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Santé publique France

**Paris 2024 Olympic and Paralympic Games**

# From preparation to action: Santé publique France's experience of health surveillance and risk prevention

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## Keywords

Mass gatherings; Olympic Games; public health issues; health risks

# Contents

# Glossary

| | |
|---|---|
| AASC | Associations agréées de sécurité civile; Approved Civil Protection Associations |
| ANSES | Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail; French National Agency for Food, Environmental, and Occupational Health & Safety |
| ANSM | Agence Nationale de Sécurité du Médicament et des produits de santé; French National Agency for the Safety of Medicines and Health Products |
| APHP | Assistance Publique des Hôpitaux de Paris; Paris Public Hospitals |
| ARA | Auvergne-Rhône-Alpes |
| ARS | Agences Régionales de Santé; Regional Health Agencies |
| BH | Bulletins hebdomadaires; Weekly Bulletins |
| BQA | Bulletin quotidien des alertes; Daily bulletin of alerts |
| BSPP | Brigade des Sapeurs-Pompiers de Paris; Paris Fire Brigade |
| C3 | Command, Control and Communication |
| CDD | Contrat à Durée Déterminée; Fixed Term Contract |
| CESPA | Centre d'Epidémiologie et de Santé Publique des Armées; Military Epidemiology and Public Health Centre |
| CIC | Cellule Interministérielle de Crise; Interministerial Crisis Unit |
| CNCS | Centre National de Commandement Stratégique; National Strategic Command Centre |
| ConOps | Concept of Operations |
| CPIAS | Centre d'Appui pour la Prévention des Infections Associées aux Soins; Support Centre for the Prevention of Healthcare-Associated Infections |
| CVdL | Centre-Val de Loire |
| DGS | Direction Générale de la Santé; Directorate General for Health |
| DIJOP | Délégation Interministérielle aux Jeux Olympiques et Paralympiques; Interministerial Delegation for the Olympic and Paralympic Games |
| ECDC | European Centre for Disease Prevention and Control |
| EFS | Établissement Français du Sang; French Blood Establishment |
| EMR | Electronic Medical Record |
| HdF | Hauts-de-France |
| ICD-10 | International Classification of Diseases and Related Health Problems, 10th Revision |
| IdF | Île-de-France; Greater Paris region |
| IOC | International Olympic Committee |
| IPC | International Paralympic Committee |
| NAq | Nouvelle-Aquitaine |
| ND | Notifiable Disease |
| CBRN | Chemical, Biological, Radiological, Nuclear |
| OPG | Olympic and Paralympic Games |
| OSCOUR® | Organisation de la Surveillance Coordonnée des Urgences; Organisation for the Coordinated Surveillance of Emergency Admissions |
| PACA | Provence-Alpes-Côte d'Azur |
| PdL | Pays de la Loire |
| PSQ | Point de Situation Quotidien; Daily Situation Update |
| RWC | Rugby World Cup |

| | |
|---|---|
| SACS | Système d'Alerte Canicule et Santé; Heatwave and Health Alert System |
| SAMU | Service d'Aide Médicale Urgente; Emergency Medical Services |
| SARS-CoV-2 | Severe Acute Respiratory Syndrome Coronavirus 2 |
| SurSaUD® | Surveillance Sanitaire des Urgences et des Décès;<br>French Monitoring System for Medical Emergencies and Deaths |
| UKHSA | United Kingdom Health Security Agency |
| UMSP | Unité Sanitaire Mobile Polyvalente; Multi-purpose Mobile Healthcare Unit |
| WHO | World Health Organization |

# Foreword from the Director General

**Dear partners and colleagues,**

Organising the 2024 Olympic and Paralympic Games in our country was a major health safety challenge.

At Santé publique France, we rose to this challenge, drawing on our expertise, our regional network and daily collaboration with all stakeholders in the health sector.

It was in 2022 that our agency began to get ready to anticipate, to prepare and to act. We have capitalised on our past experiences, including the Rugby World Cup in 2023, and have taken inspiration from international guidelines and best practices, including those of our UK and Japanese peers. This meticulous preparation made it possible to strengthen our monitoring, surveillance and alert systems, and the OPG gave us an opportunity to innovate, particularly with regard to surveillance among emergency responders, the use of mobile data to estimate population denominators, and the automation of daily reports produced by Santé publique France.

Our strategy rested on three pillars: **strengthening the existing system**, **developing new surveillance systems and working closely with our partners**, whether national, regional or international. In all the host regions and particularly in Île-de-France, the region at the heart of the Games, we deployed enhanced monitoring, in conjunction with the Regional Health Agencies, first responders and the organisers of Paris 2024. Under the aegis of the Ministry of Health, we also worked hand in hand with the ECDC, the WHO and other health agencies to ensure optimal coordination.

While the Olympic and Paralympic Games were taking place, Santé publique France analysed thousands of health data points on a daily basis and produced more than **320** epidemiological bulletins in order to deliver reactive and daily health surveillance.

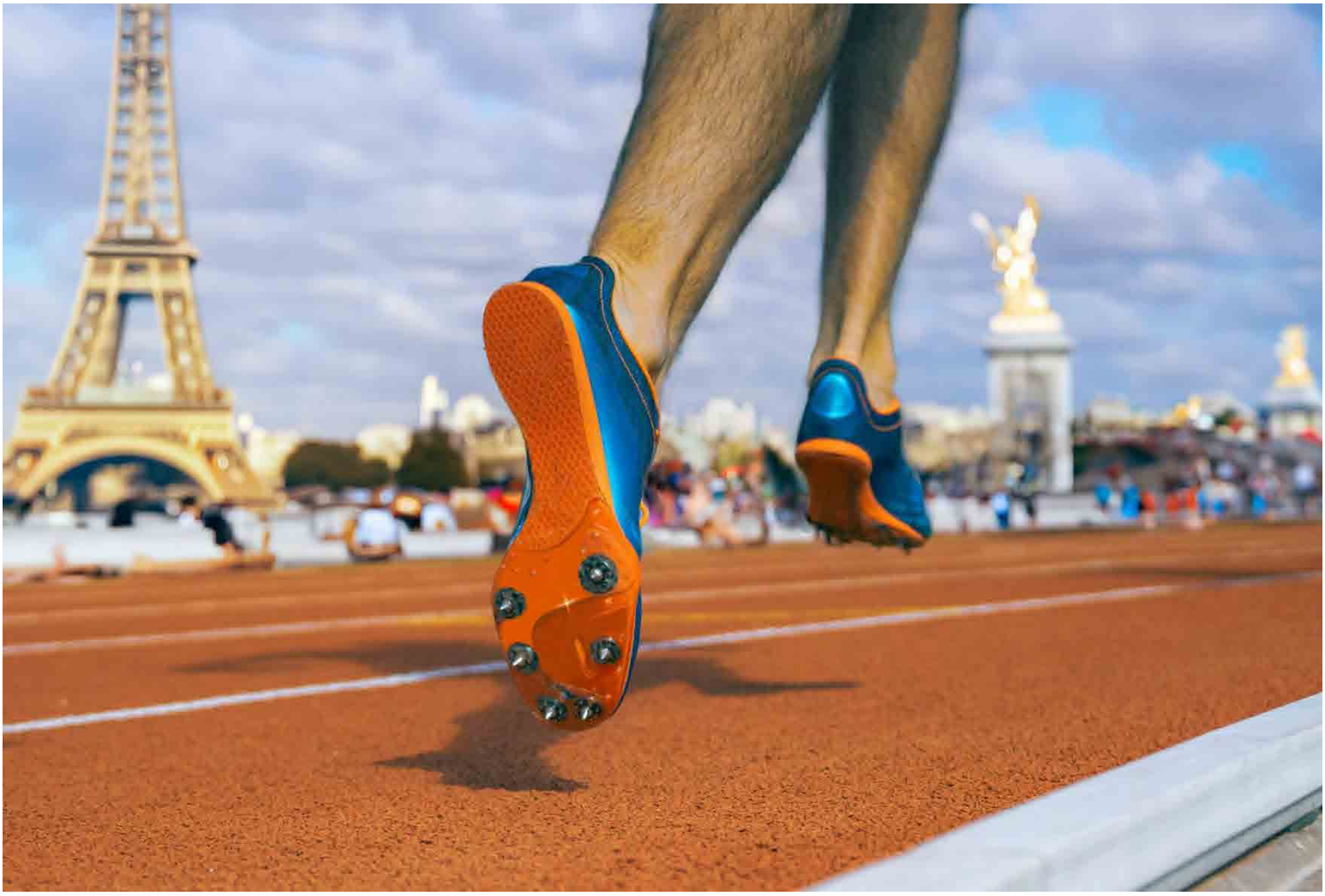
Beyond the figures, **the Games leave a legacy** for our agency and public health in France. We have strengthened our response capabilities, tested new tools and consolidated partnerships that will be valuable for the future. We have also demonstrated our ability to adapt and innovate in a demanding and high-profile environment.

I would like to pay tribute to the exceptional day-to-day commitment shown by the teams of Santé publique France throughout the Olympic and Paralympic Games, and that of our partners. Your professionalism, responsiveness and daily commitment were crucial to the success of this endeavour. The 2024 Paris Games were proof of our resilience and our ability to protect the health of all, even in the most demanding contexts.

This report on the 2024 Olympic and Paralympic Games sets out the work we undertook collectively. It takes stock of our actions, and also of the lessons we can learn for future mass gatherings. While the Games are now behind us, other public health challenges lie ahead.

Thank you all for your contribution to this unique adventure.

**Caroline Semaille, Director General of Santé publique France**



# Introduction

From 24 July to 9 September 2024, France hosted the 33rd Summer Olympic Games and the 17th Paralympic Games (OPG), attracting visitors from all over the world, with 12 million tickets sold and nearly 15,000 athletes taking part (1). Paris City Council estimates that the influx of tourists was greater than that seen in 2023, with French visitors up by 27% and visitors from abroad up 13% during the Games (2). With sporting and celebratory events and fan zones running simultaneously right in the middle of the summer, hosting the Olympic and Paralympic Games was a major health safety challenge. A dense gathering of spectators all in the same place at the same time raises public health issues, in particular due to an increased risk of spreading potentially epidemic diseases, injuries (e.g. crowd movements) or exposure to environmental factors such as extreme heat. International population movements can increase the risk of importing cases of diseases that are not usually present in the country, and the diversity of languages and health practices makes it difficult to implement preventive measures or manage cases. The increase in the number of temporary catering facilities, which are more likely to encounter difficulties with hygiene conditions, may also lead to an increase in food-borne illnesses.

The OPG are a special type of mass gathering, primarily because they are predictable in terms of their frequency, duration and expected visitor profile. As a result, they receive increased political and media attention ahead of the opening ceremony. This attention has heightened the need to anticipate and prepare for the OPG and to maintain increased vigilance for several days after the closure of the Paralympic Games. The OPG are unique in that they call on a complex network of temporary partners in addition to the institutions of the national public system to organise them, and they are the equivalent of 32 world championships running concurrently (3).

This is why, on 26 January 2022, the French Ministry of Health, through its Directorate General for Health, sent an official referral to Santé publique France asking the agency to take part in preparing the health system in advance of the 2024 Paris Summer Games. The agency's expertise was required for analysing health risks, preparing health monitoring, surveillance and alert systems and participating in the response via epidemiological investigation and data collection systems, and the strategy for mobilising and pre-positioning human and material health resources, focused both nationally and regionally.

**Box 1. A reminder of the missions of Santé publique France**

As a national public health agency, Santé publique France offers unique expertise, adapted to specific regional factors, to develop prevention, protection and improve the health of the population. This expertise is deployed through a remit based on three pillars: monitoring the health status of populations; protection, anticipation and intervention when health risks occur; and lastly, prevention through informing the public and promoting health. Holding the Games in the summer of 2024 in France required unprecedented mobilisation of agency resources. Drawing on previous experience of mass gatherings and on all its partners, the agency put in place custom monitoring protocol based on an analysis of the potential risks and it stepped up its preventive actions. The agency is uniquely positioned with 16 regional units spread across all the French regions, including in Île-de-France (IdF) where most of the Games events took place. Given the multiplicity of Olympic sites on French soil, cooperation between the national and regional branches was essential.

