Learning from London 2012
A practical guide to public health and mass gatherings

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HPA London WHO Collaborating Centre
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Contents

Foreword: Richard Budgett
Foreword: Maurizio Barbeschi
Introduction

Section 1: What might happen?
15 Public health for mass gatherings – an overview
23 Scenarios

Section 2: Technical subjects
37 Planning and working with partners and stakeholders
57 Testing and exercising
71 Legacy and evaluation
79 Enhancing surveillance systems
89 Syndromic surveillance
103 Media and communications
115 Chemical, biological, radiological and nuclear (CBRN) terrorism
123 Extreme events and mass gatherings

Annexes
138 Mass gatherings and public health: the experience of the Athens 2004 Olympic Games
139 The health legacy of the 2008 Beijing Olympic Games: successes and recommendations
140 London 2012 Olympic and Paralympic Games: summary report of the Health Protection Agency’s Games time activities
142 National Health Service (NHS) London 2012 Games Programme Reports
143 Communicable disease alert and response for mass gatherings: key considerations
144 HPA/WHO mass gathering toolkit
145 International Health Regulations (2005)
146 Assessment of health-system crisis preparedness
147 Lancet series on mass gatherings health
148 References
Foreword

It is with great pleasure that I introduce this book: Learning from London 2012, a practical guide to public health and mass gatherings.

The summer of 2012 was an amazing experience for all those involved and was a fantastic celebration of both sport and the UK as the host country.

Public health is an important component of delivering mass gatherings such as the Olympic and Paralympic Games. Maintaining and protecting the health of the athletes and spectators has always been a key aim of the IOC.

Working closely with the HPA and other health partners throughout the years of planning, and then during the Games, provided an insight into the UK’s public health system and the expertise within. The HPA’s comprehensive routine surveillance and reporting systems, together with the enhancements put in place specifically for the Games, were excellent and provide the standard to which all others can aspire. The provision of the daily public health situation report to us at LOCOG and the IOC provided the assurance that there were no major public health issues during the Games, and enabled us to focus on delivering the sports event.

The information provided in this book will be useful for all those involved in planning mass gatherings, in particular event organisers and public health organisations. I would encourage those involved to consider the recommendations within this book, and if possible access the expertise and experience of the HPA and the WHO network on mass gatherings.

I personally look forward to continuing to work with colleagues from the HPA as they take forward the public health legacy from the London 2012 games to future Olympic and Paralympic Games.

Richard Budgett
Medical and Scientific Director
International Olympic Committee
In the context of the International Health Regulations (2005), mass gatherings offer the opportunity to do two things: focus on disease prevention; and focus on public health legacy. The UK’s Health Protection Agency (HPA) took the opportunity provided by involvement in the London 2012 Olympic and Paralympic Games to do both of these, and the World Health Organization (WHO) enjoyed the benefits of close working with them.

Effective public health at mass gatherings can be a benefit to global health and security. Involvement offers chances to improve domestic and international surveillance; enhance and build relationships with organisations at home and internationally; improve public health infrastructure; enhance health behaviour; and, importantly, to contribute to the growing knowledge base on ensuring safe and healthy mass gatherings.

Every major event is a chance to build the tools and resources with which these goals can be achieved. The HPA has taken great steps to do this, and to ensure the health legacy benefits of the Games.

As part of the work to build the mass gatherings knowledge base and share it internationally, and in recognition of their great efforts in this area, in 2011 the HPA became the first WHO Collaborating Centre on Mass Gatherings and High Consequence/High Visibility Events.

A network of Collaborating Centres on mass gatherings has recently been formed across the world. In the coming years this network will provide expertise and support to those involved in mass gatherings, develop a research programme across the field of mass gatherings, and ensure the legacy from these events is continued.

In 2012, the WHO Executive Board requested the development and dissemination of multisectoral guidance on planning, management, evaluation and monitoring of all types of mass gathering events with specific emphasis on sustainable preventive measures. This reinforced the existing WHO strategy of working closely with Member States planning and conducting mass gatherings. This was followed by the World Health Assembly commitment to mass gathering medicine being endorsed by Member States including the UK.

WHO’s strategy for mass gatherings prioritises continuous capacity development and support for planners of mass gatherings. The work of the HPA, and this book in particular, will be an important contribution towards realising this goal.

