circulating diseases and demographics of visiting and host populations, environment and seasonality, the type of MG event, and behaviours and interactions between host and visiting populations.[3] The FWC 2026 is a high-profile event that will likely receive substantial international attention, contributing to expectations that the host cities ensure the health and safety of participants, visitors, and organizers.

Host cities' public health preparedness, planning, and response capacity also determine the level of risk an ID poses. This risk analysis aims to inform local and provincial planning and response to IDs related to the FWC 2026 games in Toronto. PHMs for ID hazards, along with the public health capacity of Toronto Public Health (TPH) and two neighboring health units, Peel Region and York Region, were considered in the context of the FWC 2026.

Methods

This project applied PHO's MG HIRA methodologies and templates. To identify potential ID hazards and public health preparedness activities related to planned MGs, a PHO librarian-generated search strategy was used to obtain peer-reviewed and grey literature published between April 1, 2024, and April 21, 2025, building upon the European Centre for Disease Prevention and Control (ECDC)'s 2024 review of MG literature published between January 2014 to March 2024 (see the Literature Review section in the Technical Appendix for further details).[3] The included literature, epidemiological data, and additional-hand searched articles were then incorporated into evidence summaries on the exposure context and impact of IDs at planned MGs. These evidence summaries were then used to generate likelihood, impact, and overall risk estimates of the ID hazard event(s) of interest (see the Risk Estimation section in the Technical Appendix for definitions and further details). PHO subject matter experts (SMEs) were then consulted to validate the evidence summaries, ID event(s) of interest, risk estimates and rationales. These analyses were based on data and emerging evidence available to PHO at the time of assessment (July to August 2025) and has several important limitations and knowledge gaps that affect estimates of likelihood, impact, and uncertainty to assess the risk level. Notably, this assessment was conducted a year before the FWC 2026 event (i.e., June to July 2026), the origin of travellers coming to watch Toronto matches is unknown and emerging IDs and international epidemiological trends are subject to change over the next year.

Where appropriate, evidence summaries and risk estimates were considered at the level of ID hazard group: food and waterborne diseases, vector-borne and zoonotic diseases (VBZDs), sexually transmitted and blood borne infections (STBBIs), vaccine preventable diseases (VPDs), respiratory illnesses, antimicrobial resistant organisms (AROs), and other emerging diseases (e.g., A(H5N1)). Specific diseases or pathogens were considered individually where warranted (e.g., higher risk than overall ID hazard group or different event of interest). Where relevant, populations most vulnerable to ID exposures and/or impacts were described (e.g., visiting, host, demographics, etc.). To assess the risk for each ID hazard grouping, the likelihood and impact were assessed and used with the risk matrix to assign one of three risk levels (high, moderate, low) for the following risk question: For the identified ID hazard group, what is the likelihood of the event of interest occurring during May 28, 2026, to August 2, 2026 (two weeks before and after the multi-site FWC tournament) and the impact to the public health capacity of Toronto and two neighbouring regions?

Note, the risk to Toronto, Peel Region and York Region was considered as these three PHUs are anticipated to receive and host FWC 2026 visitors and events. Assignment of risk level reflects the evidence included in this HIRA (up to July 24, 2025). For more information, please see Appendix A: Technical Notes.

Results

Summary of HIRA Findings

The current PHO review of MG literature aligns with the findings from other recent reviews by ECDC and Santé publique France in preparation for the 2024 Paris Olympic and Paralympic Games (OPGs): summer MG sporting events have historically been associated with sporadic cases or clusters of IDs, namely respiratory and gastrointestinal (GI) illnesses, but not any major outbreaks.[3,4] While some imported pathogens may circulate, the seasonality (summer) and outdoor venues are not typically conducive for sustained person-to-person spread of respiratory diseases, international visitors are often coming from high income countries with sufficient access to care, and cases reported at sporting MGs are typically common IDs for which public health systems are well prepared and have previous experience with.[4]

Table 1 provides an overview of ID hazards and the risk level estimate in response to the risk question. Summaries of the rationale, evidence, likelihood and impact estimates for these estimates can be found in the Summary of Rationale for Risk Estimates section. Specific diseases or pathogens were considered individually if they were anticipated to have a higher level of risk than the overall ID group, different events of interest than the overall ID group, or are diseases of international concern, for example. Overall ID hazard group risk estimates do not include disease-specific estimates within that group (e.g., the VPDs estimate does not include measles).

Table 1: Summary of Risk Estimates by ID Hazard Group

Disease	Risk Estimate
Vaccine-preventable Diseases (VPDs)	**Low**
Measles	**Moderate**
Food and Waterborne Diseases	**Moderate**
Vector-borne and Zoonotic Diseases (VBZDs)	**Low**
Respiratory Viruses	**Low**
COVID-19	**Moderate**
Influenza A & B	**Low**
Legionellosis	**Low**
Tuberculosis (TB)	**Low**

Disease	Risk Estimate
Sexually Transmitted and Blood Borne Infections (STBBIs)	**Low**
Mpox	**Low**
Antimicrobial Resistant Organisms (AROs) and Infections	**Low**
Other IDs: Avian Influenza A(H5N1)	**Low**
Other IDs: Viral Hemorrhagic Fevers (VHFs)	**Low**
Other IDs: Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV)	**Low**

Summary of Rationale for Risk Estimates

Rationales were based on evidence from the peer-reviewed and grey literature and PHO and external data (e.g., integrated Public Health Information System (iPHIS), Public Health Agency of Canada (PHAC) and World Health Organization (WHO)). In addition, an internal SME review of synthesized information was conducted to validate likelihood, impact, and risk estimates. The key references provided below do not represent an exhaustive list of all the evidence reviewed. Further details are available upon request.

Unless stated otherwise, the uncertainty associated with ID-specific risk estimates was low. As stated earlier, there is a general uncertainty for all risk estimates given that participating nations and international visitors are unknown at this time, and that emerging IDs and international epidemiological trends are subject to change between now and the tournament.

For events of interests that reference “expected levels of disease”, expected refers to the anticipated baseline level of disease observed in the City of Toronto summer context. Every year the city hosts an influx of visitors/tourists and large events such as Pride, Major League Baseball games, concerts and street and food festivals. As such, increases in some illnesses are anticipated every summer along with greater numbers of visitors.

Vaccine-preventable Diseases (VPDs)

Examples: Mumps, Rubella, Pertussis, Polio, Invasive Meningococcal Disease (IMD), Invasive Pneumococcal Disease (IPD)

Event(s) of interest: Increase in VPDs beyond expected levels during the summer months when FWC 2026 will be held; a single case or outbreak of invasive meningococcal disease (IMD).

Risk Level: Low

Likelihood: Unlikely

VPD activity has increased globally due to decreased immunization rates and slower catch-up of routine vaccinations after the COVID-19 pandemic.[5] VPD clusters and outbreaks have occasionally been reported at past MGs.[6–9] With the influx of international visitors for FWC, importation-related cases of select VPDs may occur in host PHUs (e.g., pertussis, varicella, IMD). Historically, pertussis and invasive pneumococcal disease (IPD) trends (2022–2024) for local PHUs and Ontario are highest in the summer months (July–September).[10]

Impact: Moderate

Severe health outcomes are more often seen among the unvaccinated, children, elderly and individuals with weakened immune systems (i.e., not the anticipated main demographic of the FWC visiting population and spectators).[11–14] Although Toronto and neighboring regions have relatively good vaccination coverage, they are generally below the national vaccination coverage goals.[15] Unimmunized or under-immunized persons and communities within these PHUs would be at greater risk of disease. A single case or cluster of IMD occurring within a group in close-contact settings (e.g., teammates) could potentially result in a high workload for the affected PHU (e.g., case and contact management, post-exposure prophylaxis (PEP)). Cases or clusters during FWC 2026 might receive media attention but are expected to be manageable within existing PHUs.

Measles

Event(s) of interest: Cases in FWC 2026 visiting populations.

Risk Level: Moderate

Likelihood: Likely

Amidst the global rise in measles activity, Toronto and neighboring regions have seen an increase in international travel-related/imported cases since 2022.[16,17] Global vaccine delivery and immunization catch-up has not yet returned to 2019 levels and FWC visitors may be arriving from countries with lower immunization coverage.[5,18] The current multi-jurisdictional measles outbreak in Ontario has had limited impact in Toronto and neighboring regions; unimmunized and under-immunized communities are predominantly affected.

Impact: Major

If an outbreak linked to Toronto or neighboring regions occurred, short-chains of transmission are most likely given the relatively high, albeit below the 95% target vaccination coverage in local populations.[15] However, even a single case would result in a high workload related to case and contact management (e.g., notification of individuals/organizations/public, the assessment of immunization status, isolation, and post-exposure prophylaxis). If international cases are linked with the current multi-jurisdictional outbreak, the affected PHU would be brought into the ongoing provincial response, if not already included. There is moderate uncertainty associated with this evidence. Existing MG evidence did not report on events occurring within the context of an existing measles epidemic. If the current multi-jurisdictional/US/Mexico measles outbreak is ongoing by FWC 2026, it is unclear what local and federal/provincial/territorial (FPT) operational changes will have been made to manage a measles-endemic status.