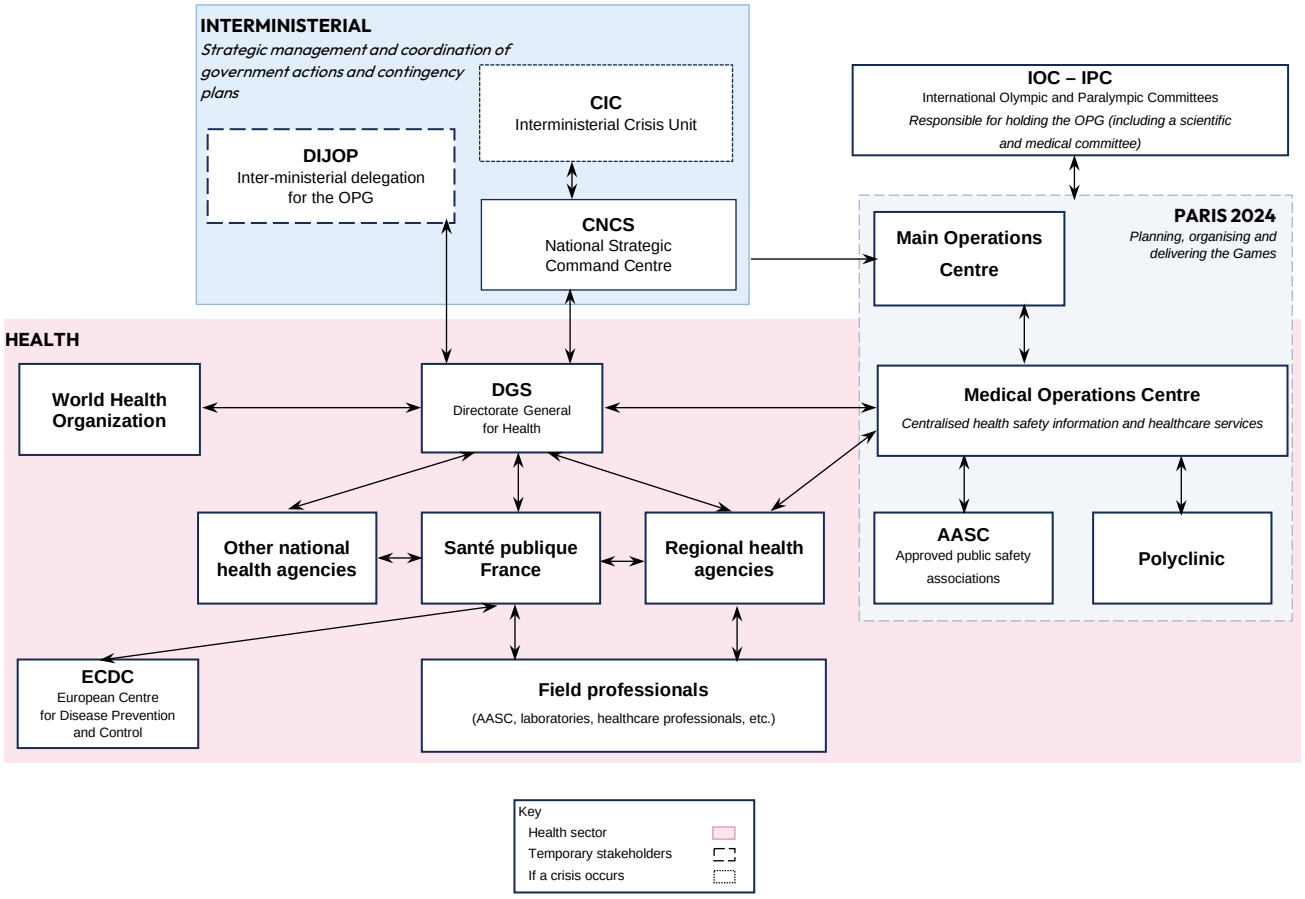
# The health safety landscape for the OPG

Coordinating the preparation of French institutions for the health risks associated with this event, the French Ministry of Health was supported by health agencies such as Santé publique France, the French National Agency for Food, Environmental and Occupational Health & Safety (ANSES), the French National Agency for the Safety of Medicines and Health Products (ANSM), the French Blood Establishment (EFS) and the Regional Health Agencies (ARS). This coordination was structured around three main areas: identifying and controlling health risks and threats, maintaining the continuity of operations during the OPG and establishing mechanisms to respond to a public health alert in advance and during the Games. Due to the extent of international and inter-sectoral coordination, specific organisations were set up, such as the Inter-ministerial Delegation for the Olympic and Paralympic Games (DIJOP) (4), in order to coordinate all areas of state preparation for the Games.

Figure 1 shows how health safety stakeholders were organised and illustrates the health chain of command, in "C3" mode (command, control and communication), which was set out in late 2023 following consultation work carried out by the DIJOP. It aimed at establishing relationships and communication channels between the various stakeholders in the health chain during the Olympic celebrations and competitions. As temporary stakeholders, such as Paris 2024, the organiser of the Paris OPG, were present alongside permanent ones, the roles of each involved party needed to be clearly defined and an information-sharing workflow, including for health surveillance data, needed to be organised so that predefined management measures could be implemented if a health event occurred.

This report marks the conclusion of this period of preparation for Santé publique France, in conjunction with the Ministry and the various stakeholders in the public health sector, and its culmination in the weeks of the Olympic and Paralympic Games. It takes stock of the work carried out, from preparation to action, to deliver health surveillance and risk prevention, and the long-term lessons learned and benefits gained as a public health agency from the 2024 Games.

## Figure 1. Map of health security stakeholders




# Foresight and collaboration: identifying the challenges ahead

Santé publique France started to prepare for the OPG in 2021 using various levers of action including its expertise in health risk analysis, its knowledge of the country, and its experience in monitoring mass gatherings, as well as drawing on the experience of previous OPG hosts.

# Capitalising on experience

## Looking back at past mass gatherings

Santé publique France prepared for the OPG by drawing on its past experiences, such as the 2016 European Football Championship (5), when it handled its first major international event in the same year as the agency was founded. During this event, it delivered prevention advice to the public in the form of postcards distributed to regional health agencies and host cities: *"6 health tips to fully enjoy the show".* Agents were active during the day and were on-call in the evenings and at weekends to detect early signals and strengthen the reporting of syndromic monitoring indicators. The agency was also able to draw on a recurring experience of regional monitoring: the Rouen Armada, which takes place in Normandy every three years (6), is a major gathering of large sailing boats that brings together thousands of visitors over a few days. In 2023, the Santé publique France regional unit used existing surveillance systems (notifiable diseases and syndromic surveillance) to activate specific surveillance in the Rouen area, which was supplemented by surveillance of medical and non-medical emergency stations deployed for the occasion. Experience of this recurring event has meant that the specific needs to be taken into account have been identified, such as reassurance from policy-makers, the resources to be adapted when a large number of surveillance systems are activated, and operational preparation between partners (e.g. first-aid and emergency responders, etc.).

## Drawing on the Olympic expertise of our peers

Santé publique France enhanced its preparation for this unprecedented event based on feedback from other countries who had previously hosted the OPG (7). Between 2022 and spring 2024, multiple key exchanges with the *United Kingdom Health Security Agency* (UKHSA) took place to understand the organisational framework around the OPG, the challenges of monitoring, and the importance of a risk assessment to prioritise specific actions and expectations at the event. In the run-up to the Games, operational experience, including the management of resources and schedules, was shared and this meant that the final links in the preparation could be completed. Further exchanges were organised with Japan's Institute for Infectious Disease Control, including former members of the Tokyo 2020 Games organising committee. This was particularly useful for identifying the relevant operational levers in a pandemic scenario and for abandoning certain investigative approaches based on their effectiveness (e.g. not mobilising international epidemiologists but relying on field epidemiology students). Finally, the Brazilian Ministry of Health shared their experience, highlighting the importance of health prevention messages and access to care for travellers. Discussions with previous

hosts emphasised that it is of paramount importance to coordinate communication between institutions at the preparatory stage.

# Identifying risks to prevent escalation

## Health risks associated with mass sporting gatherings

The IdF regional unit carried out a literature review (8) on health events occurring during mass gatherings. Infectious diseases, particularly food-borne epidemics, were one of the main risks. Environmental risks were also identified at the preparatory stage, with heat-related risks seen as particularly applicable during summer gatherings, as well as infectious diseases related to environmental factors, such as legionellosis or leptospirosis. Injuries were also mentioned and identified as requiring systematic follow-up via syndromic surveillance. The review concluded that it would be important to build on existing, proven medical and laboratory surveillance systems, strengthened by the necessary resources and cooperation of participating clinicians, policy makers and international partners.

## Health risk mapping for the 2024 OPG

Under the coordination of the DIJOP, the health sector, including the Ministry of Health and national health agencies, played a role in mapping health risks. The main risk categories were classified as follows: environmental risks (heatwaves, fires), infectious risks (e.g.: acute respiratory infection), technological risks (e.g.: post-industrial accident) and social risks (related to a celebratory atmosphere or group behaviour, such as crowd movements or risky consumption) (Figure 2). This mapping was classified[1] at interministerial level, along with security and terrorism risks. The risk assessment was based on the ISO 31000 standard, rating each risk based on its probability (from 1 to 5) multiplied by its severity (from 1 to 5), making it possible to identify levels of criticality and rank the risks according to three levels: high priority risks; risks requiring special vigilance; risks to be monitored. Between June 2022 and July 2024, this matrix was updated four times.

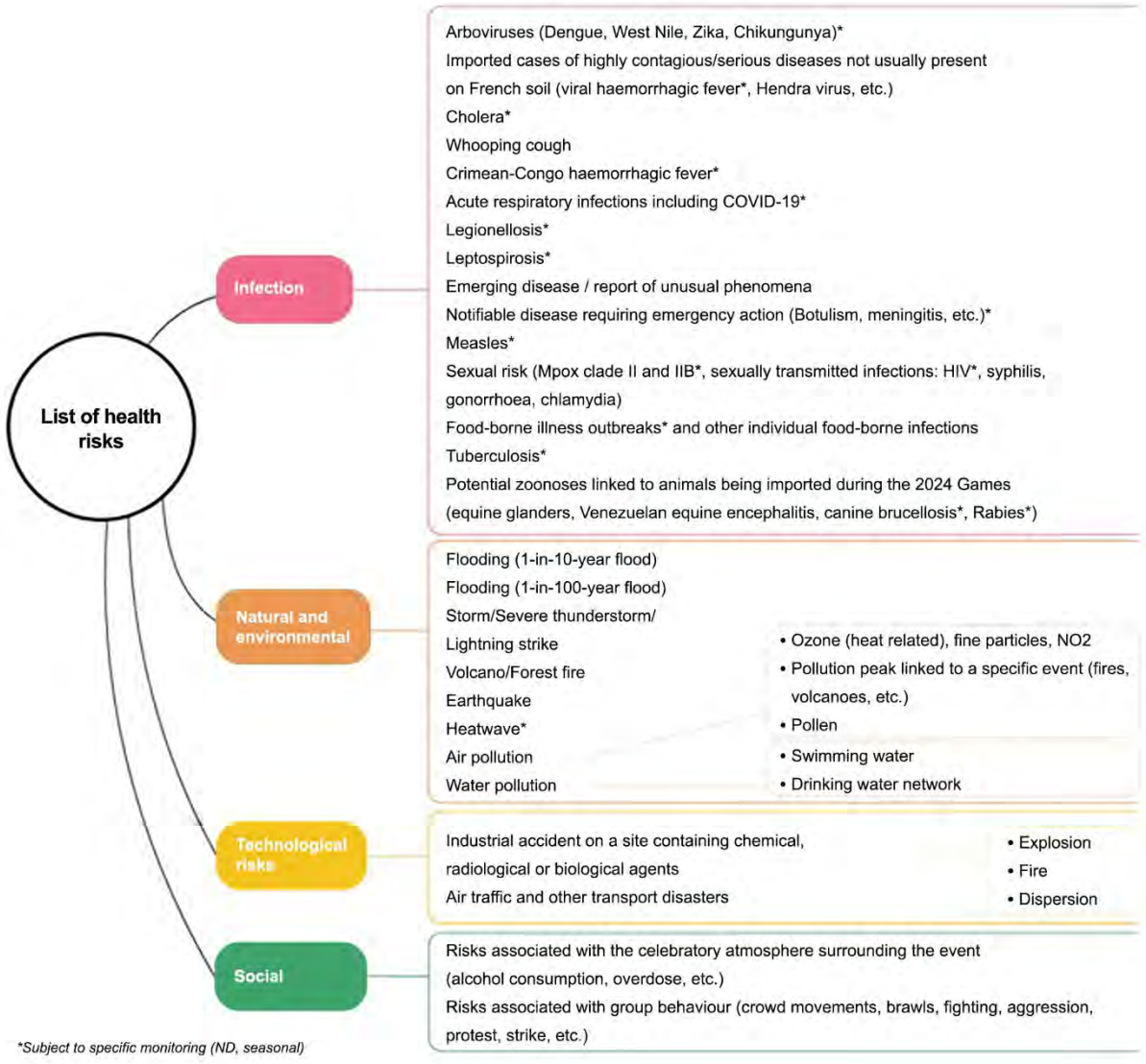
From June 2022, health risks related to heat were identified as a high priority as the Games were to be held during the hottest months of the year. Furthermore, in the spring of 2024, the increase in the number of cases of measles in Europe made this disease a high priority risk. The WHO has identified a resurgence of measles epidemics, following years of declining vaccine coverage worldwide (9). In France, the measles surveillance report in 2023 indicated that a high proportion (85%) of measles cases were imported (i.e., originated from a recent stay abroad) or were linked to an imported case (10) (infections in France from a transmission chain, the index case of which is imported). Similarly, the monitoring data for arboviruses in mainland France reported a higher number of imported cases of dengue fever, a factor pointing to an increased risk in preparation for the Games. The epidemiological situation in IdF showed 143 imported cases