Maurizio Barbeschi
Team Lead, Risk Assessment and Decision Support (ADS), Alert and Response Operations (ARO), Global Capacities and Response (GCR), World Health Organization (WHO)
Introduction

Being part of the London 2012 Olympic and Paralympic Games was an incredible experience for everyone involved and the success of the Games will stay in the memory for a long time.

However, that success was achieved through seven years of extensive planning and through effective collaboration across all the organisations involved in the Games.

It is important that the lessons from that success don’t just live in the memories of those involved but are transferred to others who face the same challenges in the future, whether in relation to an international sporting event or to any other mass gathering.

This book attempts to capture the lessons learned by the UK Health Protection Agency in planning for, and delivering, public health services for London 2012, and to present them in a way that we hope will be helpful to others.

The book describes the additional requirements that were placed on the public health system because of hosting the Games (the “Olympic Difference”) and the systems and processes that were necessary to ensure the system worked effectively and efficiently during 2012. It sets out the enhanced surveillance systems that were put in place to ensure that the agency knew everything that was happening in public health throughout the summer of 2012.

However, the working sub-title of the book was “What will you do if it goes beep?” - a reminder that while public health systems often focus on surveillance and detection
of diseases, it is equally important to know what you will do if a problem is detected. This is particularly relevant for the more unusual events that have low probability but very high impact, such as new and emerging diseases or biological terrorism.

All mass gatherings and all national public health systems are different and individual. We have tried to set out our experience in a way that we hope can be adapted to suit many different circumstances, and that therefore the book will help others think through what they need to do and plan for in their circumstances. Part of the learning from London 2012 was that the work done to prepare for the Olympics and Paralympics has made the public health system stronger and we hope that by sharing our experience, others can gain the same lasting legacy from their event.

The book is split into two parts; section 1 provides an overview of the public health systems and processes needed for a mass gathering through setting out the important questions that need to be considered and the possible answers to those questions. More details on the technical aspects are included in section 2 of this book.

Brian McCloskey CBE
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On Mass Gatherings and High Consequence/High Visibility Events

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HPA 2012 Programme Director
Section 1: What might happen?

• Chapter 1: Public health for mass gatherings – an overview
• Chapter 2: Scenarios
Chapter 1

Public health for mass gatherings – an overview

Brian McCloskey
This chapter gives an overview of the public health systems and processes needed for a mass gathering. The approach is to set out the important questions that those planning the public health system for a mass gathering need to consider and then to look at possible answers to those questions. More details on the technical aspects are included in section 2 of this book.

It is an inescapable fact that generally the demands on the public health system in a high profile international event, such as the Olympic and Paralympic Games or the World Cup, will be driven as much by the media and politics, as they will by science and public health evidence. This influence must be recognised in mass gathering planning.

This chapter first discusses the key elements of public health for mass gatherings and then illustrates the issues with a few scenarios, identifying questions to be addressed and the solutions adopted for the London 2012 Olympic and Paralympic Games.

Mass gatherings planning is based on a series of predictable questions; however, like most similar questions, they can get more complex.

If these questions are not built into the planning process from the outset, it is likely that the public health system will find itself in difficulty should anything significant happen. There are three core first line questions for mass gathering planning:

- What might happen?
- How will you know if it happens?
- What will you do if it happens?

**What might happen?**

This is the fundamental risk assessment for the mass gathering. It is built on four questions:

- What are the existing health risks in the host country (and will they be affected, for better or worse, by the mass gathering)?
- What health risks might be imported during the mass gathering?

This looks at what public health issues routinely arise in the host country that need acute public health interventions. These might include food poisoning, vaccine preventable diseases, meningitis or infectious respiratory illness, all of which routinely occur in most countries and will occur in the host country during the mass gathering.

- Many mass gatherings are international and involve significantly more international travel to the host country than would normally happen. This raises the possibility that health risks, especially communicable diseases, will be brought into the host country. This will depend on the nature and number of participants and visitors and
the countries from which they travel, as well as the normal travel pattern to the host country. The annual Hajj pilgrimage in Saudi Arabia provides many examples of both the risk of importing infections and the measures the host country takes to mitigate the risk.