Food and Waterborne Diseases

Examples: Food Poisoning/Gastrointestinal (GI) Illness, Norovirus, Salmonellosis, Verotoxin-producing *Escherichia coli* (VTEC), Hepatitis A, Shigellosis, Cryptosporidiosis

Event(s) of interest: Clusters/outbreak of GI illnesses related to FWC 2026-related events.

Risk Level: Moderate

Likelihood: Very Likely

An increase in GI illness is among the most reported events at MGs.[4,9,19] Locally, GI illnesses also increase during the summer months when FWC 2026 will be held. Public health surveillance of the 2015 Toronto Pan/Parapan American Games led to 12 investigations related to GI illness or food/water safety violations.[20] Adherence to existing food and water safety testing and reporting protocols, guidelines, as well as enhanced event-based inspections should help mitigate most exposures.[21,22]

Impact: Moderate

Many food- and waterborne infections are self-limiting and resolve without medical intervention among an otherwise healthy population. Severe cases may require hospitalization and would be detected through existing surveillance mechanisms. PHUs are anticipated to manage most clusters or outbreaks, although any large outbreaks may require substantial epidemiological and food safety investigations to identify a source and could attract media attention particularly if a food vendor/restaurant is directly associated with the event (e.g., stadium vendor). For example, exposure to a case of hepatitis A could potentially result in offering PEP to a large number of contacts (e.g., the case is a team member living in a household setting with other athletes; case is a food handler at a FWC event).

Vector-borne and Zoonotic Diseases (VBZDs)

Examples: Lyme disease (LD), West Nile Virus (WNV), Anaplasmosis

Event(s) of interest: Clusters of VBZDs.

Risk Level: Low

Likelihood: Very unlikely

Toronto and surrounding areas are established risk areas for vectors that carry tick- and mosquito-borne illnesses (LD and WNV) and human cases are commonly reported during the same time period as when the FWC 2026 will be held.[23] Autochthonous transmission of non-endemic VBDs is considered very unlikely due to very limited local vector population, but sporadic importations of non-endemic VBDs may occur. Other reportable and/or endemic zoonotic diseases in Ontario (e.g., Q fever and rabies) are extremely rare and/or the 5-year average year-to-date count is 0 to 10 cases.[24] Clusters of VBZDs are not commonly reported at MGs, even at past sporting events where host countries have had concurrent outbreaks (e.g., Zika – Brazil and Dengue – France).[3,4,25] Proactive, targeted vector-borne control is identified as the most important preventative measure to limit exposures.[26]

Impact: Minor

VBZDs require a competent vector or zoonotic reservoir for onward spread, are not transmitted person-to-person, and illnesses are for the most part self-limiting and do not require hospitalization. Early detection of some VBZDs (e.g., LD) is important to prevent severe disease.[27,28] National and international travel health advice generally includes guidance on preventative measures for insect bites, and early healthcare consultation if symptoms are present.[26]

There is moderate uncertainty with this estimate given the long incubation periods and potentially limited awareness of local vectors and symptoms among visiting populations means an increase of cases during the FWC 2026 may go undetected or fall outside the risk period.

Respiratory Viruses

Examples: Respiratory syncytial virus (RSV) and Non-influenza/COVID-19 Respiratory Viruses

Event(s) of interest: Increase in respiratory illnesses above expected levels and/or FWC 2026-related outbreaks.

Risk Level: Low

Likelihood*:* Likely

Increases in respiratory diseases are the most common infectious illnesses reported in relation to MGs.[3,4,19] Clusters and cases via syndromic surveillance have been noted at similar types of MGs. In Ontario, several non-influenza viruses have spring/summer surges (i.e., entero/rhinovirus, human metapneumovirus, parainfluenza, and adenovirus) that may overlap with the FWC 2026.[29] Many of these viruses predominantly affect children and transmission is more likely in indoor crowded settings.[3] As official FWC 2026 venues are outdoors, spread is expected to be minimal.

Impact: Minor

Most respiratory illnesses are mild and resolve without medical intervention. Respiratory disease more commonly results in severe outcomes at the extremes of age or in the presence of comorbidities.[19] Although this does not represent the predominant visiting demographic typically observed at FWC events, groups at higher risk of severe disease are part of the host population in Toronto.[11–13] Available public health interventions (e.g., public health messaging on proper hand hygiene and respiratory etiquette) can further minimize the population impact.

COVID-19

Event(s) of interest: Large surge in COVID-19 activity and/or severe outcomes and/or FWC 2026-related outbreaks.

Risk Level: Moderate

Likelihood: Likely

COVID-19 clusters and increased rates related to MGs have been reported.[3,19,25,30,31] Recent COVID-19 surveillance periods in Ontario suggest COVID-19 activity can increase during the time-period of interest.[32] While open air venues help minimize transmission, short-range transmission is still possible in high density settings.[33]

Impact: Moderate

Impact depends on the circulating variant and whether the existing population's immunity (either natural or via vaccine) mitigates the severity of disease outcomes. Vaccine booster uptake has been low, although those most at risk of severe disease are more likely to have received a recent booster.[34] Additionally, there are existing protocols and PHMs to respond to a COVID-19 outbreak.

There is moderate uncertainty associated with this estimate since the MG literature reflects heightened surveillance and reporting of COVID-19 at MGs during and following the pandemic. The impact will vary based on circulating variant(s) and population immunity at the time of the tournament. However, recently most circulating variants, including new variants of interest, tend to have increased transmissibility and/or immune evasion without necessarily being more virulent.[35,36]

Influenza A and B

Event(s) of interest: Increase of influenza activity beyond seasonally expected levels.

Risk Level: Low

Likelihood: Unlikely

Some influenza outbreaks and restricted clusters have been reported at MGs,[3] particularly where overcrowded conditions or close living quarters have favoured onward spread.[8,19,37] However, influenza activity is generally low in Ontario and Canada during the FWC 2026 period. Although visiting populations may arrive sick with seasonal influenza viruses where the local population is not immune,[32,38] the season and open-air venues at FWC 2026 are not conducive to sustained spread.

Impact: Minor to Moderate

Severe illness (e.g., requiring hospitalization) is more common among young children and elderly populations, while attendees, including international visitors, of FWC events have predominantly been adult males.[11–13] If a novel virus, or virus to which the local population is not immune, is introduced this may cause more illness than is typically observed in the summer months. Cluster or outbreaks reported at open air MGs have typically been small (e.g., 2 to 30 cases per 100,000 attendees) and would be expected to be manageable by PHUs.[4,9]

Legionellosis

Event(s) of interest: Legionellosis cluster during the FWC 2026 period.

Risk Level: Low

Likelihood: Unlikely

Legionellosis is a common health priority with indoor MG venues.[3,39] Fortunately, only one legionellosis outbreak was reported over 20 years ago that involved international visitors at a FWC tournament.[4] Although FWC 2026 official sites will be outdoor open-air venues, common legionellosis exposures (e.g., cooling towers) are not limited to specific venue sites and aerosolized contaminated water could present an exposure risk. While Ontario legionellosis rates increased between 2012 to 2021, they have remained stable over the last 5 years and no outbreaks have been reported in Toronto or neighboring regions in recent years.[40]

Impact: Moderate

Legionellosis is a reportable disease, and severe cases (e.g., Legionnaire's disease) would be detected through existing surveillance. Legionellosis investigations can require intensive efforts to identify and test potential sources of contamination.[41] However, it is anticipated that PHUs would have sufficient control measures and resources to implement.

Tuberculosis (TB)

Event(s) of interest: FWC-cluster of TB cases.

Risk*:* Low

Likelihood: Very Unlikely

TB typically requires prolonged close contact settings for human-to-human transmission.[42] TB has been considered a risk in MG settings where participating populations may be coming from high TB, TB-human immunodeficiency virus (HIV), or TB-multidrug resistant/rifampicin resistant burden countries (e.g., the Hajj, Kingdom of Saudi Arabia, or Kumbh Mela, India). Even in these settings, TB outbreaks or large transmission events have not been reported.[3,43,44] Toronto is one of the PHUs with the highest rates of TB (11.5 per 100,000 population between Oct 1, 2023, to Sept 30, 2024)[45] in part due to a greater proportion of people immigrating from higher TB-burden countries. Overall, Canada's rate of TB disease is among the lowest in the world (5.5. TB cases per 100,000 population in 2023) and disproportionately impacts Inuit, First Nations and persons born outside of Canada.[46]

Impact*:* Moderate

TB's incubation period can be weeks to years. As such, if a case or cluster is confirmed among FWC 2026 attendees or participants, post-game surveillance would be needed to link further cases. As one of the PHUs with the highest TB rates, Toronto is experienced in managing TB cases/contacts.

Sexually Transmitted and Blood Borne Infections (STBBIs)

Examples: Chlamydia, Gonorrhea, Syphilis, HIV, Hepatitis B/C

Event(s) of interest: FWC 2026-related STBBI cluster or outbreak.