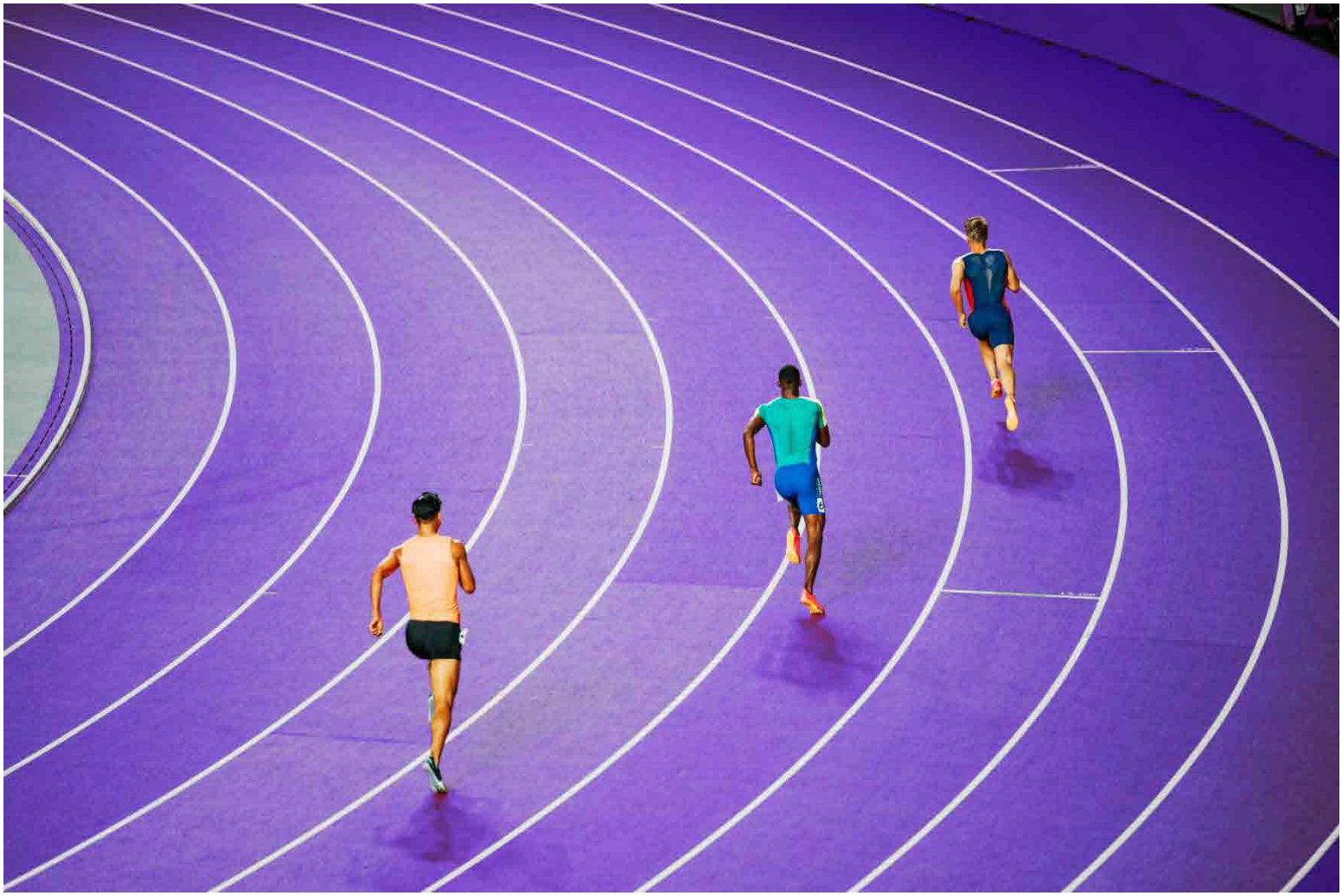
[1] A classified document is one with restricted access and distribution due to its sensitivity or importance.

of dengue (confirmed or probable) under investigation in the run-up to the Games, compared with 70 over the same period in 2023 (11).

So, at the final mapping update in July 2024 (see Figure 2), the health risks identified as highest priority were risks related to heat, arboviruses and measles.

**Figure 2. List of health risks identified in the final version of the authorities' OPG 2024 mapping**





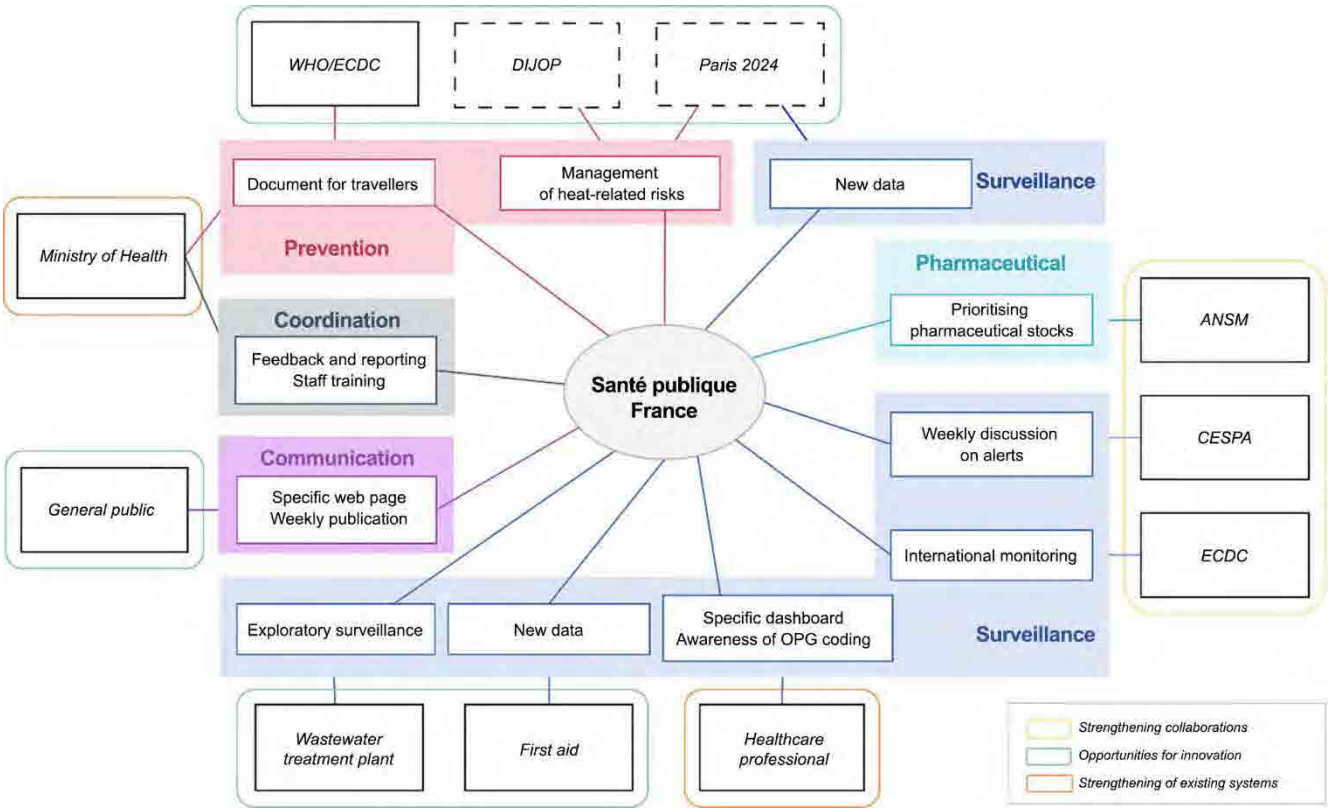
# Santé publique France's OPG strategy: strengthen, develop and collaborate

Santé publique France defined its strategy for preparing for the OPG in conjunction with the Ministry of Health around the following areas:

1. Strengthening the existing system by building on surveillance systems and operational processes.
2. Seeing the OPG as an opportunity to develop and test new surveillance systems, particularly in the Paris region.
3. Strengthening collaborations and partnerships, such as working with the ECDC to support international monitoring or with the Military Epidemiology and Public Health Centre (CESPA) to share health signals across the country.
4. Creating momentum to collaborate internally to strengthen the agency's activities and responsiveness for future unprecedented situations

In order to present the preparatory stages, the actions are broken down below into five categories: monitoring and surveillance, prevention, pharmaceutical preparation, communication and coordination (see figure 3 below).

**Figure 3. The main actions taken by Santé publique France in preparation for the OPG**



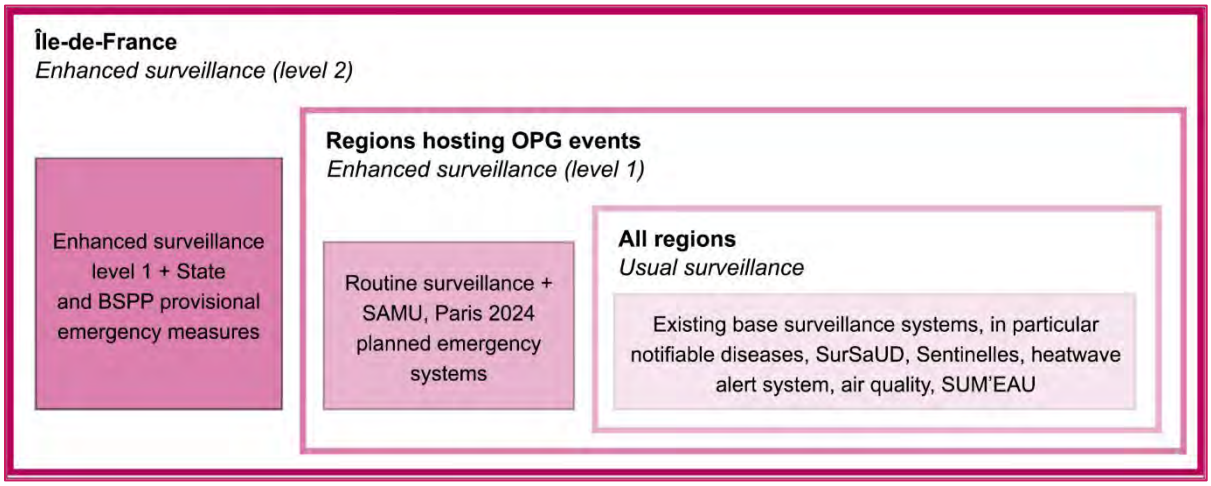
# Monitoring and surveillance of health risks in the context of the OPG

Based on the risk mapping, a health monitoring and surveillance protocol was put forward by the agency and shared with the health authorities to remind them that the objectives of health monitoring and surveillance implemented during the Paris 2024 OPG remained the same as those routinely delivered, namely:

- detecting health signals early and raising alerts;
- rapidly assessing the impact of a health event or exposure to an environmental risk;
- sharing available information with all stakeholders.

In order to meet these objectives, the challenges of which varied depending on whether or not events were being hosted in the region, the monitoring and surveillance systems were scaled geographically. In IdF and regions hosting events, new systems were temporarily deployed, while in regions not hosting events surveillance was based as usual on current systems (see Figure 4 ).

**Figure 4. Gradations of regional health surveillance and monitoring for the OPG**

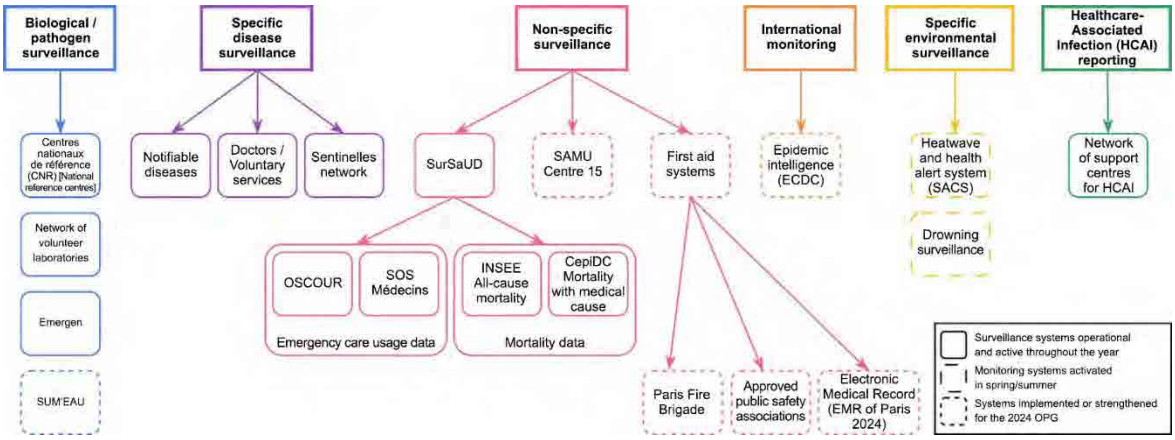



In order to test the surveillance system, and to have baseline indicators in advance of the OPG, the enhanced health monitoring and surveillance of the Paris 2024 OPG were implemented from 8 July 2024 at the national level and in IdF (i.e. 7 days before the Olympic flame arrived in IdF and 16 days before the start of the Olympic events). This continued until 15 September 2024 (i.e. 7 days after the end of the Paralympic events), continuing during the interim period between the Olympic and Paralympic Games, when no sporting events were held.

# Objective 1. Early detection of health signals and raising alerts

With a view to preventive or control measures in the event of an alert, the aim is to identify and qualify each unusual health event or situation with epidemic potential, to set out the epidemiological investigations to be conducted (12) around possible cases to assess the risks of spread, and to support the decision-making of the authorities.