What health risks might be exported from the host country after the mass gathering? Public health planners need to consider the possibility that health risks endemic to the host country will be exported when travellers return to their own country. This is particularly an issue for vaccine preventable diseases where people travel to the mass gathering from countries where diseases (such as measles) have been eliminated, but those diseases are still prevalent in the event host country.

Are there particular risks from terrorism? The perceived risk from terrorism, and in particular from terrorism related to chemical, biological or radiological threats, varies greatly in different countries. Public health planners need to understand the risks, or perceived risks, to their event. This can be achieved through cross government collaboration and joint working with the security and intelligence services.

How will you know if it happens? This question is essentially about the public health surveillance systems that will be in place during the mass gathering, although there are some special considerations for possible CBRN (chemical, biological, radiological and nuclear) terrorism risks.

Successful management of the public health issues that might arise in a mass gathering requires a comprehensive, detailed and up to date picture of the state of the public’s health to be available (in near real time) throughout the event and, preferably, in the period immediately before and after it.

The public health system responsible for a mass gathering must know at all times whether there are any incidents of possible public health significance happening in the relevant area. The ‘relevant area’ may be the city or local area hosting the event, but for large mass gatherings it will be much wider and is likely to include the whole host country.

There will need to be a unified coordination system to ensure that the outputs from all surveillance systems are brought together into a single description of what is happening – commonly known as a Situation Report or SitRep – and to act as a single point of contact for information to flow up, down and across the system. In most cases this information will be generated by standard local, regional and national surveillance systems based on the normal core systems of clinician and laboratory reporting of infectious diseases. However, this is unlikely to be sufficient in itself.
In the context of a mass gathering, the most significant deficiency in standard surveillance systems is likely to be the speed with which information flows through the system.

The next challenge will be comprehensiveness, and achieving a level of detail that allows a risk assessment to be carried out on all incidents to determine whether they present a risk to the mass gathering. In particular, public health surveillance systems are less likely to include information on non-infectious health threats such as air quality, which can be extremely important for event organisers.

The next issue will be coordination of all information from across the available surveillance systems. This will be particularly important in public health systems that work within a federal and regional government system. It is important that all information flows to a central point or coordination centre where there is a team with: expertise in mass gatherings; an overarching view of the public health issues; knowledge of the additional requirements imposed by the event; and an understanding of the command, coordination and communication arrangements in place for the event.

This central team or coordination centre has to have clear final responsibility for the surveillance outputs and risk assessments and a clear line of communication with all key stakeholders, including local and regional players, as well as across government, and the event organisers.

This question also raises a particularly important complementary question.

The challenge is not just “How will you know if ‘x’ happens?” but also “How will you know if ‘x’ doesn’t happen?”

An important element of managing the public health implications of a mass gathering is the ability to reassure stakeholders, such as the event organisers and regional and national government, that public health does indeed know what is happening across the country, and will therefore be in a position to challenge the rumours and false stories of health risks that will inevitably arise during the event.

This area poses particular challenges for traditional public health surveillance, which is generally designed to detect when things happen, but is less suited to providing reassurance that nothing is happening.

For the 2012 Games, concerns about the effectiveness of traditional surveillance in the context of a mass gathering were addressed by a range of additional surveillance systems, described in more detail elsewhere in this book. These included syndromic surveillance, event-based surveillance and enhanced international surveillance. Together they increased confidence in the ability of the system to detect incidents of possible public health significance, and to reassure about the absence of such incidents.

Consideration of all the surveillance systems available, or to be developed, for a mass
gathering leads to another set of questions:

• How quick is quick enough?
• How sure is sure enough?

Those running the public health system need to decide on the appropriate standards for surveillance and reporting of events or incidents and agree these with key stakeholders such as the organisers and government. This is important to ensure that expectations are managed and that there is a clear understanding of what is expected from public health.

It is also important to ensure that stakeholders understand the limitations of public health surveillance and the uncertainty that will inevitably surround public health incidents in the early stages. Media, events organisers and politicians will all want answers and certainty in a timescale that is too quick for surveillance systems to deliver. Stakeholders need to be reconciled, preferably well before the mass gathering, to making decisions before certainty can be achieved.

What will you do if it happens?

Having established systems to detect any abnormal signals during the mass gathering, then it is time to address the third question: What will you do if the system goes ‘beep’?"

If something might happen, and a system has been created to find it if it does, there must be a credible plan in place to deal with it. This does not necessarily mean a plan for every risk, but rather a plan that covers all risks, with adaptations for specific risks where appropriate.