Risk Level: Low

Likelihood: Likely

No large STBBI outbreaks were reported in the MG literature, although, STBBIs are commonly reported with sporting and music MGs.[9] These events often attract younger demographics who are disproportionately impacted by STBBIs in Canada and globally.[11–13] The visiting FWC 2026 population is likely to overlap with this demographic (~30-50 years of age, predominantly male) and some evidence suggests increased substance use and risky sexual behaviours at sporting MGs.[3,9,11,47] Some literature suggests that MG sporting events may correlate with increased commercial sex work and may correspond with an increase in the number of STIs.[19]

Impact: Minor

Treatment and supportive care are available for most STBBIs, although cases of antimicrobial and multi-drug-resistant strains are a concern (e.g., gonorrhea and *Shigella*).[47–54] STBBIs are likely to go under-diagnosed or underreported at MGs.[19] Any cases or clusters during FWC 2026 would be expected to be manageable for host PHUs and dedicated resources within the health system (i.e., sexual health clinics).

There is moderate uncertainty associated with this estimate. Some STBBIs have short incubation periods (e.g., gonorrhea), while others like chlamydia and syphilis have long incubation periods (e.g., a few weeks).[9] Given the length of FWC 2026, it would be possible to see increased STBBI risk. There is limited evidence on the FWC 2026 visiting populations and behavioural risk factors for acquiring infections.

Mpox

Event(s) of interest: Mpox cluster linked with FWC populations and/or clade Ia or Ib case detected.

Risk Level: Low

Likelihood: Unlikely

MGs with increased risky behaviours/sexual activities contributed to transmission during the clade IIb pandemic.[3,55] All cases reported in Canada have been clade II, except for one clade Ib case that had recent travel to a country experiencing an ongoing outbreak.[56] Toronto has the highest proportion of mpox cases in Ontario, mostly among gay, bisexual, and other men who have sex with men (gbMSM).[57,58] Ontario experienced an outbreak of mpox in 2022 corresponding with global spread of clade IIb, followed by low activity levels in 2023, and a resurgence in 2024 in the late spring and summer, which would overlap with the FWC 2026 risk period.[57] The majority of cases in 2024 and 2025 reported no travel before their infection indicating ongoing local transmission.[57]

Impact: Minor to Moderate

In Canada, most mpox infections have been mild and resolved with sufficient supportive care. Mpox is self-limiting and often does not cause severe disease or hospitalization, especially among vaccinated individuals.[55,57] Vaccines are available for populations at higher risk. Current surveillance and reporting systems are anticipated to be able to detect cases and signal undetected community transmission. If one case of either clade Ia or Ib were detected, it may require more intensive case and contact management by the PHU to limit spread, but it is anticipated PHUs could manage with their existing resources.

There is moderate uncertainty associated with this estimate. Evidence on mpox exposure and impact in high-income countries is mostly based on clade II. Ongoing clade I outbreaks in Africa provide continued opportunities for the virus to evolve and risk factors for infection, transmission, and severe illness may change.

Antimicrobial Resistant Organisms (AROs) and Infections

Event(s) of interest: Increased antimicrobial resistant (AMR) infections detected among FWC populations or introduced into hospital settings.

Risk Level: Low

Likelihood: Very Unlikely

Most MG-related AROs/AMR infections have been documented at the Hajj event in Saudia Arabia,[44] where overcrowding and sanitation can be a challenge and visiting populations are older compared to what might be expected with visiting FWC populations.[11–13] A history of hospitalization, particularly in low- and middle-income countries, as well as the US (where there has been exponential growth in colonization and infections of *Candida auris*), is a risk factor for AROs.[59–61] Additionally, Methicillin-resistant *Staphylococcus aureus* (MRSA) infections may be a particular concern for athletes.[62] However, clusters of AMR infections have not typically been reported in the MG literature.[3]

Impact: Moderate

Access to treatment may be difficult depending on the pathogen, type of infection (i.e., hospital or community-associated) and what treatment options have been authorized for use in Canada.[61] Adherence to ARO appropriate screening protocols in hospital and implementing appropriate IPAC would help limit onward spread. In Ontario hospitals, screening protocols and precautions are most common for MRSA and *Clostridioides difficile* but are inconsistent for other pathogens.[59]

Other IDs: Avian Influenza A(H5N1)

Event(s) of interest: First reported or increase in human influenza A(H5N1) case(s).

Risk Level: Low

Likelihood: Very unlikely

Avian influenza A(H5) human infections are rare but primarily occur through close unprotected contact with infected animals or contaminated environments. Avian influenza viruses have not shown the ability for sustained human-to-human transmission.[63] Risk of acquiring an infection is considered low for the general population, but low to moderate for those with occupational exposures or frequently exposed (e.g. backyard poultry).[64,65]

Impact: Moderate to Major

Ontario and Canada have existing control measures (i.e., surveillance, laboratory capacity, IPAC guidelines) that can be mobilized.[66] A single case would result in high media interest and likely an FPT response to support lab investigation and international reporting.

There is moderate uncertainty associated with this estimate. Current understanding of mild human illness have largely come from enhanced surveillance conducted by the US Centers for Disease Control (CDC) over the last year.[65] The US CDC has deactivated their highly pathogenic avian influenza (HPAI) emergency response; therefore, it is unclear how this will impact active human and zoonotic surveillance efforts and epidemiological understanding of the disease.[67]

Other IDs: Viral Hemorrhagic Fevers (VHFs)

Examples: Crimean-Congo Haemorrhagic Fever, Ebola Virus Disease, Marburg Virus Disease, Lassa Fever

Event(s) of interest: One imported (suspected or confirmed) case

Risk Level: Low

Likelihood: Very unlikely

VHFs are not endemic to Ontario or Canada. Despite past and ongoing outbreaks globally, no cases have been reported in Canada since 2002 (i.e., when the disease group was re-listed as a nationally notifiable disease).[68] The PHO and ECDC literature reviewed did not report any VHF cases or clusters in association with MGs.[68]

Impact: Major

Even a suspected case requires immediate IPAC measures and public health investigation and would require national and international collaboration. There is existing guidance for IPAC and coordination of sector supports for suspected or confirmed VHF cases in acute care settings.[68–70] Past imported cases to the US and Europe have resulted in limited onward transmission and have typically only been among HCWs providing direct patient care.[71,72]

Other IDs: Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV)

Event(s) of interest: One suspected MERS-CoV case.

Risk: Low

Likelihood: Very Unlikely

MERS-CoV is often considered a risk for MGs in the Middle East (e.g., the Hajj), where the virus circulates and people may come into contact with the zoonotic vector (camels).[73] Human-to-human transmission is possible, but is less common and requires prolonged close contact.[73] Over 90% of all MERS-CoV cases have been reported in the Arabian Peninsula, some cases have been reported in association with participation in Umrah, but there's been no evidence of onward transmission. MERS-CoV is considered to be very unlikely in the FWC 2026 context given the outdoor setting and that prolonged close contact settings are often required for human-to-human transmission.[42,73]

Impact: Major

Most confirmed MERS-CoV cases have had severe respiratory illness and 35% of all reported cases have died.[74] Clusters and outbreaks have been reported in healthcare facilities treating a case where there has been inadequate or inappropriate IPAC measures.[74] A single case of MERS-CoV in a host PHU would be globally significant and require provincial and federal involvement to support testing and international reporting.

Planning Considerations

Where existing surveillance is robust, the recommendation is to build upon these systems and resources in preparation for a MG event. For example, the 2024 Paris OPGs largely relied on existing surveillance systems, but also leveraged seasonal surveillance systems (e.g., environmental – heatwave and vector-borne data) and extended wastewater surveillance to other priority pathogens.[39] Systems that were stood-up for the OPGs included non-specific or syndromic surveillance through emergency responder data and epidemic intelligence conducted by ECDC.[3,4]

For FWC 2026, some PHO SMEs noted enhanced surveillance could consider integration of iPHIS, Public Health Ontario Laboratory (PHOL) testing, and test results with syndromic surveillance mechanisms such as medical encounters to FIFA-specific medical clinics, calls to Telehealth Ontario, or use of hospital visit triage information from acute care hospitals across Ontario. The potential role of enhanced surveillance, including syndromic surveillance, should be considered alongside evidence from previous MGs in Ontario. During the 2015 Toronto Pan/Parapan American Games, syndromic surveillance was not found to provide early or unique notification for events and events that were reported through syndromic surveillance could not be validated.[20] Rather, enhanced communication systems (e.g., Public Health Coordinator, surveillance teleconferences, and extended hours/on-call process) were the primary sources of early notification to surveillance partners for new investigations.[20] One narrative review also noted that public health surveillance systems may be swamped by the effort required to validate each syndromic surveillance signal.[4]

In the Toronto, Ontario, and Canadian contexts, there is generally robust surveillance across different ID hazards. PHO outlined several planning considerations for pre-event public health activities to enhance ID awareness, detection, and preparedness. The following are general planning considerations from PHO and, where relevant, supporting insights from the literature followed by a summary of more specific considerations for IDs categories identified as having a moderate risk level. Additional planning considerations for ID categories identified as low risk are available upon request.

Pre-event

The following are activities for provincial and local authorities involved in planning and response plans to consider conducting in advance of the FWC 2026 games:

- Conduct proactive surveillance and assessments of local and global epidemiological trends for VPDs, VBZDs, respiratory diseases, STBBIs, HPAI, and VHF IDs with a particular focus on FWC 2026 participating countries to provide situational awareness. Within the above-mentioned ID categories, consider the global measles situation, and epidemiological/genomic trends of COVID-19 for proactive surveillance and assessments closer to the FWC 2026 tournament dates.
- Discuss the utility and feasibility of expanded sentinel wastewater surveillance.