**Figure 5. Overview of health surveillance systems during the 2024 OPG**




## Build on existing systems

To achieve this objective, Santé publique France has mainly relied on its existing surveillance systems (see figure above):

- **Surveillance systems based on a network of volunteer GPs** that can identify signals or alerts, such as the Sentinelles Network, which includes over 1300 independent GPs and more than 100 paediatricians in mainland France, participating in the surveillance of infectious diseases, particularly acute respiratory infections. Other examples are hospital departments such as the network of 32 paediatric nephrology departments and volunteer paediatricians involved in monitoring haemolytic uraemic syndrome (HUS).
- **National reference laboratories and networks of voluntary laboratories:** the laboratories of these networks were made aware that a very busy summer period is expected so they can adjust staffing and report any unexpected events as quickly as possible. Among them, the "3-labos" system is based on automated feedback of individual diagnostic data from two centralising sample laboratories (Eurofins-Biomnis and Cerba) for infectious disease surveillance (trend monitoring, contribution to investigations, etc.). The Emergen Consortium is involved in the genomic monitoring of SARS-CoV-2 and the identification of emerging variants.

- **Notifiable diseases:** in France, there are 38 notifiable diseases, 36 of which are infectious diseases that must be declared by the healthcare professional as soon as they are suspected or diagnosed. Healthcare professionals were made aware of early reporting, for example at conferences such as the National Infectious Diseases Days. In addition, as the doctors of foreign delegations received authorisation to practice medicine on French soil for their delegation and their athletes, Santé publique France supported informing these healthcare professionals of their obligations, particularly to report NDs in France, including diseases classified as high priority in the risk mapping. The Ministry of Health also sent messages to healthcare professionals ("Urgent DGS information") highlighting the importance of early reporting or declaration of diseases such as measles (13) or pertussis (14) in a context of resurgence in the run-up to the OPG.
- **Syndromic surveillance:** syndromic surveillance is defined as an epidemiological surveillance system that involves the collection, analysis and interpretation in near real time of non-specific health data, in order to detect health signals that may require public health actions. The data collected *via* its main syndromic surveillance system SurSaUD® are available and ready for analysis on D+1 of their entry into the system. Surveillance consists of analysing syndromic groupings of morbidity data (symptoms, reasons for seeking care, or ICD-10 codes including primary and associated diagnoses) to identify abnormal clusters of cases in space or time. Santé publique France analysed on a daily basis the data on visits to the 700 emergency services of the OSCOUR® network (Organisation of coordinated emergency surveillance, capturing 97% of visits nationally), procedures carried out by 57 SOS Médecins associations and electronic death certificates (48% of mortality nationally). The use of emergency departments and SOS Médecins associations was monitored using 95 indicators covering various fields[2]. These indicators were analysed daily both nationally and regionally, by age group and by type of outcome (return home or hospitalisation). The observed levels of these indicators were compared with those of the previous days and years used as a benchmark.
- **Heatwave and health alert system (SACS):** The integrated heatwave alert and management system is activated each year from 1 June to 15 September. The monitoring of heatwaves, their impact on health and the preventive actions required before or in the event of heat waves were entirely based on the usual actions (15). Météo-France has defined four colour-coded vigilance levels, depending on the strength of the heatwave (green, yellow, orange, red). They translate into health monitoring and prevention actions. The orange level indicates a heatwave (i.e., a period of intense heat for 3 consecutive days and 3 nights, likely to constitute a health risk for the exposed population). The red level is an extreme heatwave, with a significant health impact, exceptional duration, strength and geographic impact.
- **Specific drowning surveillance:** This is activated from 1 June to 30 September and collects data on accidental drownings and drownings of undetermined origin from emergency department visits. The analysis looks at the features of the drowning (day, age of the individual, place) and certain circumstantial factors and results in 3 bulletins over the summer.

[2]General clinical signs; Gastrointestinal pathologies and presentations; Respiratory pathologies and presentations; Dermatological pathologies and presentations; Cardiovascular pathologies and presentations; Neurological pathologies and presentations; Circumstantial indicators; Mental health indicators

- **Support centres for the prevention of healthcare-associated infections (HCAIs):** They play a role in monitoring and preventing HCAIs, for example related to primary care, or in monitoring hygiene practices or serious adverse events. They support the monitoring of trends and emergence of infectious risks or resistant strains, contributing to the identification of health alerts.

## Strengthening collaboration for health surveillance

In addition to these existing mechanisms, supported by its partners, the OPG also emerged as an opportunity for Santé publique France to strengthen its partnerships.

- **ECDC for international monitoring:** In view of the international nature of the event, Santé publique France leant on its partnership with the ECDC, in particular on its expertise in *epidemic intelligence*, i.e. international monitoring of infectious diseases. Building on its use during the Rugby World Cup (RWC) in 2023 (Box 3), *epidemic intelligence* consists mainly of screening various sources of information (media, scientific, etc.), and feedback from agencies in charge of health monitoring. Two weeks before the opening ceremony, the ECDC began monitoring specific to the 2024 OPG and the information was reported to Santé publique France Monday to Friday (and on weekends if there was an ongoing major alert). The objective was to identify information relating to events, cases, outbreaks or epidemics likely to affect the OPG. Building on ECDC expertise in monitoring risks related to mass gatherings (London Games in 2012 with the United Kingdom Health Security Agency and the Euro 2024 football championship with the Robert Koch Institute in Germany), the ECDC and Santé publique France defined, prior to the 2024 OPG, criteria for filtering the items to be analysed daily (incidents, cases, clusters, etc.). These criteria were based on a list of countries (based on ticket buyers' data) and on diseases identified as having potential for spread or being imported into France. Each item was analysed using the 3 epidemiological pillars (time, place and person), and evaluated based on its severity, seasonality and transmission pathways, and finally validated or rejected.
- **Emergency Ambulance Services (SAMU):** Collecting information from SAMUs offered an opportunity to gain insights into unscheduled care, in particular pre-hospital care that is not captured by SurSaUD®. A pilot project was set up for the RWC that confirmed the feasibility and relevance of monitoring two types of data: 1) the volume of all-cause calls to the SAMUs, allowing overall activity and its variations to be monitored, and 2) the individual patient data reported in the SAMU crisis management portal, used in exceptional situations. In line with national procedure, the files of the patients treated by the SAMU during the OPG were linked to specific events, making it possible to identify the cases related to the OPG. Data on call volumes and numbers of patients treated were therefore monitored daily by Santé publique France.
- **Exploratory monitoring of wastewater:** Santé publique France, with the ANSES and the ministries of health and ecology, set up a national system for microbiological monitoring of wastewater (SUM'EAU), as recommended by the European Union (16). The system monitors SARS-CoV-2 in 54 wastewater treatment plants in the 13 French regions on a weekly basis. For the OPG, Santé publique France seized the opportunity to extend surveillance, on an experimental basis, to five other pathogens, based on health risk mapping and expert recommendations (17) at key treatment plants in Île-de-France: poliovirus, Mpox virus, measles virus, influenza A and B viruses.

**Box 2. Experimenting with extending wastewater monitoring during the OPG**

The wastewater microbiological monitoring project, known as SUM'EAU, initiated under the aegis of the Ministry of Health and the Ministry of Ecology with scientific support from Santé publique France for the epidemiological surveillance component and from ANSES for the analytical component, demonstrated its usefulness in monitoring population health during the COVID-19 pandemic.

Santé publique France extended its wastewater monitoring, previously restricted to SARS-CoV-2, to 5 other pathogens based on the following criteria: feasibility of analysis, relevance to the context of the OPG, and the added value of this monitoring to support decision-making. These criteria, which were compared with scientific publications and drew on consultation with 30 experts using the Delphi consensus method, resulted in an agreement on exploratory surveillance of the following pathogens during the OPG: poliovirus, Mpox virus, measles virus, influenza A and B viruses.

Deployed at 5 wastewater treatment plants in the Paris region, one which was already involved and four additional plants, samples were taken twice a week between 24 June 2024 and 13 October 2024, i.e. over a period of 16 weeks starting one month before and ending one month after the OPG. Preliminary results of the experiment showed that each of the viruses, except poliomyelitis, was detected in one or more samples. Detection of SARS-CoV-2 and Mpox was correlated with clinical results identified elsewhere.

This experiment shows how collaboration between public health professionals, microbiologists, health authorities and sanitation stakeholders is essential to deliver a project of this kind, one that demonstrates France's ability to monitor these viruses *via* wastewater. The experiment could serve as a protocol framework for monitoring to be put in place at future mass gatherings, in addition to the usual health surveillance systems.

## New partnerships for monitoring events as closely as possible

As a final tool to strengthen early detection, Santé publique France also developed specific partnerships and set up syndromic surveillance systems as close as possible to the event, involving first responders from approved public safety associations (AASC) as well as medical teams under the aegis of Paris 2024 (Figure 5).

- **Electronic Medical Record (EMR):** Paris 2024 set up an electronic medical record, which collected data from consultations with athletes and Olympic staff at the Polyclinic in the Olympic Village in Saint-Denis, Île-de-France, and from emergency responder stations on the sites. Santé publique France took advantage of the opportunity to retrieve and analyse the anonymised data from this source every day and worked in collaboration with the organiser to define a list of 45 symptoms, which were compared with those monitored through the SurSaUD® system.
- **First aid providers outside the Olympic venues:** The IdF regional unit worked with the two main first aid AASCs, the French Red Cross and the French Rescue and Response Federation, who were posted at the celebration venues and close to the competition venues. During the OPG, data collection via these first responders was integrated into the surveillance deployed in the Paris region only (12 items cross-referenced with the SurSaUD® system indicators and data from the Paris Fire Brigade).

- **Paris Fire Brigade (BSPP), covering Paris and three neighbouring departments:** The IdF regional unit set up a partnership with the BSPP, which provides pre-hospital care for victims. The BSPP have technological equipment that allowed data to be reported in near-real time. Santé publique France and the BSPP identified 7 items capturing the main risks in the IdF risk mapping. This monitoring was included in the regional monitoring conducted around Paris and pre-tested during the 2023 Rugby World Cup (RWC) with daily data sharing from September 2023, and including a historical review of the same year to compare summer 2023 with that of the OPG.

**Box 3. Additional and enhanced preparation in Île-de-France (IdF)**

The first preparatory work for the OPG began in 2021 in the IdF region, as it is here that the majority of the events would be taking place. In addition to the aforementioned literature review on health risks during gatherings, experimental and partnership work was carried out to maximise knowledge and detection of risks for the OPG.

- Meeting for discussions and coordination with partners on the ground: Paris Public Hospitals (APHP), Regional Observatory of Unscheduled Care (Observatoire Régional des Soins Non Programmés, ORSNP), Paris Fire Brigade (BSPP), Paris City Council; Prefecture of the Defence and Security Zone, IdF Regional Directorate for Medical Services (National Health Insurance Fund), civil protection associations; network of local healthcare professionals (Communauté Professionnelle Territoriale de Santé, CPTS) of the 18th district of Paris; Batignolles funeral parlour to be informed quickly in the event of a sudden influx.
- New data sources were established through an agreement with the BSPP for the transmission of their data (syndromic indicators and deaths) and with first aid responders from planned emergency response arrangements (Dispositifs prévisionnels de secours, DPS).
- Relevance and usage of mobile telephone data as a proxy for the population denominator in real time (see Box 4).
- Development of a procedure and emergency instructions for setting up monitoring in the event of an industrial accident/pollution in Île-de-France.
- Pilot assessment of the relevance of OSCOUR syndromic groupings in two emergency departments (Bichat Teaching Hospital and Delafontaine Hospital) in March 2022.

On an experimental basis, in 2023 the IdF regional unit came to an agreement with the IdF Regional Directorate for Medical Services of the National Health Insurance Fund (CNAM) in order to receive indicators on sick leave and the reasons for it, and on the use of diagnostic tests for arboviruses. These elements could serve as a signal, in addition to existing systems, of an unusual increase in one of the diseases monitored in order to measure its impact in time and space in the event of an epidemic.

Strengthening existing processes for reporting to health authorities was also part of Santé publique France's response to the OPG. All surveillance systems were analysed more frequently, including on weekends. To deliver a high level of responsiveness, Santé publique France also set up specific on-call lines, in addition to the usual ones, in order to ensure a 24/7 response capacity. These on-call lines took on the work of analysing and interpreting data, coordinating the joining up and reporting of daily situation updates, providing back up for technical duties in the event of incidents, and strategic support in the event of requests.

# Objective 2: Rapid impact assessment of a health event or exposure to an environmental hazard suspected of having an impact on health

The rapid risk assessment requires reactive data to inform the authorities or for reassurance if there is no impact or event. In this respect, the main syndromic surveillance system implemented OPG labelling, a strategy that was tried and tested during the 2023 Rugby World Cup (see Box 3). In order to assess the impact of the OPG on the use of emergency services and SOS Médecins, specific coding was put in place during the monitoring period. Santé publique France and its partners developed the following case definition: *"Any use of healthcare services relating to a health event that may be linked to a visit to an OPG24 site, i.e. occurring while present at the site, and/or during the journey to or from it, and/or at the end of a visit to the site. OPG24 site means: a Paris 2024 competition site, training site, celebration site (Paris 2024 fan zone, Club France), celebratory gathering site/giant screen in a public space, travel/ transport to or from a site mentioned above, etc.".*

In addition to the usual diagnosis(es) entered by the healthcare professional treating the patient, a specific code (Y339 in the ICD-10 for the OSCOUR network, "Mass gathering for sport" for the SOS Médecins specific thesaurus) was used if the patient met the case definition criteria. In addition to introducing labelling, awareness was raised among the partners of the SOS Médecins and OSCOUR® networks via the French Society of Emergency Medicine (SFMU) through news items on the website, and the distribution of flyers and campaign posters.

