International Infectious Disease Surveillance
London 2012 Olympic and Paralympic Games

Contents:

Purpose and scope of international infectious disease surveillance

In the context of the London 2012 Olympic and Paralympic Games, the agreed purpose of international surveillance was to monitor and assess the risk, on a day to day basis throughout the surveillance period, of any infectious disease threats abroad that might have the potential to impact on human health in the UK, and in particular on the Games.

The impact of imported infectious diseases in this context was considered as:

1. Their associated morbidity, mortality, and health care costs
2. Their potential for introduction, establishment and spread within the UK and possible amplification in the mass gathering setting and/or subsequent export to other parts of the world
3. The capacity within the UK to diagnose and respond to these infections
4. The need to alert and provide information or guidance to UK clinicians regarding recognition and appropriate treatment of diseases (including those less commonly seen in the UK) for individual health and public health purposes
5. The need for particular public/port health measures to be instituted either in response to incidents or to prevent importation
6. Public and /or political concern (including 'rumour control')
7. Disruption to London 2012

International surveillance was for infectious disease in humans and in other potentially importable vehicles of infectious agents that might impact on human health, including animals, other vectors and food. It did not include international surveillance of non-infectious hazards or CBRN issues, for which the HPA had additional systems in place.

The ultimate aim of international infectious disease surveillance was to identify and assess overseas threats to human health (including potential threats), to the UK and to the Games in particular, in order to permit relevant UK health and public health authorities to develop appropriate and proportionate responses to prevent, manage or control those risks as necessary and in real time.

The international team

International infectious surveillance for London 2012 was conducted by means of collaboration between the HPA and the European Centre for Disease Prevention and Control (ECDC). Within the HPA there were four groups involved in this collaboration that have a routine role in international infectious disease surveillance:

- Travel and Migrant Health Section (TMHS), Health Protection Services, Colindale
- Emerging Infections and Zoonoses (EIZ), Health Protection Services, Colindale
- Microbial Risk Assessment (MRA), Emergency Response Department, Health Protection Services, Porton Down
- The National Travel Health Network and Centre (NaTHNaC); a service commissioned by the HPA from University College Hospital.

All parts of the team routinely risk assess incidents identified from scanning multiple sources of information about infectious disease incidents overseas. This process is also referred to as epidemic intelligence. However, only ECDC has a dedicated 24/7 expert resource committed to systematic epidemic intelligence. The HPA groups conduct epidemic intelligence as part of their other activities with variable levels of resource committed to this activity and with a large degree of overlap between the groups, although each considers information about international infectious disease incidents from its own particular specialist perspective.

Development of the model 2010-2012

At the request of the HPA surveillance working group, the international team began developing the model to be used for international surveillance during the Games in the spring of 2010. The overall approach to surveillance during the Games was intended by the HPA to be one of enhanced 'business as usual'. The initial model trialled therefore involved all contributing groups in the team conducting their normal international surveillance activity (with no enhancement) but with the addition of a daily teleconference between team members jointly to consider international incidents detected and risk assess them for any potential threats to the Games. The trials demonstrated that this approach identified infectious disease incidents effectively, and that there was value in the daily teleconference since each part of the team brought its own perspective and expertise to the joint risk assessment. This part of the model was therefore retained. However, it was also apparent that the model overall was not the most efficient approach.

Each group had its own selection criteria used while scanning their usual sources for information about overseas infectious disease incidents. This meant that incidents were raised at the daily meeting which, while of significance from the public health perspective of the individual group, would be very unlikely to impact on London 2012 – i.e. the model was sensitive but insufficiently specific for London 2012. Furthermore, implementation of this model would have required seven-day-a-week rotas of staff within each group in the team, which would have necessitated training of additional personnel and significant additional resource input.

In the interests of increasing the efficiency of incident selection for the daily risk assessment teleconference, a further trial compared the activity of all the HPA groups combined against ECDC activity. In this trial all parts of the team used an agreed set of criteria for selection of international incidents for further risk assessment. The trial demonstrated that ECDC identified more incidents that were relevant for further risk assessment. This finding reflects

the fact that ECDC uses a wider range of information sources than do the HPA groups, including automated web-based systems to scan media reports, and official links through their European wide function. It is also indicative of ECDC's longstanding expertise in epidemic intelligence with significant resource dedicated to this function. In general ECDC also has a broader perspective than the HPA groups, which look for very specific types of risk according to their particular area of concern (e.g. issues relevant for travellers abroad, emerging infections etc).

In the light of the findings of this trial it was decided that the incident selection aspect of international infectious disease surveillance for London 2012 would be led by ECDC and that they would enhance their epidemic intelligence activity to support this. To contribute to this enhancement the HPA arranged for two public health trainees to be embedded at ECDC during the Olympic and the Paralympic Games periods respectively. It was determined that the HPA groups would contribute possible incidents for further risk assessment that they identified through their routine activity, but would not enhance that activity. All groups in the team would contribute to the daily teleconferences to risk assess incidents that had been identified, and the risk assessment process would be led by the HPA. As a result of the daily international team risk assessment teleconference, contributions were made to the National Infectious Disease Surveillance Situation Report, which in turn contributed to the HPA daily report to the London Organising Committee for the Olympics and Paralympic Games (LOCOG).