- Consider the benefits and limitations in using syndromic surveillance and that data sources or methods used require sufficient time for training and gathering baseline data and trends.
- Define clusters or event(s) of interest that will alert and warrant further public health investigation and consider whether these need to be more sensitive during the FWC 2026 risk period based on estimated risk, resources and feasibility.
- Develop communication mechanisms to report and respond to health alerts and/or outbreaks across PHUs and host cities.
- Ensure mechanisms to receive laboratory reports are robust and ready so that reports are processed efficiently and that systems have adequate surge capacity.
- Standardize surveillance reporting across the involved PHUs and deliver training to staff that will use these systems.[20] Consider how reporting of human health surveillance will be integrated with other environmental factors or signals even in the absence of human illness (e.g., food handling and water safety issues at venues).
- Plan communication campaigns to increase awareness of any recommendations for the public (e.g., maintaining up-to-date vaccinations, practicing hand hygiene and respiratory etiquette) and HCWs (particularly emergency departments, primary care, others) covering relevant guidance on ID diagnosis, treatment and/or reporting.
- Consider performing table-top/simulation exercises to validate response protocols particularly with potential major impact pathogens (e.g., measles, influenza A(H5N1) and VHFs).

During

The following are activities for provincial and local authorities involved in planning and response plans to consider conducting during the FWC 2026 games:

- Enhance awareness among HCWs of clinical suspicion for measles and off-season respiratory illness among individuals who have travelled to attend FWC 2026.
- Enhance communication mechanisms (e.g., a public health coordinator, surveillance teleconferences, and extended hours/on-call process) to ensure timely and efficient detection and notification of sporadic ID cases to surveillance partners.
- Continue to scan local, national and global public health signals that might warrant action or impact FWC 2026. Consider leveraging existing networks, such as the Global Public Health Intelligence Network (GPHIN) daily reporting and use of event-based reporting systems such as the WHO's Epidemic Intelligence from Open Sources system (EIOS).

Post-event

The following are activities for provincial and local authorities involved in planning and response plans to consider conducting in the weeks following the FWC 2026 games:

- Continue post-event enhanced surveillance and reporting, as some IDs have longer incubation periods past the end of the FWC 2026.
- Continue communication campaigns to promote public health risks and awareness for visitors with extended stays and frontline HCWs.

Other Planning Considerations

Considerations for Moderate Risks

COVID-19 and Measles were rated as moderate risk in part due to future uncertainties around the COVID-19 spring/summer activity and predominant strains, and the possibility of measles outbreaks in Ontario occurring during FWC 2026. These should be among diseases prioritized for pre-event monitoring and assessment activities (prioritizing global activity from nations with teams playing in Canada) to identify what additional measures should be taken for enhanced outbreak detection, reporting during the tournament, enhanced frontline HCW awareness, and surge capacity.

For COVID-19, PHO recommends leveraging existing integrated respiratory virus surveillance to monitor local and global activity for COVID-19 as well as influenza and RSV. For example, PHAC produces a biweekly (during the summer and weekly in-season) Canadian respiratory virus surveillance report summarizing activity for COVID-19, as well as influenza and RSV.[29] PHO also maintains the Ontario Respiratory Virus Tool (ORVT) which provides information on trends of Ontario and PHUs' respiratory activity year-round.[75] WHO also routinely publishes risk assessments of emerging variants of interest and reports on Global COVID-19 activity. These existing information sources could be built into enhanced reporting for FWC 2026.

For measles, PHO recommends that, if possible, FWC participants (e.g., athletes and staff) travelling to Canada should be encouraged to have copies of their immunization records available to ensure timely assessment of contacts of measles cases. They also recommended enhancing frontline HCW awareness and clinical suspicion for measles among FWC related travellers as it supports timely notification, diagnosis, appropriate specimen collection, and IPAC measures. Lastly, it is important to ensure there is sufficient capacity and FPT coordination to support additional surveillance and outbreak activities in the event of an outbreak.

Food and waterborne diseases were also rated as a moderate risk since they are very commonly reported at MG events and can increase locally in the summer. During the 2015 Pan/Parapan American Games, 12 of 18 public health investigations were for GI illnesses or food/water safety violations,[20] and should be anticipated for FWC 2026. PHO SMEs recommended creating additional capacity to support

public health inspection activities of food vendors and facilities including water storage or tanks associated with food trucks (i.e., pre-event and during the event as relevant). To facilitate laboratory testing, consider the feasibility of providing stool testing kits with instructions on how to complete lab requisitions and submit specimens to HCWs at FWC medical tents. HCWs should also be aware of where they can send suspect cases of hepatitis A for serological testing.

Additional low risk disease group-specific considerations are available upon request.

Future Risk Assessment Considerations

This HIRA was conducted over 10 months in advance of FWC 2026. The following are risk assessment activities to consider conducting closer to June 2026:

- **Partner validation:** the current estimates have been reviewed and validated by PHO; additional input from local and provincial public health experts supporting FWC 2026 preparedness should be used to further validate and contextualize the findings and planning implications.
- **Re-evaluation of risk estimates:** identify time(s) prior to FWC 2026 when risk estimates will be re-evaluated based on updated information.
- **Identify triggers for assessment/re-evaluation:** in addition to a set time for re-evaluation, identify evidence-based triggers for re-assessment of risk estimates (e.g., changes in incidence, transmission, severity, geography, status of ongoing outbreaks, etc.) and the assessment of new hazards (e.g., new Public Health Emergencies of International Concern).
- **Assess risk of bioterrorism:** ID bioterrorism risks (e.g., anthrax and plague) were not considered in this HIRA. If not already addressed elsewhere, the likelihood and impact of ID bioterrorism agents and other chemical, biological, radiological, nuclear and explosive (CBRNE) hazards should be considered in future assessment activities, including the collaboration required between PHUs, laboratory services, municipal and FPT agencies.[76]
- **Continued FPT-PHU collaboration:** PHO will continue to support risk assessment activities in collaboration with local and provincial partners for FWC 2026, including liaising with SMEs and federal counterparts as required.

Conclusions

This HIRA summarized evidence on IDs associated with MGs and their likelihood and impact in the FWC 2026 context. High densities of people and crowded accommodations and facilities can facilitate the spread of IDs at MGs, particularly respiratory and food and waterborne illnesses. Official FWC 2026 sites will be outdoor venues (i.e., BMO field, Fort York and The Bentway Fan Zone, and Centennial Park training facility). While outdoor venues can decrease the likelihood of sustained person-to-person or respiratory transmission, transmission is still possible particularly where there is a high-density of people or where there are common sources of exposure such as food vendors or contaminated water sources. Based on the MG literature and historical disease trends in Ontario, the current risk assessment estimated the risk of COVID-19, food and waterborne illnesses, and measles to be moderate, while all other IDs were estimated to be low risk. COVID-19, measles, and food- and waterborne illnesses should be among the diseases prioritized for pre-assessment activities to monitor global and local epidemiology ahead of FWC 2026; additional consideration should be given for what enhanced outbreak detection, surveillance methods and potential surge capacity are warranted and feasible for public health to undertake.

Although IDs reported at warm weather and predominantly outdoor sporting MG events have mostly been sporadic cases or restricted clusters, a comprehensive enhanced surveillance plan that can detect and manage all IDs hazards is still important. Prevention and preparedness strategies should be implemented at three stages: pre-event, during the event and post-event (e.g., post-event enhanced surveillance). Even for IDs assessed as low risk, activities across these stages will be important including health promotion activities, risk communication, planning for public health and health system surge capacity (especially if there may be concurrent MG events), and minimizing potential exposures through food safety inspections and vector control, for example. Overall, with increased visitors to Toronto, some level of increased illness is to be expected with FWC 2026. However, proactive, collaborative and comprehensive planning, surveillance and response activities should minimize the risk of large outbreaks and the public health burden.