**Box 4. Rugby World Cup 2023: a life-sized rehearsal**

In 2023, ten months before the OPG, France hosted the Rugby World Cup (RWC). For the agency, this mass gathering was an opportunity to test the monitoring protocol planned for the OPG and the chain of daily reporting to the health authorities, with a view to reassurance, by confirming the absence of any particular event.

Drawing on existing systems, this was an opportunity to test specific indicators and how they were made available to the authorities. A specific dashboard of 37 indicators for syndromic surveillance was developed and analysed on D+1 and D+2 of each rugby match. Specific labelling, or coding, to identify health events related to the World Cup was implemented in emergency departments and SOS Médecins consultations. Although the RWC did not conclude on the usefulness of this labelling, it was retained for the OPG together with an awareness campaign for healthcare professionals to promote and reinforce its use. Finally, the collaboration on international monitoring with the ECDC was tested and proved to be functional. Although no major health alerts related to the World Cup were identified, the detection in September 2023 of a group of cases of botulism due to sardine consumption in Bordeaux, a southern city that is a hub of international tourism, tested the investigative and communication capabilities in the context of a highly media-sensitive event.

During the OPG, the rapid assessment of an event and the qualification of any signal were strengthened to anticipate the risks to public health and respond diligently to any political or media requests. Every day, daily meetings were organised both internally to share any events and signals that had occurred and to qualify the risks, and externally with the Ministry of Health and the ARS to share the latest information, government needs or requests. These meetings took place 7 days a week. Discussions were also planned, or launched if necessary, to manage

health risks related to heat within the framework of the SACS (with the Ministry of Health and Météo-France), the sharing of information on international monitoring with daily discussions on infectious disease signals, and with the CESPA.

**Box 5. The use of mobile data to estimate population denominators in Île-de-France (IdF)**

In order to contextualise the surveillance data for the summer of 2024, the IdF regional unit of Santé publique France sought to estimate the population denominators, taking into account the departures of Paris residents going on holiday and the arrivals of national and international visitors. Provided by the main mobile phone operator, daily population estimates were modelled from the antenna–mobile phone connection data. Available from 1 June to 30 September 2024 for each department, these data indicated the origin of the SIM card, whether France or one of 180 other countries/territories.

During the enhanced surveillance period, 493,368,201 person-days were recorded in IdF.

- 63.9% were residents of IdF of all nationalities combined, 12.8% were residents of France other than IdF of all nationalities combined, 8.2% resided in the European Union/United Kingdom/Switzerland, and 15.1% resided outside the EU/United Kingdom/Switzerland.
- The estimated population of IdF residents ranged from a maximum of 10,636,392 on 4 June to 5,709,363 on 17 August (i.e. -46.3%), the lowest number in the OPG surveillance period. The number of residents outside the European Union/United Kingdom/Switzerland varied between 1,834,441 on 2 August and 1,467,726 on 1 September.

In IdF, the experimental analysis of these data meant that the rising indicators could be contextualised in late summer, the slowdown observed in the IdF SARS-CoV-2 circulation data could be corrected, and visitor numbers could be estimated from countries affected by the influenza A epidemic, or the Mpox epidemic after the WHO declared it a public health emergency of international concern on 14 August 2024. Near-real-time population estimates helped to contextualise the summer 2024 epidemiological indicators.

## Objective 3. Provide data on health events occurring in the context of the OPG in order to describe an event and report its substance to all stakeholders

The surveillance carried out by Santé publique France was reported to the health authorities at both regional and national level for support with decision-making and for reassurance (Table 1). This process included daily national and regional health situation updates in regions hosting OPG events, shared every day at 3 p.m. with the Ministry of Health. The objective of the daily situation update (PSQ) was to provide a summary of the alerts and signals identified by the various health surveillance systems. It was therefore a matter of quickly reporting an event to the authorities and reassuring them when nothing was out of the ordinary. Due to the inherent operational limitations of the systems and the time needed for analysis, the PSQ was based on data from the previous day, with alerts or signals from the day potentially added. The PSQ, in particular those from IdF, were also shared with the organiser of the Games, Paris 2024, who was thus able to inform the IOC. In addition, specific national and regional weekly bulletins (BH) for the OPG were drafted, covering the events and monitoring of the previous full week, with a comparative analysis of the indicators of the different systems from one week to the next. These bulletins were published online on the Santé publique France website and translated into English so they could have a wider impact on public health stakeholders internationally.

Adjustments were made to the activation of surveillance systems complementary to the existing ones and the frequency of reporting to the authorities based on when events were being held in the regions. In addition to the enhanced surveillance period, the reporting period was determined based on epidemiological relevance and taking into account the periods when the National Strategic Command Centre (CNCS) was activated at its highest alert level. The PSQ were therefore produced between 15 July and 12 August 2024, then between 21 August and 9 September 2024, and the BH published every week between 16 July and 10 September 2024.

**Figure 6. Content of Daily Status Updates (PSQ) and Weekly Bulletins (BH)**

| | **PSQ** | | **BH** | |
|---|---|---|---|---|
| *Geographical coverage* | *National* | *Regional* | *National* | *Regional* |
| SACS | ✔ *(if orange/red warning in place)* | X | ✔ *(if orange/red warning in place)* | X *(specific existing bulletin)* |
| Alerts | ✔ | ✔ | X | X |
| SurSaUD® | ✔ | ✔ | ✔ | ✔ |
| SAMU | ✔ | ✔ | ✔ | ✔ |
| Paris 2024 EMR | ✔ | ✔ | X | X |
| International monitoring | ✔ | X | X | X |
| BSPP | X | ✔ *(only in IdF)* | X | ✔ *(only in IdF)* |
| Civil Protection Associations | X | ✔ *(only in IdF)* | X | ✔ *(only in IdF)* |
| Mortality | ✔ | X | ✔ | X |
| Wastewater surveillance | X | X | ✔ | ✔ |

# Prevention of the main health risks

Based on risk mapping, prevention focused on three main risks: heatwaves, vector-borne diseases transmitted by mosquitoes, and measles. In order to ensure consistent messaging, the process of developing prevention systems was collaborative, with all stakeholders made aware of the main risks.

## Heat-related risks

Heat-related risks were identified as among the most critical since the first health risk mapping and as a result preparation had been in progress at the inter-ministerial level since 2022. The existing SACS heatwave alert system was available for health surveillance (19), and it also consists of a prevention system appropriate to the different heatwave warning levels (preventive communication, activation of a freephone number, etc.). In preparation for the OPG, and to prepare for the range of non-French-speaking populations, Santé publique France adapted and created new tools (posters and leaflets) available in English, and increased the volume of prevention tools distributed, in particular through its partnership with the Paris transport authorities, and in fan zones organised by the cities. An OPG "toolbox" for foreign travellers was developed in partnership with the Ministry of Health. It included printed materials and digital resources. The prevention messages were adapted so they were appropriate to the OPG spectators given their specific characteristics (expected to visit multiple sites). A few days before the opening ceremony, the French Ministry of Health, Santé publique France and Météo France published a press release to restate the prevention measures to take during heatwaves (20).

Collaborating with Paris 2024, the organiser of the OPG, meant that prevention recommendations could reach the OPG spectators. Discussions with the Paris 2024 medical team on heat risks and preventative measures began 18 months before the opening ceremony. Through this work, agreements were reached on the messages, particularly for outdoor events in the event of a heatwave, and on adapting them to the Paris 2024 graphic charter to ensure that visitors would be more likely to follow them. An agreement was made that ticket holders would from time to time throughout their "spectator journey" be sent awareness-raising emails and SMS messages, translated into 12 languages, prior to the events, as well as receiving video or audio messages on the site, all operated by Paris 2024.

## Arboviruses transmitted by mosquitoes

The risks of arboviruses were identified from the very first health risk mapping, and rated as one of the highest risks in summer 2024. Preventive actions focused on these vector-borne diseases in order to limit the number of cases and make sure that healthcare professionals would deliver early treatment and raise alerts. A "Guidance for your practice" leaflet was provided to professionals to remind them of the symptoms and actions to be taken (21). Presentations were given to biologists and infection specialists at Bichat Hospital, and at the annual meeting

of the Society of Travel Medicine. Prevention documents were updated and distributed via social media or as paper leaflets to encourage travellers to adopt preventive measures and remind them how to react if symptoms occur. The outcome of continued work with Paris airports was that prevention messages were also on display there.

## Prevention of measles

In the spring of 2024, the resurgence of measles epidemics around the world highlighted the need to remind travellers about the importance of vaccination to prevent transmission of the disease. This is one of the most contagious diseases (one case can infect up to 18 individuals) and its complications can have serious impacts including death, which is why it is ranked among the highest risk diseases in the health risk map. In this context, it was important to limit the potential number of measles cases through prevention targeted at travellers. Beyond travellers, the French population were also reminded of vaccination recommendations. The objectives of communication were to encourage each person to check their vaccination status. As with the previous risks, Santé publique France updated and strengthened the promotion of its prevention tools. European Immunisation Week (21-27 April 2024) was an opportunity to encourage the ARS to promote measles vaccination.

**Box 6. International collaboration across the health sector to prevent health risks related to the OPG**

In 2024, the WHO, ECDC (European Center for Disease Prevention and Control), the French Ministry of Health and Santé publique France collaborated to produce a joint public health advice notice (22) for travellers attending the OPG. It covers a wide range of topics such as vaccination, respiratory diseases, heatwaves, food and water safety, diseases transmitted by insects, tobacco and alcohol consumption and sexually transmitted diseases. It also explains how to access healthcare in case of need, as a lack of knowledge on how to seek care is a risk identified by Santé publique France as potentially leading to treatment delays.

This international partnership was down to the unprecedented scope of the OPG. In future, it will be useful to consider prevention issues at smaller gatherings, to understand who is involved and to focus on areas for action at the earliest opportunity.

# Optimising intervention capabilities by strengthening pharmaceutical resources

## Anticipating the distribution of pharmaceutical needs in France

When requested by the Ministry of Health to participate in an assessment of capacity for health resources, including strategic pharmaceutical stocks, Santé publique France and the ANSM anticipated an increase in the need for pharmaceutical countermeasures. According to the probability of their occurrence, the impact and the national recommendations for treatment and prevention, 11 infectious diseases[3] present in the risk mapping were identified as potentially being subject to a rise in demand for products, whether for treating cases (antitoxins, monoclonal antibodies, antivirals), preventing secondary cases (vaccination, antibiotics, immunoglobulins) or organising population vaccination campaigns. These needs were compared to the quantities available, whether in hospital internal pharmacies or in the strategic stock of Santé publique France for certain medical countermeasures. The quantities available in the State's strategic stocks were deemed sufficient to cover the identified risks without the need for additional acquisitions.

In addition to anticipating these medical countermeasures, the possible increased use of diagnostic tools by healthcare professionals, such as saliva kits for measles diagnosis for general practitioners, was anticipated. Ahead of the OPG and in a context of risk of measles importation, Santé publique France reminded the ARS of the order circuit so that they could ensure the proper transport of these kits throughout the country. The ANSM made manufacturers aware of the need to anticipate increases in requirements during the OPG.

An increased use of laboratory consumables was anticipated during this period, particularly for botulism, viral haemorrhagic fever and Mpox. Pharmaceutical products, including botulism and diphtheria antitoxins, held by the Pharmaceutical Establishment were positioned close to the OPG sites in order to reduce distribution times.

With regard to non-infectious risks, a committee of experts feeding back to Santé publique France updated the therapeutic recommendations for tactical stocks positioned in healthcare facilities. At the request of the DGS, additional acquisitions targeting CBRN (chemical, biological, radiological, andnuclear ) threats were made by Santé publique France from 2023.

[3] Botulism, Diphtheria, VHF, Acute hepatitis A, Invasive meningococcal disease, Mpox (clade I/IIa and IIb), Rabies, Measles, Influenza, Poliomyelitis

## Multi-purpose mobile healthcare unit

Before preparation for the OPG began, the Ministry of Health had mandated Santé publique France to purchase a mobile medical capacity that could be mobilised in the event of an exceptional situation. The advent of the OPG accelerated the opportunity to acquire a multi-purpose mobile healthcare unit (Unité Sanitaire Mobile Polyvalente, USMP), which could be used for the OPG. It was acquired prior to the Games and made available to the APHP to be positioned on the Champs Elysées, a site for Olympic events and celebrations. First response care could be provided from the unit.

# Operational planning and coordination

During the OPG, specific coordination within the agency and management of teams and schedules were required in view of the multiplicity of stakeholders, the high need for reassurance, investigation and information, and the management of an expected peak of activities.