The tools developed to support international surveillance activity included:

- A comprehensive range of sources of global infectious disease information and epidemic intelligence scanning tools
- Databases to record and track events
- A password-protected portal to share information between team members on different sites
- Communication templates and protocols
- Risk assessment aids:
    - Detailed up-to-date baseline global epidemiology profiles prepared on a wide range of diseases
    - Tables of population connections between the UK and other countries of the world prepared from International Passenger Survey data
- Specific criteria for Games relevance
- Standard definitions of risk level
- Standard operating protocols for daily processes.

Table 1: Resources to support the international infectious disease incident surveillance function during London 2012

Resource category	Resource and lead developer	New/pre-existing/ modified	Description
Epidemic intelligence	ECDC Surveillance and Epidemic Intelligence Systems	Pre-existing and Modified	Details of ECDC systems are documented in Jones J, Lawrence J, Payne Hallström L, Mantero J, Kirkbride H, Walsh A, Jermacane D, Simons H, Hansford KM, Bennett E, Catchpole M. International infectious disease surveillance during the London Olympic and Paralympic Games 2012; process and outcomes. *Eurosurveillance 2012* (in press)
	HPA identified incidents meeting criteria for London 2012 relevance (HPA, TMHS)	New	See Table 2
Databases	ECDC Threat tracking tool	Modified:	See Jones J, Lawrence J, Payne Hallström L, et al (as above)
	HPA Olympic international surveillance database (HPA, TMHS)	New	An access database in which all incidents identified that met London 2012 relevance criteria were recorded in a standardised way, risk assessments added, and situation reports generated automatically.
Communication	ECDC Extranet	New	See Jones J, Lawrence J, Payne Hallström L, et al (as above)
	Z drive (HPS, Colindale)	New	Shared network drive for all members of the team based in HPS-Colindale to share information.
Protocols	Standard operating procedures (HPA, TMHS, ECDC)	New	Comprehensive guidance for all specific team members on daily processes.
	IRAT resources (HPA, TMHS)	New	Standard agenda for daily teleconferences with constant dial in details and template for recording minutes.
Risk Assessment support tools	Epidemiological profiles (HPA, TMHS and EIZ)	New	Up to date global epidemiology of a wide range of diseases including recent outbreaks.
	Travel patterns (HPA, TMHS)	New	Tables of travel connections for the months July to September inclusive between the UK and the rest of the world based on International Passenger Survey data
	Risk definitions (HPA, EIZ)	Pre-existing	Standard definitions of risk levels

Table 2: Criteria used during epidemic intelligence activity to select international infectious disease incidents of possible relevance to London 2012

Incidents generally excluded from further risk assessment unless significant change in epidemiology/clinical picture/potential for international spread
• Chronic ID of long latency, e.g. TB, HIV, chronic hepatitis B, C • Arthropod borne disease with no current evidence for the occurrence of autochthonous transmission in the UK, e.g. malaria, dengue, chikungunya, leishmaniasis, yellow fever • Diseases which are normally endemic in the global area being reported with no significant change in epidemiology/clinical picture/implications for international spread • Localised outbreaks of gastro-intestinal disease, unless an internationally distributed food source is implicated, or *E. coli* VTEC, or highly infectious person-to-person with large numbers affected e.g. norovirus • Outbreaks in defined population groups e.g. school/hospital/refugee camp where there is little chance of spread to the wider population, unless very unusual or severe • Environmentally acquired infections e.g. Legionnaires' disease • Sporadic cases of plague/anthrax/botulism or other agents that may be associated with bioterrorism but where the case has an obvious zoonotic exposure.
Incidents generally included for further risk assessment

• Respiratory disease:
  o New incidents of influenza among humans, especially with a new subtype
  o New incidents of Severe Acute Respiratory Syndrome
  o New incidents of other acute and severe respiratory infections, with or without a microbiological diagnosis
• Gastro-intestinal disease:
  o With significant changes in epidemiology/clinical picture
  o Large* outbreaks of viral infection spread by person to person contact e.g. Norovirus.
  o *E. coli* VTEC: significant numbers of cases over a short time frame in a small area
  o If an internationally distributed food source is implicated
• Vaccine preventable disease where there has been a significant change in epidemiology in the global area being reported
• Large* outbreaks or a change in clinical picture of meningococcal disease/encephalitides
• Large* outbreaks or a change in clinical picture of sexually transmitted infection
• Significant changes in the antibiotic resistance of an organism causing an outbreak
• Zoonotic disease:
  o New incidents of avian influenza in birds in a previously unaffected area, especially with a new subtype
  o Other zoonotic disease that may have direct implications for the Games e.g. in horses
• Incidents of serious undiagnosed illness of any type, especially with a high morbidity/mortality
• Incidents of acute syndromes without a definitive diagnosis (e.g. fever, rash, jaundice, neurological, diarrhoea and vomiting, respiratory)
• Any incident of a disease with an unexpectedly high morbidity or mortality
• Clusters of imported disease reported from countries outside the UK, which imply a problem in a third country and from which disease has not been previously reported
• Incidents on cruise ships where the ship is destined for the UK
• Any incident of disease with a significant potential for international spread