References

1. World Health Organization (WHO). Public health and social measures during health emergencies [Internet]. Geneva: WHO; 2025 [cited 2025 Aug 29]. Available from: https://www.who.int/initiatives/who-public-health-and-social-measures-initiative

2. Fédération Internationale de Football Association (FIFA). 2022 at a glance: FIFA World Cup Qatar 2022 [Internet]. Zurich: FIFA; 2022 [cited 2025 Jul 24]. Available from: https://publications.fifa.com/en/annual-report-2022/2022-at-a-glance/fifa-world-cup-qatar-2022-summary/

3. European Centre for Disease Prevention and Control (ECDC). Mass gathering events and communicable diseases: considerations for public health authorities: 14 June 2024. [Internet]. Stockholm: ECDC; 2024 [cited 2025 May 1]. Available from: https://data.europa.eu/doi/10.2900/776940

4. Gallien Y, Fournet N, Delamare H, Haroutunian L, Tarantola A. Epidemiological surveillance and infectious disease outbreaks during mass international summertime sports gatherings: a narrative review. Infect Dis Now. 2024;54(4S):104889. Available from: https://doi.org/10.1016/j.idnow.2024.104889

5. GBD 2023 Vaccine Coverage Collaborators. Global, regional, and national trends in routine childhood vaccination coverage from 1980 to 2023 with forecasts to 2030: a systematic analysis for the global burden of disease study 2023. Lancet. 2025;406(10500):235-60. Available from: https://doi.org/10.1016/S0140-6736(25)01037-2

6. World Health Organization (WHO). Disease outbreak news: invasive meningococcal disease - Kingdom of Saudi Arabia [Internet]. Geneva: WHO; 2025 [updated 2025 Apr 11; cited 2025 Jul 7]. Available from: https://www.who.int/emergencies/disease-outbreak-news/item/2025-DON563

7. Vachon MS, Barret AS, Lucidarme J, Neatherlin J, Rubis AB, Howie RL, et al. Cases of meningococcal disease associated with travel to Saudi Arabia for Umrah pilgrimage – United States, United Kingdom, and France, 2024. MMWR Morb Mortal Wkly Rep. 2024;73(22):514-6. Available from: https://doi.org/10.15585/mmwr.mm7322e1

8. Parker S, Steffen R, Rashid H, Cabada MM, Memish ZA, Gautret P, et al. Sacred journeys and pilgrimages: health risks associated with travels for religious purposes. J Travel Med. 2024;31(8):taae122. Available from: https://doi.org/10.1093/jtm/taae122

9. Botelho-Nevers E, Gautret P. Outbreaks associated to large open air festivals, including music festivals, 1980 to 2012. Eurosurveillance. 2013;18(11):20426. Available from: https://doi.org/10.2807/ese.18.11.20426-en

10. Ontario. Ministry of Health. integrated Public Health Information System (iPHIS). Average monthly counts and rates across Ontario, York, Peel, and Toronto PHUs (2022-2024) for measles, invasive meningococcal disease (IMD), mumps, pertussis, invasive pneumococcal disease (IPD) [data set]. Toronto, ON: King's Printer for Ontario; 2025 July [extracted 2025 Jun 12].

11. Eberhardt KA, Vinnemeier CD, Dehnerdt J, Rolling T, Steffen R, Cramer JP. Travelers to the FIFA World Cup 2014 in Brazil: health risks related to mass gatherings/sports events and implications for the summer Olympic Games in Rio de Janeiro in 2016. Travel Med Infect Dis. 2016;14(3):212-20. Available from: https://doi.org/10.1016/j.tmaid.2016.05.014

12. Turco DM, Tichaawa TM, Moodley V, Munien S, Jaggernath J, Stofberg QS. Profiles of foreign visitors attending the 2010 FIFA World Cup in South Africa. Afr J Phys Health Educ Recreat Dance. 2012;18 Suppl 2:73-80. Available from: https://hdl.handle.net/10520/EJC128306

13. Sallam M, Jabbar R, Mahadoon LK, Elshareif TJ, Darweesh M, Ahmed HS, et al. Enhanced event-based surveillance: Epidemic Intelligence from Open Sources (EIOS) during FIFA World Cup 2022 Qatar. J Infect Public Health. 2024;17(9):102514. Available from: https://doi.org/10.1016/j.jiph.2024.102514

14. World Health Organization (WHO). Pneumococcal disease [Internet]. Geneva: WHO; 2025 [cited 2025 Jul 7]. Available from: https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/norms-and-standards/vaccine-standardization/pneumococcal-disease

15. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Immunization data tool [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Feb 7; cited 2025 Jul 7]. Available from: https://www.publichealthontario.ca/en/Data-and-Analysis/Infectious-Disease/Immunization-Tool

16. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Enhanced epidemiological summary: measles in Ontario [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Jun 26; cited 2025 Jul 2]. Available from: https://www.publichealthontario.ca/-/media/Documents/Surveillance-Reports/Measles/25/measles-ontario-epi-2025-06-26.pdf?&sc_lang=en

17. Public Health Agency of Canada (PHAC). Measles and rubella weekly monitoring report [Internet]. Ottawa, ON: Government of Canada; 2025 [cited 2025 Jun 6]. Available from: https://health-infobase.canada.ca/measles-rubella/

18. World Health Organization (WHO). Immunization coverage [Internet]. Geneva: WHO; 2025 [updated 2025 Jul 15; cited 2025 Jul 24]. Available from: https://www.who.int/news-room/fact-sheets/detail/immunization-coverage

19. Vivek K, Bhatia M. Infectious disease and mass gathering medicine. In: Brady WJ, Sochor MR, Pepe PE, Maino Ii JC, Dyer KS, editors. Mass gathering medicine [Internet]. 1st ed. Cambridge, UK: Cambridge University Press; 2024. p. 372-9. Available from: https://doi.org/10.1017/9781009105156.026

20. Chan E, Hohenadel K, Lee B, Helferty M, Harris J, Macdonald L, et al. Public health surveillance for the Toronto 2015 Pan/Parapan American Games. Can Commun Dis Rep. 2017;43(7/8):156-63. Available from: https://doi.org/10.14745/ccdr.v43i78a04

21. Jooste M, Schwellnus M. Countermeasures to reduce the risk of infections at the 2024 Olympic and Paralympic Games – a balancing act. J Sport Health Sci. 2024;13(6):722-5. Available from: https://doi.org/10.1016/j.jshs.2024.05.009

22. Ikenoue C, Fukusumi M, Shimada S, Shimada T, Suzuki M, Sugishita Y, et al. Preparedness for infectious diseases during the Tokyo 2020 Olympic and Paralympic Games: advancing the health system beyond the games. Lancet Reg Health West Pac. 2025;55:101488. Available from: https://doi.org/10.1016/j.lanwpc.2025.101488

23. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Ontario vector-borne disease tool [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Jun 5; cited 2025 Jul 7]. Available from: https://www.publichealthontario.ca/en/Data-and-Analysis/Infectious-Disease/VBD-Tool

24. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Diseases of public health significance cases for January to December 2024 [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [cited 2025 Jul 16]. Available from: https://www.publichealthontario.ca/-/media/Documents/Surveillance-Reports/Infectious/24/surveillance-report-infectious-diseases-2024.pdf?&sc_lang=en

25. European Centre for Disease Prevention and Control (ECDC). Communicable disease threats report: week 37, 7–13 September 2024 [Internet]. Stockholm: ECDC; 2024 [cited 2025 Jul 29]. Available from: https://www.ecdc.europa.eu/sites/default/files/documents/Communicable_disease_threats_report_7_13_September_2024_week_37.pdf

26. Javelle E, Itani O, Rapp C, Hamer DH, Huits R. Will the Olympic flame spark dengue outbreaks during the Paris 2024 summer Olympic and Paralympic games? J Travel Med. 2024;31(7):taae088. Available from: https://doi.org/10.1093/jtm/taae088

27. Public Health Agency of Canada (PHAC). Lyme disease: symptoms and treatment [Internet]. Ottawa, ON: Government of Canada; 2025 [updated 2025 Jun 12; cited 2025 Jul 21]. Available from: https://www.canada.ca/en/public-health/services/diseases/lyme-disease.html

28. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Lyme disease [Internet]. Toronto, ON: King's Printer for Ontario; 2024 Dec [updated 2024 Dec 13; cited 2025 Jul 21]. Available from: https://www.publichealthontario.ca/en/Diseases-and-Conditions/Infectious-Diseases/Vector-Borne-Zoonotic-Diseases/Lyme-disease

29. Public Health Agency of Canada (PHAC). Canadian respiratory virus surveillance report [Internet]. Ottawa, ON: Government of Canada; 2025 [cited 2025 Jul 24]. Available from: https://health-infobase.canada.ca/respiratory-virus-surveillance/

30. Schmidt T, Beebeejaun K, Latta A, Wippel C, Addo J, Salvi C, et al. Mass gathering events and COVID-19; lessons learnt from the 2020 European football championship. Bull World Health Organ. 2024;102(11):803-12. Available from: https://doi.org/10.2471/BLT.23.290044

31. Goumballa N, Hoang VT, Al-Tawfiq JA, Sokhna C, Gautret P. Evidence for transmission of SARS-CoV-2 at religious mass gatherings: a systematic review. New Microbes New Infect. 2024;60-61:101442. Available from: https://doi.org/10.1016/j.nmni.2024.101442

32. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Integrated respiratory virus risk indicators for Ontario: March 23, 2025 to April 5, 2025 [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Mar 28; cited 2025 Jun 16]. Available from: https://www.publichealthontario.ca/-/media/Documents/I/2023/integrated-respiratory-virus-risk-indicators-ontario.pdf

33. Ontario Agency for Health Protection and Promotion (Public Health Ontario). COVID-19 transmission through short and long-range respiratory particles [Internet]. Toronto, ON: Queen's Printer for Ontario; 2022 [cited 2025 Jun 13]. Available from: https://www.publichealthontario.ca/-/media/documents/ncov/phm/2022/01/covid-19-respiratory-transmission-range.pdf?sc_lang=en

34. Public Health Agency of Canada (PHAC). Demographics: COVID-19 vaccination coverage in Canada [Internet]. Ottawa, ON; 2024 [updated 2024 Jul 12; cited 2025 Aug 18]. Available from: https://health-infobase.canada.ca/covid-19/vaccination-coverage/