## From theory to practice: orchestration ahead of the Games

Santé publique France set up a specific steering committee for the preparation of the OPG, tasked with monitoring the progress of each project, unblocking situations, providing reactive arbitration and feedback on the latest preparatory events from partners or government authorities. Between 2022 and 2024, the recruitment of seven dedicated fixed-term contract staff helped to consolidate the delivery of the projects. In 2024, ahead of the Games, Santé publique France anticipated the organisation of the necessary work over the period, boosted by an internal call for volunteers to support the teams who would be on the front line during the summer, with the final ad hoc adjustments on the ground. With new internal staff with volunteers being deployed outside their usual roles, as well as external staff with the specific OPG recruitment taking place within the Ministry of Health, Santé publique France decided to offer internal and external training to staff. The aim was to provide a common understanding of the agency's missions during the Games, its organisation and how the actions were to be carried out and the results delivered, in order to ensure harmonious collaboration during what was expected to be a pressured time. To make sure that the Games volunteers acted consistently in support of the teams on the front line, internal training specific to each task or mission was provided.

In anticipation of possible epidemiological surveys in different languages, an internal survey of the languages spoken by the staff was carried out (this ultimately proved not to be necessary to support investigations during the OPG).

**Box 7. Enhanced support resources**

To strengthen back-up arrangements and ensure operational continuity during the Games, additional equipment was deployed to front-line teams, particularly in the regions hosting events (computers, 5G connectivity and telephones). Satellite telephones were also put into operation to ensure availability in the event of a network outage. Finally, Paris 2024 and the IOC had anticipated nearly 50 accreditation applications (although these were ultimately not used) in case epidemiologists were needed for investigations within the Olympic sites, although logistics management caused significant delays in awarding accreditation.

## Training and rehearsals before the opening

In its preparation for the OPG, Santé publique France organised two internal exercises and participated in a simulation exercise organised by the organiser, Paris 2024.

An initial internal crisis simulation exercise, known as **Charléty**, was performed on Thursday 25 May 2023 over half a day. The objectives of the scenario were to test the monitoring and surveillance tools, as well as the agency's response, if concomitant environmental and technology events were to occur in a mass gathering context. Ahead of the OPG, it highlighted the importance of appropriately distributing and defining each team's/person's role, including in the escalation hierarchy for decision-making, and that actions to be taken needed to be ready to use, particularly for implementing monitoring in the event of an industrial accident or pollution.

A second exercise called **Javelot** was performed on 21 May 2024 over a period of 8 hours. The purpose of the exercise was to test the organisation, monitoring and feedback planned for the OPG and it simulated a situation that was ramped up to crisis point, with the deterioration of the agency's essential functions. The operational areas identified to consolidate ahead of the OPG included defining the internal communication flow specific to the OPG and the roles of the coordinators (including during non-working hours), and finalising a procedure setting out the operations planned for the OPG.

These exercises also form the groundwork for the future preparation for mass gatherings consisting of, in particular, exercises organised well in advance of the event integrating different aspects of crisis communication and planning for a pool of human reinforcements formed ahead of a crisis.

On 15 and 16 May 2024, Santé publique France also participated in the **SimEx** exercise run by the organiser of the Paris 2024 OPG, which simulated a medical incident (food poisoning outbreak) and a geopolitical incident. For Santé publique France, this was an opportunity to test its communication flows with the Ministry of Health in the context of the OPG, which involved placing a liaison officer at CORRUSS, the health and social emergency response centre. There were clear advantages to this choice, as it made exchanges easier between the operational centres of the DGS and Santé publique France.

**Box 8. The arrival of the Olympic Flame in Marseille**

For the arrival of the Olympic flame in Marseille, the first stage before continuing throughout mainland and overseas France, Santé publique France strengthened its current health monitoring and surveillance system. Taking place on 8 May, this coincided with an extended public holiday weekend to mark VE day (1945 Victory in Europe day), and a specific on-call phone line was set up for the purpose of reassurance for the health authorities. A specific analysis of syndromic surveillance data (SurSaUD® system) was additionally sent to the regional and national authorities over the two days following the event.

Monitoring was maintained throughout the flame's journey without strengthening the existing mechanisms until the opening of the specific OPG surveillance on 8 July 2024 (i.e., 7 days before the arrival of the Olympic flame in IdF and 16 days before the start of the Olympic events).

## Participating in coordinated communication

Government communication was coordinated by the DIJOP. For health-related topics, communication was entrusted to the Ministry of Health, which required close collaboration with other stakeholders such as Santé publique France or the ARS. As previous OPG hosts had shared, clear communication is essential between existing stakeholders and temporary OPG bodies. Equally important within each entity involved in the OPG, Santé publique France ensured good communication with its agents so that they understood the agency's commitments, remit and role during the OPG. There were a number of communication challenges for the agency: ensuring that public health messages and monitoring indicators were seen and properly understood by both stakeholders and the population, preparing the agency to intervene on sensitive subjects and, lastly, taking the opportunity to use the event to promote physical activity and its health benefits more widely, this being the government's major national cause for 2024 (23).

The emphasis was placed on:

1) **Enhanced access to information for all** and raising awareness of Santé publique France's actions through the creation of a dedicated space on the website, in French and English, showcasing Santé publique France's preparations for the OPG, presenting the planned strengthened surveillance, prevention resources and recommendations for healthcare professionals, providing information on frequently asked questions. Available from 11 June 2024, the regional and national OPG weekly bulletins were also published here and reposted on social networks such as X, LinkedIn and Facebook. Regular communication was organised with the media to relay monitoring indicators and prevention messages. Given the international scope of the event, the OPG website in English and the weekly bulletins in English appeared to be a key strategy for informing international partners and IOC bodies about the Agency's preparations.
2) **Anticipating and being prepared for a crisis and planning a response with the ministerial authorities,** centralising communication on the OPG, with wordings on the main risks developed in advance in French and English, and ensuring media coverage, including social media and weekly feedback on current topics. Santé publique France also chose spokespersons for certain topics and they received specific media training prior to the OPG. A support guide to media response was also produced, with the aim of being as well prepared as possible to respond if any health crises occurred. In addition,

between 17 June and 11 September, Santé publique France adjusted the monitoring of social networks and the media to strengthen the monitoring of mapped risks.

3) **A specific internal communication was organised at each preparation stage with all agents,** in order to discuss and transmit dedicated information on how Santé publique France would be organised for the summer of 2024. As all agents were impacted by adjustments to the way their work was organised (extended remote working, additional
on-call duties, etc.), a proper understanding of the agency's place in the 2024 Games landscape was essential.

## During the OPG: implementation

In order to provide data, produce daily deliverables and comply with inter-ministerial organisation, Santé publique France defined a precise daily schedule for the OPG. It included daily coordination meetings to share requests, problems related to surveillance systems (such as delayed receipt of health data) and health alerts, both internally and with the Ministry of Health. The aim was to analyse and interpret the data, gather information from different sources and produce daily and weekly reports, while identifying the highlights of the day. The same process took place at weekends. Although the OPG deliverables were specific to the Olympic and Paralympic period, Santé publique France used its existing tools such as the daily bulletin of alerts (Bulletin quotidien des alertes, BQA), issued on a daily basis since 2004 to share health alerts and updates on their development with the authorities and partners involved.

The overall organisation of the agency during the OPG was recorded in an operational document (ConOps), a reference document containing all useful information such as the daily meeting times and deadlines for deliverables and outputs, a description of partners and their roles, arrangements for tasks and on-call duties, key teams and contact persons and a procedure in case of an incident.

# Time to take stock

# A summer under surveillance: a review of health alerts

## Enhanced monitoring during the OPG: 321 reports issued and 14 health alerts reported

During the enhanced surveillance period, between 8 July and 15 September, Santé publique France produced 321 reports: 271 daily reports (44 national and 227 regional) and 42 weekly BEH (including eight in English). In the absence of any significant health event, specific OPG output fed back to the authorities was reduced between the Olympic and the Paralympic Games (Figure 6).

As part of the enhanced health surveillance implemented during the OPG, several alerts and signals were reported to the health authorities, although none of them ultimately constituted a major public health event. These included the main risks identified in the mapping presented above, with leading causes being arboviruses, the risk associated with high temperatures and food poisoning (Figures 6 and 7).

Looking at heatwaves, the summer of 2024 was ranked the eighth hottest summer since 1900 according to Météo France, with a long heatwave spread across eight regions (i.e. 40% of the French population), although IdF was not affected. This was characterised by two temperature peaks during the Games, between 28 July and 2 August and then between 8 and 14 August, which led to the usual prevention measures being activated (see Box 8).

Among the alerts for infectious diseases, the majority concerned the epidemiological situation of arboviruses, including the first indigenous case of chikungunya in IdF, cases of West Nile virus infection and two indigenous cases of dengue in PACA. In addition, two salmonella outbreaks and suspected listeria in food served in the Olympic village were also closely monitored. Internationally, one case of Crimean-Congo haemorrhagic fever was reported in Madrid, cases of COVID-19 occurred in the Australian delegation, and athletes affected by gastroenteritis, initially associated with the triathlon, were reported, although the risks to the health of populations in France were estimated to be very limited. Even if not directly related to OPG events, these reports provided some context to the health situation and illustrated Santé publique France's ability to detect the signals.

Other information on the health situation in France was available as part of the usual summer monitoring, in particular the alerts sent by Santé publique France via its BQA. Of the alerts reported in the BQA, four were also reported in the OPG PSQ during the monitoring period:

- New salmonellosis epidemic (S. Enteritidis HC5_ 378560);
- Salmonellosis epidemic, serotype 4,5,12: i: - HC2_235492;
- West Nile virus circulating in PACA;
- Cases of chikungunya with strong suspicion of indigenous contamination – IdF.

Finally, an alert that occurred during the enhanced monitoring period that could in retrospect be qualified as of interest in the context of the Games was reported via the BQA once the enhanced monitoring period had ended. These were a cluster of legionella cases in Paris. A misting system installed for the OPG was suspected at that point, although there was no validated causal link.

## No "OPG effect" observed

Compared to the previous years (2022–2023), neither the usual systems nor the arrangements put in place for the Games showed any excess activity during the enhanced monitoring period of the OPG. In total, away from the Olympic sites, 1,472 cases were identified as being connected to the OPG, including 1,042 in the emergency departments, mostly in IdF (70%) and involving French residents (71%), with people usually residing abroad more likely to opt to call to the SAMU (see Box 11).

Among the 16,683 care events recorded in the files of the Paris 2024 Polyclinic (EMR), the majority were injuries (39%), feeling faint (22%) and skin problems (18%), with peaks recorded during times of high temperatures, and they mainly involved spectators (52% versus 22% in Paris 2024 staff, and 19% in athletes or members of the Olympic family).

In total, of the 103 signals detected through the various surveillance systems, 32% led to an investigation, and none were qualified as a public health alert.

## Multiple sources for reassurance and operational continuity

While most surveillance systems were in operation throughout the reference period, some technical challenges were encountered during enhanced surveillance. Firstly, analysis of the data from the Paris 2024 EMR was only available from 31 July, i.e. 5 days after the opening ceremony and 23 days after the start of the enhanced monitoring, due to tasks for stakeholders being prioritised and a period of testing this new system, the data produced and the epidemiological interpretation. In addition, on several occasions, the absence of data from emergency services or other stakeholders was noted and reported to the health authorities. Nevertheless, this technical difficulty had only limited impact thanks to the availability of other data for the same area. In fact, the multiplication of data sources for syndromic surveillance (BSPP, AASC in IdF, SurSaUD®) led to a more complete cross-analysis of events related to the OPG and the potential outcome of receiving no information in the event of a system failure was avoided (see Figure 6).

The majority of the alerts mentioned above were identified by routine surveillance systems, which demonstrates that national epidemiological surveillance is already robust. In addition, data from first responders (BSPP, Red Cross, Paris 2024) contained a wealth of information, and showed similar trends to those observed in routine surveillance systems; i.e. mainly stable activity and a slight increase in fainting noted occasionally during hot weather peaks (see Box 9).

**Box 9. Paris 2024 OPG Summer Heat and Health Report (24)**

Identified as one of the biggest risks for the OPG, heat-related risks were given special attention in preparation for the Games and in the reporting during the events.

In summer 2024, Santé publique France highlighted a major heatwave episode between 28 July and 14 August. It affected 43 departments in eight different regions, excluding IdF, i.e. 40% of the population residing in France. Two temperature peaks marked this episode, between 28 July and 2 August and then between 8 and 14 August. During this period, OPG football events were held in several cities (Nice, Marseille, Bordeaux, St-Étienne and Lyon) in the affected regions between 28 July and 3 August, as well as sailing events in Marseille on 2 and 3 August. No heatwave episodes were observed during the Paralympic Games.

In terms of prevention, distribution of leaflets paper resources translated into English was stepped up by Santé publique France to meet the needs of the influx of tourists. In addition, the health and heatwave alert system (SACS) tools available were deployed as usual in line with the Météo France heatwave warning level. In 2024, Santé publique France resources were downloaded 320,964 times, including 245,375 leaflets in French and 37,076 in English, 18,643 posters on the right actions to adopt in the event of extreme heat, 19,870 posters on warning signs (16,909 in French and 2,961 in English). Between 1 July and 31 August, Santé publique France's digital animation highlighting the preventive actions take was shown in pharmacies and on 940 screens in healthcare facilities. Between 1 and 14 July, i.e. before the OPG, it was broadcast 122,500 times in hospitals. The digital broadcast planned for periods of orange heatwave warning was activated seven times between 29 July and 9 August. Finally, the "Heatwave info service" freephone number, coordinated by the Ministry of Health, was activated twice: from 19 July to 2 August then from 10 to 13 August.