- Any incident of disease that may interfere with trade or travel as advised by WHO or Foreign and Commonwealth Office
- Any incident occurring outside the UK that might attract significant UK media attention or public or political interest.

* where 'large' is defined relative to history of any previous outbreaks

Results of international infectious disease surveillance during London 2012

More than 400 international infectious disease reports were identified and assessed by the international team during the monitoring period, of which 49 separate incidents were identified as relevant according to the Games criteria and therefore required further risk assessment by the international team. None of these were risk assessed as being a potential threat to London 2012. The most commonly identified type of incidents requiring follow up were gastrointestinal infections such as salmonellosis, cholera and *E. coli*.

The international team included information in its contributions to the daily situation reports about six international infectious disease incidents that were not a threat to the games but which had attracted or might attract media, political, or public concern. The incidents included (with the initial source of the information) were:

1. Acute respiratory syndrome in Cambodia, later confirmed as hand, foot and mouth disease caused by Enterovirus-71 (notification under the International Health Regulations/IHR)
2. Acute watery diarrhoea in Cuba, later confirmed as cholera (Cuban Ministry of Health)
3. Swine origin H3N2v influenza A in the USA (IHR)
4. Ebola in Uganda (WHO and Ugandan Government)
5. Cholera in Nepal (media report)
6. Hantavirus pulmonary syndrome in Yosemite National Park, USA (US Centers for Disease Control and Prevention)

Of these, incidents 1, 2, 4 and 6 (plus four updates to these incidents) were included in respective final HPA daily SitReps.

Lessons learned for the HPA

The model used for international infectious disease surveillance during London 2012 relied on international collaboration, with ECDC having lead responsibility for identification of potential incidents through its expert epidemic intelligence function and the HPA leading on the joint risk assessment. Although the HPA has several groups which are involved in epidemic intelligence this resource is directed to the detection of specific types of threat rather than general systematic epidemic intelligence activity.

Improving the efficiency and expertise of epidemic intelligence within the HPA such that it could be performed to the level expected by the agency during London 2012 entirely in-house would require additional resource dedicated to developing this function; such resource has not previously been available, including for the London 2012 Olympic and Paralympic Games. On the other hand there may be an argument that the level of response developed for international infectious disease surveillance for the Games was disproportionate to the threat. Over 700 hours of additional staff resource across the international team identified no actual threats to the Games. This is largely associated with the fact that there are very few international infectious disease incidents that would be likely to significantly impact on an event such as the Games in a country such as the UK.

The biggest threat would come from disease that is both serious in its clinical effect and highly infectious person to person. These types of events are rare and in reality very unlikely to be missed by the current level of epidemic intelligence which the agency undertakes with no special enhancement required. Furthermore, daily international situation reports were required from the team; the vast majority of these were nil returns and an 'exception' reporting system may have been more appropriate. The specific benefits of the type of enhanced system that was used for the Games are; possible earlier detection of international incidents (which may be important for actual threats), and collaborative expert risk assessment. In particular, the collaboration with ECDC worked extremely well, and also provided training opportunities. The demonstration of efficient use of resources by appropriate division of labour between national and international partners in a unique event context is an important lesson for a time when public health concerns and economic limitations are both global. In the absence of dedicated resources for the further development of HPA expertise in epidemic intelligence the recommendation would be that, where the agency in future requires the level of this function that was expected for London 2012, support should once again be sought from ECDC.

Lessons learned for other organisations involved in international surveillance for similar mass gathering events

The public health challenges associated with mass gatherings such as the Games require a range of responses of which international infectious disease surveillance is only one. Each country hosting such events will have different epidemiological situations and public health infrastructure that will create unique considerations for the possible threat from international infectious disease incidents (e.g. the presence of insect vectors and sanitary infrastructure), as will the nature of the mass gathering event and any particular risks associated with it. The extent of resource that is dedicated to international surveillance as compared with the other aspects of response should appropriately reflect the overall risk assessment for the event, as well as the resource available and the existing systems for this activity. For example, in some instances it may be adequate to rely on existing international alerting mechanisms (e.g. IHR alerts), whereas in others it may be necessary closely to monitor particular international incidents that could significantly impact on a particular event in the particular circumstances of a particular country. It is hoped that the experience of the international team in conducting international surveillance for the Games may provide lessons for countries responding to similar events in the future.