35. World Health Organization (WHO). WHO TAG-VE risk evaluation for SARS-CoV-2 variant under monitoring: NB.1.8.1 [Internet]. Geneva: WHO; 2025 [cited 2025 Jul 24]. Available from: https://cdn.who.int/media/docs/default-source/documents/epp/tracking-sars-cov-2/23052025_nb.1.8.1_ire.pdf?sfvrsn=7b14df58_4

36. World Health Organization (WHO). WHO TAG-VE risk evaluation for SARS-CoV-2 variant under monitoring: XFG [Internet]. Geneva: WHO; 2025 [cited 2025 Jul 24]. Available from: https://cdn.who.int/media/docs/default-source/documents/epp/tracking-sars-cov-2/25062025_xfg_ire.pdf?sfvrsn=260a9981_4

37. Rainey JJ, Phelps T, Shi J. Mass gatherings and respiratory disease outbreaks in the United States – should we be worried? Results from a systematic literature review and analysis of the national outbreak reporting system. PLoS ONE. 2016;11(8):e0160378. Available from: https://doi.org/10.1371/journal.pone.0160378

38. Alshamrani M, Farahat F, Alzunitan M, Hasan MA, Alsherbini N, Albarrak A, et al. Hajj vaccination strategies: preparedness for risk mitigation. J Infect Public Health. 2024;17(11):102547. Available from: https://doi.org/10.1016/j.jiph.2024.102547

39. Toro L, de Valk H, Zanetti L, Huot C, Tarantola A, Fournet N, et al. Pathogen prioritisation for wastewater surveillance ahead of the Paris 2024 Olympic and Paralympic Games, France. Euro Surveill. 2024;29(28):2400231. Available from: https://doi.org/10.2807/1560-7917.ES.2024.29.28.2400231

40. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Legionellosis in Ontario: January 1, 2024 to December 31, 2024 [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [cited 2025 Jul 24]. Available from: https://www.publichealthontario.ca/-/media/Documents/L/25/surveillance-report-legionellosis-ontario-2024.pdf?&sc_lang=en

41. Rebellato S, Lee C, Gardner C, Kivilahti K, Wallace J, Hachborn D, et al. Community Legionella outbreak linked to a cooling tower, 2022. Can Commun Dis Rep. 2023;49(9):380-6. Available from: https://doi.org/10.14745/ccdr.v49i09a04

42. Yezli S, Yassin Y, Mushi A, Maashi F, Abdelmalek NM, Awam AH, et al. Undiagnosed and missed active pulmonary tuberculosis during mass gatherings: a prospective cross-sectional study from the Hajj pilgrimage. Eur J Clin Microbiol Infect Dis. 2023;42(6):727-40. Available from: https://doi.org/10.1007/s10096-023-04596-8

43. Zumla A, Saeed AB, Alotaibi B, Yezli S, Dar O, Bieh K, et al. Tuberculosis and mass gatherings—opportunities for defining burden, transmission risk, and the optimal surveillance, prevention, and control measures at the annual Hajj pilgrimage. J Infect Dis Med. 2016;47:86-91. Available from: https://doi.org/10.1016/j.ijid.2016.02.003

44. Pao LT, Tashani M, King C, Rashid H, Khatami A. Antimicrobial resistance associated with mass gatherings: a systematic review. Trop Med Infect Dis. 2025;10(2):2. Available from: https://doi.org/10.3390/tropicalmed10010002

45. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Tuberculosis in Ontario: January 1, 2020 to December 31, 2024 [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Apr 01; cited 2025 Jul 24]. Available from: https://www.publichealthontario.ca/-/media/Documents/T/25/tuberculosis-ontario-epi-summary-apr-21.pdf?&sc_lang=en

46. Public Health Agency of Canada (PHAC). Tuberculosis disease in Canada, 2023 (infographic) [Internet]. Ottawa, ON: Government of Canada; 2025 [cited 2025 Jul 17]. Available from: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/tuberculosis-disease-2023-infographic.html

47. Public Health Agency of Canada (PHAC). Sexually transmitted and blood borne infections (STBBI) prevention guide [Internet]. Ottawa, ON: Government of Canada; 2025 [updated 2025 Jan 20; cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/stbbi-prevention-guide.html

48. Public Health Agency of Canada (PHAC). Chlamydia and LGV guide: key information and resources [Internet]. Ottawa, ON: Government of Canada; 2025 [updated 2025 Jan 16; cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/chlamydia-lgv.html

49. Public Health Agency of Canada (PHAC). Gonorrhea guide: treatment and follow-up [Internet]. Ottawa, ON: Government of Canada; 2025 [updated 2025 May 14; cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/gonorrhea/treatment-follow-up.html

50. Public Health Agency of Canada (PHAC). Syphilis guide: treatment and follow-up [Internet]. Ottawa, ON: Government of Canada; 2024 [cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/syphilis/treatment-follow-up.html

51. Public Health Agency of Canada (PHAC). Canada's sexually transmitted and blood-borne infections (STBBI) action plan 2024-2030 [Internet]. Ottawa, ON: Government of Canada; 2024 Feb [cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/sexually-transmitted-blood-borne-infections-action-plan-2024-2030.html

52. Public Health Agency of Canada (PHAC). Hepatitis B: symptoms and treatment [Internet]. Ottawa, ON: Government of Canada; 2025 [cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/diseases/hepatitis-b.html

53. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Gonorrhea [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Jan 7; cited 2025 Jul 22]. Available from: https://www.publichealthontario.ca/en/Diseases-and-Conditions/Infectious-Diseases/Sexually-Transmitted-Infections/Gonorrhea

54. Public Health Agency of Canada (PHAC). STBBI prevention guide: treatment and follow-up [Internet]. Ottawa, ON: Government of Canada; 2024 [updated 2024 May 10; cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/stbbi-prevention-guide/treatment-follow-up.html

55. Public Health Agency of Canada (PHAC). Rapid risk assessment: Clades 1a and 1b mpox virus (MPXV) multi-country outbreaks – public health implications for Canada [Internet]. Ottawa, ON: Government of Canada; 2024 Sep [updated 2024 Oct 10; cited 2025 Jul 22]. Available from: https://www.canada.ca/en/public-health/services/emergency-preparedness-response/rapid-risk-assessments-public-health-professionals/rapid-risk-assessment-clades-1a-1b-mpox-virus-multi-country-outbreaks-public-health-implications-2024.html

56. Public Health Agency of Canada (PHAC). Mpox epidemiology update [Internet]. Ottawa, ON: Government of Canada; 2025 June [cited 2025 Jul 22]. Available from: https://health-infobase.canada.ca/mpox/

57. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Enhanced epidemiological summary: mpox in Ontario: January 1 to June 30, 2025 [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [cited 2025 Jul 16]. Available from: https://www.publichealthontario.ca/-/media/Documents/M/25/mpox-ontario-enhanced-episummary.pdf?&sc_lang=en

58. Ontario. Ministry of Health. integrated Public Health Information System (iPHIS). Average monthly counts and rates across Ontario, York, Peel, and Toronto PHUs (2022-2024) for chlamydial, gonorrhoea, human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS), syphilis, hepatitis B, mpox [data set]. Toronto, ON: King's Printer for Ontario; 2025 Jul 24 [extracted 2025 Jun 12].

59. Ontario Agency for Health Protection and Promotion (Public Health Ontario); Institute for Quality Management in Healthcare. Antimicrobial resistance in common hospital pathogens in Ontario: annual laboratory and hospital survey report 2023 [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [cited 2025 Jul 19]. Available from: https://www.publichealthontario.ca/-/media/Documents/A/25/antimicrobial-resistance-common-hospital-pathogens-ontario.pdf?sc_lang=en

60. European Centre for Disease Prevention and Control (ECDC). Risk assessment: public health risks related to communicable diseases at the Rio de Janeiro Olympic and Paralympic Games, Brazil 2016 – 1st update, 13 June 2016 [Internet]. Stockholm: ECDC; 2016 [cited 2025 Jul 11]. Available from: https://www.ecdc.europa.eu/en/publications-data/public-health-risks-related-communicable-diseases-rio-de-janeiro-olympic-and

61. Public Health Agency of Canada (PHAC). Canadian antimicrobial resistance surveillance system (CARSS): 2024 key findings [Internet]. Ottawa, ON: Government of Canada; 2024 [updated 2024 Nov 20; cited 2025 Jul 19]. Available from: https://www.canada.ca/en/public-health/services/publications/drugs-health-products/canadian-antimicrobial-resistance-surveillance-system-2024-executive-summary.html#a3

62. Maucotel AL, Kolenda C, Laurent F, Tristan A. Staphylococcus aureus: no ticket for the Paris 2024 Olympic Games! Infect Dis Now. 2024;54(4S):104882. Available from: https://doi.org/10.1016/j.idnow.2024.104882

63. Public Health Agency of Canada (PHAC). Avian influenza A(H5N1): spread, prevention and risks [Internet]. Ottawa, ON: Government of Canada; 2025 [updated 2025 Jul 10; cited 2025 Jul 20]. Available from: https://www.canada.ca/en/public-health/services/diseases/avian-influenza-h5n1/prevention-risks.html