The national assessment found more than 17,000 cases of emergency care for the composite health indicator iCanicule (including hyperthermia, dehydration and hyponatraemia), recorded in particular during heatwaves. All age groups were affected, particularly those aged 75 and over who accounted for 52% of emergency department visits and 24% of SOS Médecins consultations for the iCanicule indicator. During heatwaves, more than 600 deaths were estimated to be attributable to heat exposure, i.e. more than 10% of all-cause mortality observed during these episodes (out of 3,700 deaths over the entire monitoring period). Deaths were observed in all age groups, but the vast majority, over three quarters, were in people aged 75 and over, both over the summer and during the heatwaves.

**Figure 7. List and timeline of health situation reports in regional and national PSQ during the Olympic Games**

| | | Location of alert | Description of reports |
|---|---|---|---|
| **International monitoring** | W1 | Spain | Confirmed case of Crimean-Congo haemorrhagic fever in Madrid (Spain) |
| | W2 | IdF | Cases of COVID-19 in the Australian delegation |
| | W3 | IdF | Cases of acute gastroenteritis in Belgian and Swiss athletes reported by the media - suspected link to the triathlon |
| **Environmental alerts** | C1 | IdF | Anticipation of an ozone pollution episode |
| | C2 | HdF | Increase in SAMU interventions related to the heat in the Olympic Torch Relay |
| | C3 | National | Activation of the digital heat-related risk prevention system |
| | C4 | | Major heatwave episode |
| **Infectious signals** | I1 | CVL-PdL | Pre-existing salmonellosis 37 epidemic 8,560 *(in follow-up since 18 June 2024)* |
| | I2 | CVL-PdL | Salmonellosis 23 epidemic 5,492 |
| | I3 | PACA | 1st Indigenous case of West Nile virus 2024 in the Var |
| | I4 | IdF | 1st indigenous case of Chikungunya - confirmed on 29 July |
| | I5 | HdF | Suspected cluster of legionellosis cases |
| | I6 | IdF-HdF | Suspected listeria in cabbage (Olympic village meals) |
| | I7 | ARA | Reminder of risk of contamination (low) with leptospirosis |
| | I8 | PACA | Confirmation of two equine cases of West Nile virus in the Var *(link with I3)* |
| | I9 | PACA | 1 indigenous case of dengue identified in the Alpes-Maritimes |
| | I10 | PACA | 2 indigenous cases of dengue identified in the Alpes-Maritimes |
| | I11 | PACA | 2 new human cases of West Nile virus in the Var *(link with I3-I8)* |
| | I12 | HdF | Ambulance service transfer of an absolute emergency in the North (cardiological reason) |
| **Data issues** | D1 | IdF-ARA | Emergency department data unavailable |
| | D2 | PdL | Absence of emergency department data from the main hospital in Nantes |
| | D3 | ARA | Absence of emergency department data from Lyon Public Hospitals |
| | D4 | National | Incomplete data from electronic death certification |
| | D5 | PdL | Absence of emergency department data from the main hospital in Nantes |
| | D6 | IdF | First report on data collected from first responders |
| | D7 | IdF | No output and transmission of emergency department data from the APHP to Santé publique France |
| | D8 | PACA | Incomplete transmission of hospital emergency department data |
| | D9 | IdF | Absence of data from the AASC |

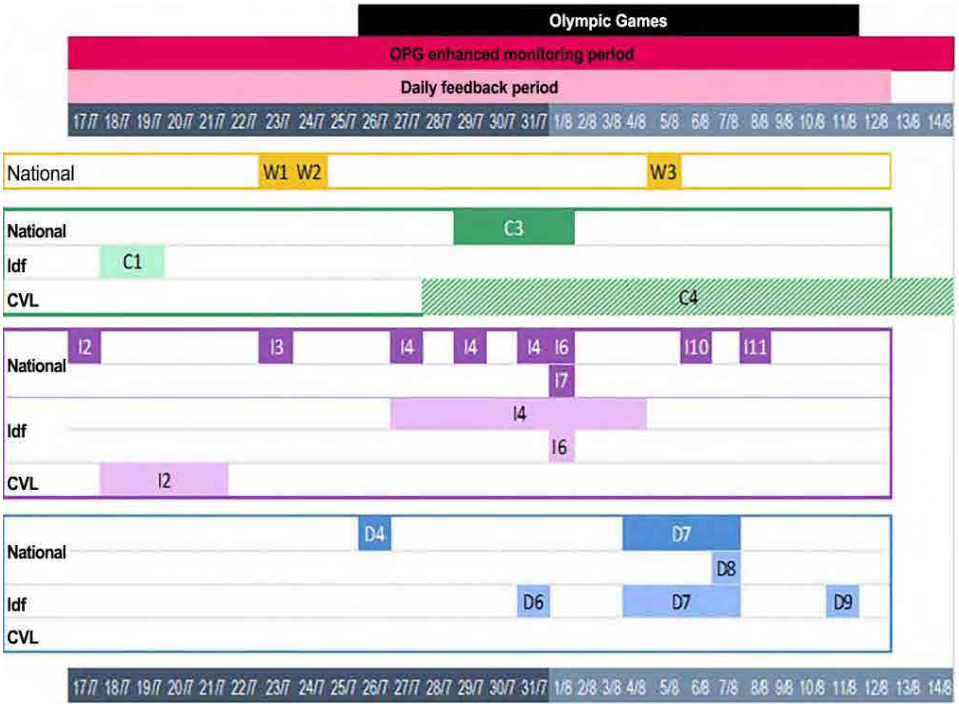
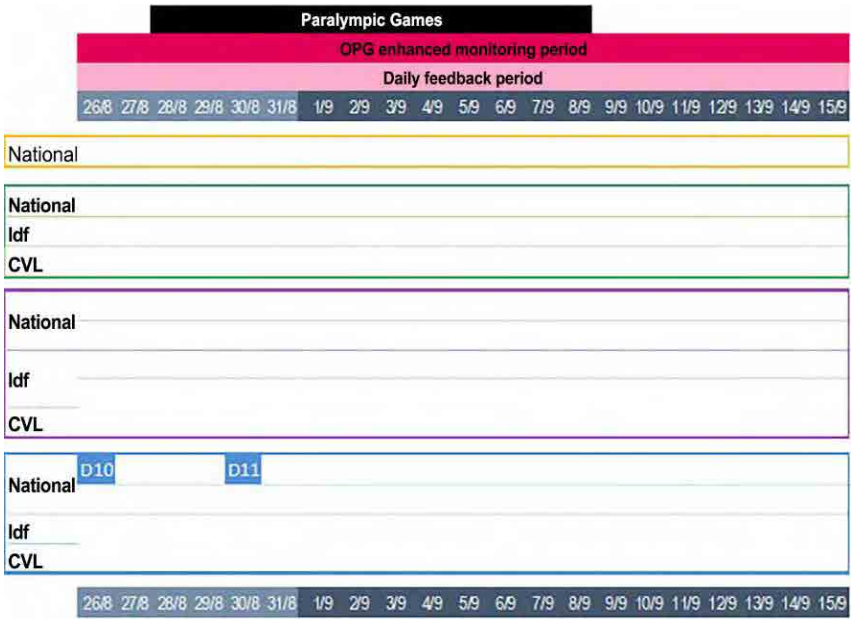


**Figure 8. List and timeline of health situation reports in regional and national PSQ during the Paralympic Games**

| | | Location of alert | Description of alert |
|---|---|---|---|
| **Data issues** | D10 | National | Absence of mortality data from electronic certification |
| | D11 | National | Absence of mortality data from electronic certification |




**Box 10. What is the assessment of surveillance by first responders in IdF?**

The BSPP and the AASC are the first responders to victims in Paris and in neighbouring departments at large gatherings. During the OPG, the IdF regional unit supplemented its syndromic surveillance with systems based on daily BSPP and AASC data to monitor various health indicators and trends. A list of 7 indicators was selected with the BSPP to include the main infectious and environmental risks monitored during the OPG. Paris 2024 was in charge of coordinating first aid posts inside the Olympic sites, and the Red Cross outside. A list of 12 indicators was incorporated into the software used by the first responders, supplemented by variables such as severity, patient course and location. Every day, the BSPP, Paris 2024 and the AASCs each automatically sent Santé publique France an anonymised database containing the individual data of patients seen the previous day.

No significant increase in activity or number of victims treated was observed for the BSPP compared to 2023. The BSPP responded on average to 944 people per day during the Olympic Games, and 1,030 people during the Paralympic Games. The main reasons for treatment were injuries (20%). A slight increase in fainting was observed on 30 July, a very hot day, with 192 cases reported (+41% compared to previous days). A similar increase was observed in SurSaUD® on the same day. The Paris 2024 first aid stations cared for nearly 10 times more patients than the AASC stations (14,498 vs. 1,540). The main reasons for attendance were injury (nearly 40% for both). No clustering of cases or health alerts related to the OPG were reported, which is corroborated by other surveillance systems in place.

This monitoring of first responders led to a better understanding of health needs by providing data on pre-hospital care. They contributed to providing reassurance to the health authorities and the organiser of the OPG. Monitoring by the Paris 2024 EMR, however, cannot be compared with previous years. The surveillance partnership with the BSPP is a legacy of the OPG that can be capitalised on in IdF.

**Box 11. Summary and lessons for international monitoring or *epidemic intelligence***

Between 15 July and 13 September 2024, the ECDC shared 177 events identified as relevant in the context of the OPG. These covered 29 diseases, and 17 events were classified as signals. Three signals were reported in the daily situation update (PSQ) sent to the Ministry of Health. The pathologies reported most often were arboviruses (23%), COVID-19 (16%), Mpox, pertussis (7%), measles (6%) and acute gastroenteritis (6%).

None of the elements detected were the subject of an alert that could have led to a risk for the population present for the OPG. This result is in line with past experiences seen in the scientific literature.

What should we take away from this?

Arbovirus signals coincided with the epidemic period in Europe, and Santé publique France already provides enhanced monitoring for this between 1 May and 30 November each year. With climate change and mosquitoes increasingly being found further north, monitoring is necessary particularly in the context of mass gatherings involving international travel and consequently an increased risk of imports.

- International monitoring is useful and complementary to existing monitoring systems. This monitoring also detected national signals, which are also routinely captured by national systems.
- Lesson from the London OPG in 2012: International epidemic intelligence is a key element in detecting and combating misinformation. When a nation works with Europe to build an agile and responsive partnership leading to a smooth communication strategy for alerts occurring during the OPG, it can also be applied in the event of misinformation to the various stakeholders and the public.
- Human resources may be under pressure due to the number of daily signals to be checked and interpreted if necessary.

**Box 12. Summary and recommendations of syndromic surveillance during the OPG**

Compared to the previous years (2022–2023), there was no excess activity during the enhanced monitoring period of the OPG. An expected increase, not specific to regions hosting events, was observed around 15 August, when reduced primary care availability due to the public holiday meant individuals turned to emergency departments or SOS Médecins. In total, excluding the EMR, there were 1,472 OPG-related cases identified, including 1,042 in emergency departments. The majority of patients were concentrated in IdF (70%) and mostly lived in France (71%), with people usually residing abroad more likely to opt for calling the SAMU.

The care events recorded in the EMR (N=16,683) were mainly injuries (39%), followed by feeling faint (22%) and skin problems (18%). Of these, 52% were spectators, 22% were Paris 2024 staff, and 19% were athletes or members of the Olympic family. The days of greatest activity were 30 July, when there was a temperature peak, and 11 August, coinciding with the "Marathon for All".

A total of 103 signals were detected using these multiple surveillance systems, with 32% leading to an investigation, but none were qualified as a public health alert. Data from Paris 2024 (EMR), with no comparison possible, were more often qualified as signals (62%).

What should we take away from this?

- Rejected signals were common. Being able to compare data with previous years and identify an event as related to the OPG means improved characterisation of the external risks and the risks resulting from the event with a potential for dissemination.
- In the context of a mass gathering, the responsiveness of the systems informing decision makers is essential. As syndromic surveillance data was only available with a day's delay, we needed to remind decision makers of this constraint so that it would be taken into account in their reverse scheduling.
- Specific coding is valuable if it is founded on a strong and informed network of partners. When this type of coding is used regularly in the context of exceptional climate-related events (e.g. storms, cyclones), accidental events (e.g. industrial accidents) or mass gatherings it becomes easier to adopt.
- It is useful to launch monitoring ahead of the gathering to allow time to test the procedures, to understand what is "background noise" and to identify any incidents just ahead of the event.

# Summary of communication actions

## A dedicated page on the agency's website

Launched specifically to keep the general public informed, the OPG page of the Santé publique France website was visited 4,500 times between June and August 2024, with a peak on the day of the opening ceremony of the Olympic Games. This number is consistent with what would be expected in so-called "normal" circumstances, where no particular health event occurs. Weekly national and regional bulletins, and the English translation of the bulletin, were not often consulted on the website. However, this does not include partners with whom Santé publique France has shared its resources directly viewing the materials. Low consultation rates for the bulletins published online can be explained by the absence of major health events.