In most cases this will primarily consist of existing public health response plans, particularly outbreak control plans, but reviewed for appropriateness to the mass gathering.

The issues that need to be considered in this context are:

• Consistency
• Coordination
• Speed; and
• Communication.

There is a strong need to ensure consistency of response across all areas of public health so that all incidents, or possible incidents, are approached in the same way. This may be very challenging in areas where public health (and government) works in a federal system with demarcation between the responsibilities of different tiers of the
public health and government systems. However, if consistency is not achieved there is likely to be criticism of the public health system.

Mass gatherings are very complex events and often take place across multiple venues and with the close involvement of new agencies such as organising committees and international bodies. This adds complexity to the public health response to incidents, as many additional players will wish to be involved. This makes coordination an even more critical aspect of response than is usual.

As with surveillance, there needs to be a central coordination centre that leads on the operational response, and has an oversight of the activities of different organisations and at different tiers of government. This coordination centre also needs to be given the authority to coordinate the response across agencies whenever necessary.

The combination of the perceived increased risk from mass gatherings and the intense scrutiny to which they are subject will mean that expectations of the response to any incident (including the response to public health incidents) will be heightened. This in turn will mean that stakeholders (and the public) will expect things to be done much more quickly than might usually be the case, and the public health system needs to be prepared to deliver this as far as possible.

The extent of scrutiny of mass gatherings, and therefore of the public health system supporting them, also means that efficient and reliable communication is critical. This includes communication to stakeholders, professionals, the media and the public. This communication will focus on two broad aspects: explaining what has happened; and being clear about what has not happened. Both are important to the success of the mass gathering and to the reputation of the public health system.

The aim of the communication effort in public health is to ensure that accurate information is available as quickly as possible; that it is presented in an appropriate format and language for the intended audience; that it is delivered as quickly as possible; and that it is as clear as possible.

To achieve this it is valuable to have a communications team embedded in the central coordinating centre, where they can quickly identify issues that might become a problem and work with the public health team to develop a response.

The communications team will need to be connected to their equivalent teams across government and the organisers, so that once an issue has been identified and an appropriate response agreed, it can rapidly be shared with all stakeholders so that a “single version of the truth” becomes the agreed response of all stakeholders. In this way, the media will not get different responses from different parts of the system.
Chapter 2

Scenarios

Brian McCloskey, Tina Endericks
The following scenarios are intended to elaborate on the issues that arise from the questions set out previously and to identify some of the ways in which the public health system can respond to them, as well as the lessons learned from the London 2012 Olympic and Paralympic Games.

**FOOD POISONING**

**What might happen?**

Food (and water) borne diseases will happen during the course of a mass gathering because they occur regularly in all countries irrespective of hosting an event. Factors that might change the risk in the context of a mass gathering include:

- An increase in the number of temporary food outlets.
- An increase in mass catering such as in the Olympic Village for athletes, in fan parks at the World Cup or in tented accommodation at the Hajj.
- Catering in situations with limited access to clean water.
- Poor sanitation and hand hygiene in crowded places.

The first public health priority is to reduce the risk of food and water borne illnesses by preventative measures before the mass gathering. This can be effective as well as providing additional reassurance during the event (see box opposite for the 2012 Games experience).

**How will you know if it happens?**

Most public health systems will have a surveillance system designed to detect infectious diseases such as food borne illness. These will generally include clinical reporting and laboratory reporting but other information may come from: syndromic surveillance; self reporting; social media; and press reporting.

The key issue for the traditional surveillance reporting will be speed. Although traditional systems can be effective in picking up cases and outbreaks over time, there is a considerable lag time between exposure and surveillance detection. In particular, self reporting (often to the media in the context of a mass gathering) and use of social media will happen much faster than reporting through surveillance systems.

That is why it is important that the public health system uses as many different approaches as possible to capture information that might indicate a public health problem, and that the system includes a central coordinating centre where information from all sources comes together and potential issues can be flagged. Additional sources of information can include syndromic surveillance, media
Reducing the risks

As part of the planning to reduce the risk of food poisoning associated with the 2012 Games a significant amount of work was done, mainly led by the UK’s Food Standards Agency (FSA) and delivered by local government. This included:

• Campaigns to raise awareness among food businesses and visitors of the importance of good food hygiene and food safety.