64. Food and Agriculture Organization of the United Nations (FAO), World Health Organization (WHO), World Health Organization for Animal Health (WOAH). Updated joint FAO/WHO/WOAH public health assessment of recent influenza A(H5) virus events in animals and people [Internet]. Geneva: WHO; 2025 [cited 2025 Jul 9]. Available from: https://www.who.int/publications/m/item/updated-joint-fao-who-woah-public-health-assessment-of-recent-influenza-a(h5)-virus-events-in-animals-and-people_apr2025

65. Public Health Agency of Canada (PHAC). Rapid risk assessment update: Avian influenza A(H5N1) clade 2.3.4.4b, public health implications for Canada [Internet]. Ottawa, ON: Government of Canada; 2024 [cited 2025 Jul 9]. Available from: https://www.canada.ca/en/public-health/services/emergency-preparedness-response/rapid-risk-assessments-public-health-professionals/avian-influenza-a-h5n1-clade-2-3-4-4b-update.html

66. Public Health Agency of Canada (PHAC). Avian influenza A(H5N1): Canada's response [Internet]. Ottawa, ON: Government of Canada; 2025 [cited 2025 Jul 20]. Available from: https://www.canada.ca/en/public-health/services/diseases/avian-influenza-h5n1/canada-response.html

67. Centers for Disease Control and Prevention (CDC). H5 bird flu: current situation [Internet]. Atlanta, GA: CDC; 2025 [cited 2025 Jul 9]. Available from: https://www.cdc.gov/bird-flu/situation-summary/index.html

68. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Viral hemorrhagic fevers [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [cited 2025 Jul 10]. Available from: https://www.publichealthontario.ca/en/Diseases-and-Conditions/Infectious-Diseases/Vector-Borne-Zoonotic-Diseases/Ebola

69. Public Health Agency of Canada (PHAC). Infection prevention and control measures for Ebola disease in acute care settings [Internet]. Ottawa, ON: Government of Canada; 2023 [updated 2023 Jun 22; cited 2025 Jul 24]. Available from: https://www.canada.ca/en/public-health/services/diseases/ebola/health-professionals-ebola/infection-prevention-control-measures-healthcare-settings.html

70. Ontario. Ministry of Health. Public health management of viral hemorrhagic fevers – interim guidance [Internet]. Toronto, ON: King's Printer for Ontario; 2022 [updated 2022 Nov 14; cited 2025 Sep 4]. Available from: https://www.ontario.ca/files/2024-05/moh-interim-viral-hemorrhagic-fevers-phu-guidance-en-2024-05-30.pdf

71. Centers for Disease Control and Prevention (CDC). Ebola: outbreak history [Internet]. Atlanta, GA: CDC; 2025 [updated 2024 May 6; cited 2025 Jul 22]. Available from: https://www.cdc.gov/ebola/outbreaks/index.html

72. WHO Regional Office for the Eastern Mediterranean (EMRO). Haemorrhagic fevers, viral [Internet]. Cairo: EMRO; 2025 [cited 2025 Jul 11]. Available from: http://www.emro.who.int/health-topics/haemorrhagic-fevers-viral/index.html

73. World Health Organization (WHO). Middle East respiratory syndrome coronavirus (MERS-CoV) dashboard [Internet]. Geneva: WHO; 2025 [updated 2025 Apr 20; cited 2025 Jun 13]. Available from: https://data.who.int/dashboards/mers/cases

74. World Health Organization (WHO). Middle East respiratory syndrome coronavirus (MERS-CoV) [Internet]. Geneva: WHO; 2022 [updated 2025 Aug 5; cited 2025 Aug 18]. Available from: https://www.who.int/news-room/fact-sheets/detail/middle-east-respiratory-syndrome-coronavirus-(mers-cov)

75. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Ontario respiratory virus tool [Internet]. Toronto, ON: King's Printer for Ontario; 2025 [updated 2025 Jul 4; cited 2025 Jul 7]. Available from: https://www.publichealthontario.ca/en/Data-and-Analysis/Infectious-Disease/Respiratory-Virus-Tool

76. Patel SS, Neylan JH, Bavaro K, Chai PR, Goralnick E, Erickson TB. Chemical, biological, radiological, nuclear, and explosives (CBRNEs) preparedness for sporting event mass gatherings: a systematic review of the literature. Am J Disaster Med. 2022;17(1):57-74. Available from: https://doi.org/10.5055/ajdm.2022.0420

77. World Health Organization (WHO). The generic all-hazards risk assessment tool for mass gathering events [Internet]. Geneva: WHO; 2023 [cited 2025 Jun 4]. Available from: https://www.who.int/publications/i/item/WHO-2023-Generic-Mass-gatherings-All-Hazards-RAtool-2023-1

78. Anand SP, Tam C, Calvin S, Ayache D, Slywchuk L, Lambraki I, et al. Estimating public health risks of infectious disease events: a Canadian approach to rapid risk assessment. Can Commun Dis Rep. 2024;50(9):282-93. Available from: https://doi.org/10.14745/ccdr.v50i09a01

79. van Dijk A, Dawson E, Moore KM, Belanger P. Risk assessment during the Pan American and Parapan American Games, Toronto, 2015. Public Health Rep. 2017;132(1 Suppl 1):106S-10S. Available from: https://doi.org/10.1177/0033354917708356

80. World Health Organization (WHO). Prioritizing diseases for research and development in emergency contexts [Internet]. Geneva: WHO; 2025 [cited 2025 Jun 4]. Available from: https://www.who.int/activities/prioritizing-diseases-for-research-and-development-in-emergency-contexts

81. Otten A, Fazil A, Chemeris A, Breadner P, Ng V. Prioritization of vector-borne diseases in Canada under current climate and projected climate change. Microb Risk Anal. 2020;14:100089. Available from: https://doi.org/10.1016/j.mran.2019.100089

Appendix A: Technical Notes

Methods

Type of assessment

This project involved a HIRA, guided by PHO templates and methodologies for MGs. These were supplemented with resources from the WHO approach to MG HIRAs.[77] A HIRA is a strategic and evidence-based assessment of public health risks to help inform planning and prioritization of health emergency preparedness and disaster risk management activities and can include considerations and options for strengthening the necessary coping capacities and reducing the exposure and population vulnerability to hazards.

Scope of assessment

This assessment focused on IDs hazards that may arise before, during, or after planned MGs as well as PHMs implemented before and in response to potential ID hazards.

Risks were assessed for PHUs Toronto, Peel Region, and York Region.

The following overarching questions guided data collection, risk-informed evidence gathering, and risk estimation:

- **Hazard Identification Question:** What ID hazards are anticipated to require a response or contribute to negative health outcomes for the 2026 FWC in the current local, national, and global context?
- **Risk Question:** For identified ID hazard group, what is the likelihood of the event of interest occurring during May 28, 2026 to August 2, 2026 (two weeks before and after the multi-site FWC tournament) and the impact to the public health capacity of Toronto and two neigbouring regions?

Data Collection

Data from peer-reviewed and grey literature was used to identify ID hazards related to planned MGs. To assess the risk of these IDs, literature review results and epidemiological data were incorporated into evidence summaries and risk estimates that were reviewed and validated by PHO SMEs. This assessment was based on data and emerging evidence available to PHO at the time of assessment (i.e., July 2025) and has several important limitations and knowledge gaps that impact estimates of likelihood, impact, and uncertainty. Notably, this assessment was conducted almost a year before the FWC 2026 event (i.e., June to July 2026), the origin of travellers coming to watch Toronto matches is unknown and emerging IDs and international epidemiological trends are subject to change prior to the event.

Where appropriate, evidence summaries and risk estimates were considered at the level of ID hazard group (e.g., food and waterborne illnesses; VBZDs; STBBIs; VPDs; respiratory illnesses; AROs; other emerging diseases (e.g., A(H5N1)). Specific diseases or pathogens were considered individually if, for example, its risk is anticipated to be higher than that of the overall disease group or requires a different event of interest than that of the group (e.g., single case detection compared to outbreak, or ongoing outbreak in local context). Where possible, populations most vulnerable to ID exposures and/or impacts were described (i.e. visiting, host, demographics, etc.).

Literature Review

This review builds upon a rapid literature review conducted by the ECDC prior to the 2024 Paris Summer OPGs.[3] The ECDC's review summarized public health preparedness and communicable disease outbreaks related to organized MGs (e.g., sporting competitions, religious or cultural events, mass gathering events) from January 2014 to March 2024.[3] PHO librarians developed peer-reviewed and grey literature search strategies to identify relevant literature published between April 1, 2024, to April 21, 2025. The following questions were developed to guide the search:

1. What outbreaks or increases in transmission of any ID have been observed during, before and after organised MG events (linked to the planned MG event) since April 1, 2024?
2. What preparedness and response measures were implemented in countries (e.g., by public health authorities, ministries of health, and event organizing committees) before and in response to potential or actual outbreaks during planned MG events?

For the peer-reviewed literature, detailed search strategies were developed for Medline and supplementary databases. Grey-literature searches were developed to scan information from public health and multilateral health organization websites.