## Social media activity remained stable

Santé publique France maintained an important link on all its social networks to promote understanding of its work and ensure that its messages were visible. During the OPG, between 11 July and 23 September 2024, Santé publique France produced 10 LinkedIn posts with a higher-than-average engagement rate[4], and 14 Facebook posts and 14 X posts, with average engagement on both networks.

Overall, the engagement rates are consistent with those obtained for the agency's usual posts and higher than the engagement rates observed in the healthcare sector.

## Greater media attention ahead of the Games

As with previous Games, media interest was greater in the run-up to the OPG. When Rio hosted the 2016 OPG, the media had heightened the panic about the Zika epidemic in Brazil in the months preceding the Games (25). The WHO issued a press release on recommendations to travellers, athletes and visitors regarding the Zika virus (26). Santé publique France identified 26 requests for information related to the OPG from the press between January and mid-September 2024, with increased interest in the possibility of epidemics of sexually transmitted infections or measles and heatwaves. In 2024, the agency recorded 788 media mentions citing surveillance data from the published weekly bulletins and prevention data.

Adapting its strategy to the health context and its requirements, Santé publique France provided regular media monitoring of risks during the summer and organised communication sessions, including a press review on drowning and arboviruses prior to the OPG.

While the first two bulletins attracted greater interest, the absence of a major health event during the Games may explain the lack of general media coverage of the agency's publications.

[4] The engagement rate is the percentage of interactions (likes, comments, shares, clicks, downloads, etc.) versus the reach (number of people who have seen the post) or the number of subscribers/followers.

# Capitalising on the outcomes: Lessons learned from the Games

## An after action review commensurate with the event

The purpose of the after action review was to take stock of how the agency met the challenge of this event of unprecedented scope, incorporating all aspects, from monitoring to coordination, in order to capitalise on it and handle future mass gatherings even more effectively.

It involved all internal departments and used a mixed methodology combining "hot" and "cold" data collection periods, and quantitative and qualitative methods (Figure 8). The steps were as follows:

1. Assessment of actions: collection and summary of actions carried out for the OPG, based on the follow-up of preparatory actions, deliverables and meetings, from the Ministry of Health referral on 22 January 2022 up to the last OPG bulletin produced in September 2024.

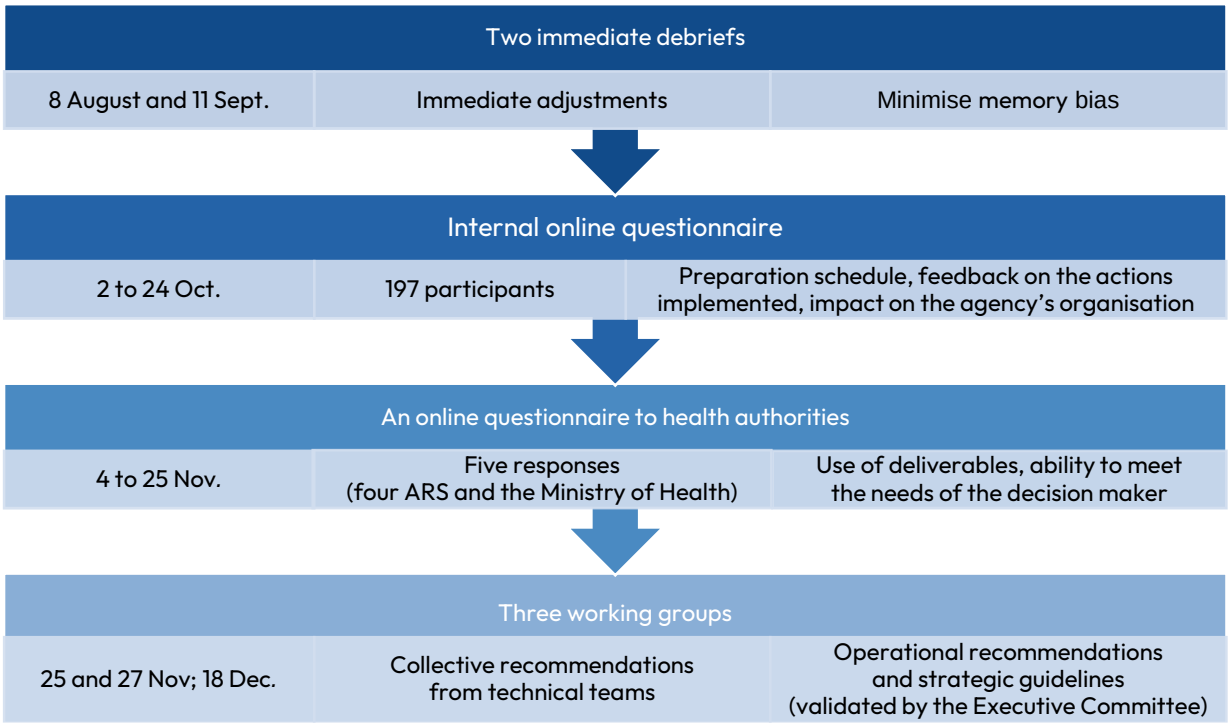
2. Immediate or "Hot" debriefings: debriefing meetings were held right at the end of the Olympic period (8 August) and Paralympic period (11 September) to collect staff experiences, minimise the risk of recall bias and suggest immediate adjustments, particularly between the Olympic and Paralympic Games.

3. Cold data collection to identify actions to be developed and areas to improve. Two self-administered online questionnaires were launched:

    - An internal questionnaire for all Santé publique France staff to provide feedback a few weeks after the event. It was open from 2 to 24 October 2024.
    - An external questionnaire for the health authorities (DGS and ARS of the host regions) to identify whether the actions implemented by the agency met their needs and to find out how satisfied they were with the responses to their requests. It was open from 4 to 15 November 2024.

4. Three internal and cross-functional working groups met to draw up recommendations based on the results of the two questionnaires and the presentation of the main points: Health monitoring, prevention and communication, and discussions of the agency's Executive Committee.

**Figure 9. Information collection for the after action review**




## Centralised coordination sized for the event

Although it was anticipated, a long preparation time was needed for Santé publique France and this meant that staff could engage in implementing the actions planned between 2022 and 2025. It is important to anticipate how much time each person will spend on the event and integrate it into their workload. Each specific working group should have clear objectives and the frequency of their meetings should be defined and appropriate to the event scale.

**Defining roles both for preparation and during the OPG is essential.** During the OPG, all the agents involved had a specific role defined in the ConOps document accompanied by a schedule for each of the teams. Enhanced job-specific training was helpful.

Drawing up a health risk map was an essential step in calibrating Santé publique France's work, particularly in the field of prevention. **An additional map to show all risks specific to the agency for the OPG,** including technology risks (cyber and application risks) or risks related to response capacity (excess requests, multiple alerts, excess crisis burden), is a relevant tool that supplements the health risk mapping.

**The agency's dedicated internal structure and the specific reflexes acquired will be harnessed** for other unprecedented or exceptional situations, especially where these are planned. The identification of reference persons for preparation, spokespersons during the Games, or the usefulness of the meetings or working groups set up for the OPG will serve as a framework for the agency to organise its handling of future planned events of exceptional scale.

## Surveillance

The health authorities were satisfied with the content and frequency of the health updates provided by the agency.

During the OPG, it is essential to share a common **definition of a case to qualify an event or health alert as related to a mass gathering**. This definition must include the notions of the place and time of the event or the duration of exposure.

A mass gathering may be an opportunity or may require the implementation of new surveillance systems. In order to ensure that information is reliable, it is **essential to test the process** of data collection, sharing and analysis and the production of results in advance so that quality interpretations can be provided for decision making. Prior to the event, the data collector may have different priorities than those of the monitoring experts; it is important to plan a schedule that allows for a testing phase with contact persons representing each stakeholder involved. It also takes time for epidemiologists working with new systems to become familiar with the data and deliver nationally and regionally standardised analyses and interpretations. Using multiple syndromic surveillance systems can act as a back-up if one of them fails to report data. After the event, the use of the new systems may go beyond the scope of mass gatherings. Santé publique France aims to maintain the SAMU data source and capitalise on its experience with BSPP, particularly for mass gatherings, to strengthen its syndromic surveillance of pre-hospital data.

Healthcare professionals are essential for surveillance and intelligence systems to run, being the first to detect an unusual health event and potentially raising an alert. Consequently, **informing and raising awareness among healthcare professionals about the health risks specific to mass gatherings** is essential to ensure rapid signal detection and feedback.

## Targeted prevention messages shared between stakeholders

A mass gathering with the international scope and media attention of the OPG **was an opportunity to disseminate prevention messages**. Relying on health risk mapping to prioritise and therefore target messages and on the stakeholders involved in this gathering to share their content and disseminate these messages can be a way of preventing risks and avoiding the saturation of healthcare services.

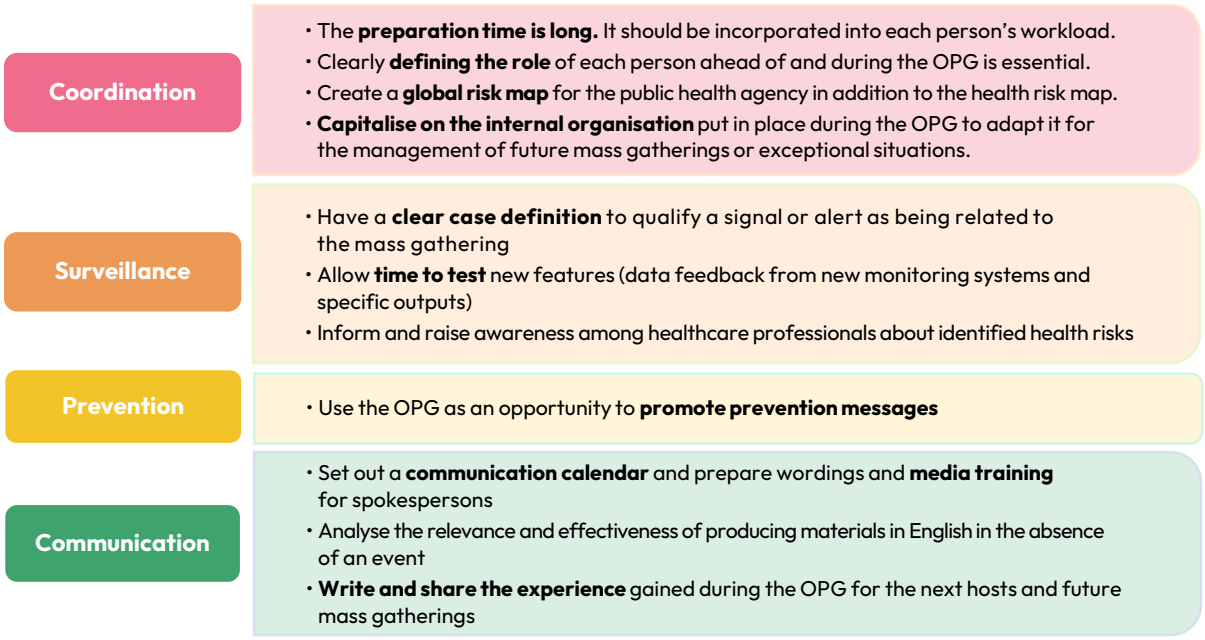
## Communication

The OPG is an event on an exceptional scale in terms of sport and media. Santé publique France has prepared a **communication plan, anticipated what questions might be raised and provided media training to the spokespersons identified.** This preparation made it possible to clearly define the role of the spokesperson before the event and to anticipate discussion points in the event of a crisis or request for information.

It may be useful to assess the impact on the international community of the availability of weekly bulletins translated into English in the absence of a major health event to assess whether they are needed at future mass gatherings.

To cement the legacy of the Games for the agency and more broadly for future hosts, it is important to assess the actions put in place and share their conclusions. This is why Santé publique France **is sharing the experience acquired** during the Paris 2024 OPG with the future hosts of the Games, and is participating in the scientific documentation of the understanding gained of the public health issues of these kinds of mass gatherings.

**Figure 10. Main recommendations of Santé publique France after the OPG**




**Box 13. Legacy of the Games for Santé publique France**

In conclusion, we learned that:

- ✓ It is important to cooperate with the organisers at the earliest opportunity
- ✓ The Games present an opportunity to create new partnerships as close as possible to the ground
- ✓ Support from international stakeholders is key to disseminate prevention messages
- ✓ Continuing to train media response experts for the spokesperson team is crucial
- ✓ Exercises are required to test the specific procedures implemented
- ✓ A shared and efficient daily schedule is valuable
- ✓ Multiple sources of data are important to deliver mass gathering surveillance: new syndromic surveillance systems need to be integrated sustainably

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**From 24 July to 9 September 2024,** France hosted the 33rd Summer Olympic Games and the 17th Paralympic Games, attracting visitors from all over the world. With sporting and celebratory events running simultaneously in the middle of the summer, hosting the Olympic and Paralympic Games was a major health safety challenge.

**This report reviews the work carried out by Santé publique France,** the French national public health agency, in conjunction with the Ministry of Health and the various national and international public health stakeholders, to monitor and prevent health risks.

**This work leaves a useful legacy,** such as new surveillance systems and new partnerships that have been developed. We wish to share this experience with all parties interested in protecting public health in the context of mass gatherings.

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