Results from the peer-reviewed literature scan were de-duplicated and entered into Covidence, an online systemic review tool. Two reviewers double screened 20% of results at both the title/abstract and full-text screening stages. Reviewers met to discuss and resolve any screening conflicts and ensure inclusion/exclusion criteria was being accurately applied (inclusion and exclusion criteria are available upon request).

For the included literature, data extraction templates were developed to review the literature and collect data on types of IDs/outbreaks, planned MGs, ID events of public health interest, and PHMs reported across the literature.

Risk-Informed Evidence Gathering

IDs identified in the literature review were prioritised for inclusion in evidence summaries and risk assessment based on their relevance to the FWC 2026 context. Inclusion and exclusion considerations were informed by Diseases of Public Health Significance (DOPHS), past PHO MG HIRAs, WHO priority pathogens, global observations of IDs and MGs (i.e., from the literature review), and SME input (see Appendix B). For relevant pathogens/diseases, supporting information was gathered (e.g., PHO DOPHS cases and rates, national and global data, and hand-searched literature as needed) to enable the assessment of the likelihood, impact, and overall risk an ID hazard group poses to Toronto, Peel Region, and York Region for FWC 2026.

Where available or appropriate, likelihood and impact evidence within ID hazard groups was further sub-grouped into local or global geographies (e.g. Toronto, Peel Region, and York Region, Ontario, Canada, WHO regions or key global trends). During the risk assessment process, information on the FWC 2026 event itself (e.g., venue characteristics) and visiting and host populations (e.g., demographics and behaviour) continued to be gathered as it became available

Evidence Synthesis

The PHO Emergency Planning, Response, and Recovery (EPRR) team prepared an evidence synthesis summary for each ID hazard group based on the risk-informed data gathering. The evidence summary was used to complete the Risk Analysis Worksheet, which includes the assessment, rationale, risk estimate, and planning implications. During this stage, the EPRR drafting team also defined possible events of interest for each ID group that were assessed for likelihood, impact, and risk estimates.

Risk Estimation

The EPRR team synthesized evidence to complete the Risk Analysis Worksheet. The completed worksheet was discussed internally by the team to reach consensus on the assigned likelihood, impact, risk, and uncertainty levels.[78] The completed Risk Analysis Worksheet was then reviewed and validated by PHO SMEs before they reviewed the draft HIRA report.

Assigning Risk Levels

To arrive at a risk estimate for an ID hazard group, likelihood and impact estimates were generated and input to a risk matrix (Figure A1) to arrive at an overall risk value (Risk = Likelihood x Impact). Three risk levels (high, moderate, low) have been defined and adapted from PHO's previous HIRA work for the FWC 2026 context. Definitions and considerations to assign likelihood and impact levels have been adapted from past MG HIRAs. A level of uncertainty was also assigned to each overall risk estimate and drivers of uncertainty were noted (e.g., uncertainty due to unknown event context or limited evidence). Where appropriate, differential risks for specific pathogens or key populations were reported (i.e., driven by differing impact or likelihoods).

Figure A1: Risk Matrix

	Minor Impact	Moderate Impact	Major Impact	Severe Impact
Very Likely	Low	Moderate	High	High
Likely	Low	Moderate	Moderate	High
Unlikely	Low	Low	Moderate	Moderate
Very Unlikely	Low	Low	Low	Moderate

Risk Levels and Descriptions

High: The health event poses a threat to public health capacity of Toronto, Peel Region, and York Region during FWC 2026, including the two weeks preceding and following the tournament. It is a high priority for planning.

Moderate: The health event could affect the public health capacity of Toronto, Peel Region, and York Region during FWC 2026, including the two weeks preceding and following the tournament. It is a medium priority for planning.

Low: The health event is unlikely to affect the public health capacity of Toronto, Peel Region, and York Region during FWC 2026, including the two weeks preceding and following the tournament. It is a low priority for planning

Likelihood Definitions and Considerations for Assessment

Very likely: This health event is very likely to occur (i.e. is expected to occur in most circumstances).

- Considerations:
    - Multiple incidents have occurred in the last five years in the Toronto, Peel Region, and/or York Region, or the health event has been regularly reported at similar MGs.
    - Health event has a very high prevalence, incidence, or increasing rates among visiting or host populations, and/or, globally.

Likely: The health event is likely to occur.

- Consideration: One or two similar incidents have either occurred in the Toronto, Peel Region, and/or York Region in the past five years, or the health event has been reported at similar MGs elsewhere.

Unlikely: The health event is unlikely to occur.

- Consideration: Similar incidents have only occurred in the Toronto, Peel Region, and/or York Region more than five years ago, or the health event has only been reported once or twice at similar MGs elsewhere.

Very unlikely: The health event is very unlikely to occur (i.e., only under exceptional circumstances)

- Consideration: It is possible for the health event to occur, but it either has not been reported yet or it has only happened extremely rarely at non-MG events.

Impact Definitions and Considerations for Assessment

Severe: The public health capacity of Toronto, Peel Region, and/or York Region would be overwhelmed by the health event, and/or some essential services (e.g., emergency services, transportation, and/or education/childcare settings) could be disrupted.

- Considerations:
    - High disease severity, high morbidity or mortality
    - Very high incidence of cases or number of severe disease clusters
    - High profile issue-impact
    - National and international media attention
    - Potential for public health to be overwhelmed beyond surge capacity in multiple jurisdictions
    - Existing surveillance and laboratory systems are not robust enough to manage and would not be timely, require significant provincial and/or federal support
    - Requires significant cross-jurisdictional or multi-level planning

Major: The public health capacity of Toronto, Peel Region, and/or York Region would be strained by the health event and/or some essential services may be disrupted.

- Considerations:
    - Moderate-severe morbidity, important mortality numbers; moderate-highly transmissible
    - High incidence of cases and/or unusual disease clusters
    - Beyond local surge plans; local lab and surveillance systems may not be timely and will require external support and/or enhanced surveillance planning
    - Requires incident management at provincial level, significant multi-jurisdictional cooperation and support
    - Local and national media interest; some international media interest
    - Requires cross-jurisdictional advanced planning and support

Moderate: The public health capacity of Toronto, Peel Region, and/or York Region would have the capacity to cope with the health event. Unlikely that essential services would be disrupted.

- Considerations:
    - Mild-moderate morbidity, limited to no mortality; low to moderate transmissibility
    - Higher incidence than expected or unusual disease clusters
    - Short-term capacity issues in public health but manageable within existing surge capabilities
    - Possibly requiring enhanced functioning in surveillance and laboratory services but manageable within existing resources and expertise
    - Local media interest
    - Possibility for notification and monitoring by province
    - Manageable within existing health unit and/or plans and agreements
    - Need for advanced planning possible but limited

Minor: The health event is well within the capacity of the Toronto, Peel Region, and/or York Region public health system to manage (e.g., no disruptions to essential services)

- Considerations:
    - Mild, self-limiting illness with no need for medical assistance; no to low transmissibility
    - Not exceeding expected incidence rates and/or not unexpected diseases
    - Routine function of public health, surveillance systems and laboratory sufficient to manage
    - Negligible impact; local or nil media coverage
    - No need for advanced planning beyond routine structures

Levels of Uncertainty and Factors to Assign a Level

High:

- Minimal, poor-quality evidence
- Conflicting views among experts
- No experience with similar incidents

Moderate:

- Adequate quality of evidence
- Consistent results published in the great literature
- Agreements by two (or more) experts – assumptions made by analogous incidents

Low:

- Good quality evidence
- Multiple reliable resources
- Expert opinion concurs
- Experience of previous similar incidents

Appendix B: ID Selection for HIRA

To identify IDs of interest included in evidence summaries that would contribute to risk estimates for the ID hazard groups, a preliminary list of IDs relevant to planned MGs was compiled by the EPRR team. Relevance to FWC 2026 in Toronto was determined using the following considerations:

1. DOPHS that have the potential for human-to-human transmission among FWC participants, visitors, and local populations (i.e. self-limiting diseases, diseases limited to neonates to children, or those typically imported without onward transmission were deprioritized)
2. Infectious pathogens and diseases identified for risk assessment by experts in past PHO risk assessment products (e.g., 2015 Toronto Pan/Parapan American Games)[79]
3. IDs identified as requiring increased surveillance for past organized MGs (e.g., OPGs)[3,39]
4. IDs that have caused outbreaks or increases in illness beyond expected levels at previous planned MGs[3,39]
5. IDs identified by the WHO as presenting the greatest risk to public health because of their epidemic potential and/or the absence or insufficiency of countermeasures[80]

The preliminary list was then further refined through SMEs' input.

The following list includes reasons for why an ID might not be included in evidence summaries that contribute to risk estimates:

1. Self-limiting diseases, diseases limited to neonates or children, or IDs that are typically imported with limited onward transmission
2. The disease is rare (i.e., either a handful of cases or diseases where one or two outbreaks have occurred within the last 50 to 100 years with no further indication that the pathogen is in circulation)[81]
3. The disease is geographically restricted to one country[81]
4. The disease has low pathogenicity in humans[81]
5. There is little or no scientific information available about the disease in the published literature, presumably due to any or all of the above conditions[81]

Public Health Ontario
661 University Avenue, Suite 1701
Toronto, Ontario
M5G 1M1
1-877-543-8931
communications@oahpp.ca
publichealthontario.ca

Ontario