• Provision of additional training and resources for food business owners to improve hygiene standards.

• A focus on working with and supporting mobile food vendors outside venues (identified early as a high risk) and raising awareness of the importance of identifying any illegal mobile catering operations and ensuring resources and capabilities to remove them if required.

• Improving local government authority enforcement skills and capacity.

• Undertaking additional testing of food premises in venues at pre-games test events and providing expert advice to improve these, e.g. quality of water provided to mobile food units was improved following sample results at a test event.

• Close collaboration and agreement on early sharing of information across all stakeholders; in particular FSA, local authorities, the London Organising Committee of the Olympic and Paralympic Games (LOCOG), food producers, and HPA.

• Strict requirements and testing by LOCOG: better than standard practice.

• Enhanced testing and surveillance systems.

• An exercise scenario prior to the 2012 Games on a rapidly escalating food poisoning outbreak.

• Provision of healthy eating advice for visitors - what to look for when eating out during the Games.

monitoring, and follow up of all events picked up by local public health teams.

The complementary question of how will you know if something doesn’t happen is especially important in this context. It is inevitable that people will develop gastrointestinal (GI) symptoms during the course of the mass gathering (because GI
symptoms are always around in the population, even without an event taking place). If there is any link to the mass gathering (because, for example, the affected person ate at a food stall in one of the event venues the previous evening) it is likely that this will end up in the media, or reported to the organisers, as being a result of the event. The public health system needs to have very high confidence in its surveillance systems if it is going to be able to dispel such rumours and allegations by saying, in effect: “If we haven’t picked it up, it hasn’t happened”.

This confidence in the surveillance is strengthened by having multiple systems as above; by having direct access to local public health teams on the ground who can rapidly check on information; by having single points of contact across organisations where information can be cross-checked; and by having a robust command, control and coordination system where all information is brought together in one place.

What will you do if it happens?

All public health systems will have in place a range of outbreak response plans that are used in the day-to-day response to outbreaks.

These should be the basis for mass gathering response planning – it is always better to use well tried and tested systems and plans rather than inventing new plans just for the event. However the plans need to be validated against the additional requirements imposed by a mass gathering, particularly the speed of response expected and the extra challenge for communications and media relations. The system will need to have a clear escalation plan and access to surge capacity if a situation starts to develop beyond the normal expectations.

The 2012 Games experience – food poisoning

There were a number of sporadic cases involving visitors, security staff and team members: none of these were more than isolated cases of presumptive food poisoning with different causative agents. The number of cases seen was representative of what would normally be seen in the UK during the summer.

When cases were associated with venues the HPA worked closely with the FSA and LOCOG’s Catering, Cleaning and Waste team to investigate any potential food related cases. None of the investigations identified a food source at a Games venue. There were a number of individual cases attributed to venues which upon investigation were linked to other sources – people tend to attribute illness to their last meal or to an event, such as the Games.
LEGIONELLA

What might happen?

Sporadic cases of Legionnaires’ disease occur routinely in many parts of the world. As with food borne illnesses, therefore, it is possible that cases will occur during a mass gathering. The risk may be affected in the context of an event if there are new installations of cooling towers in venues, or if there are new temporary water supplies in place. The risk can be mitigated by working with organisers before the event to ensure that all water supplies associated with the mass gathering are properly installed, managed and maintained to the relevant standards.

How will you know if it happens?

Standard surveillance systems will detect cases and potential outbreaks of Legionnaires’ disease but it is likely that the lag time will be too long to identify and manage the risk within the timeframe of the mass gathering. This could result in cases of Legionnaires’ disease linked to the event being identified only after participants have returned home.

Coordination between public health and those tasked with monitoring and sampling water supplies at the mass gathering will help to flag up incidents of Legionella contamination that might trigger extra surveillance and case finding.

Reassurance in the event of reports of Legionnaires’ disease, through the media or through the event medical services or another source, will be difficult without quick access to local public health teams to follow up reports, and access to environmental sampling information from those responsible for the safety of water systems at the event.

What will you do if it happens?

Standard outbreak response plans for a case of Legionnaires’ disease should be in place irrespective of the mass gathering. A case arising with a possible link to the event will need to be investigated quicker, and at a lower threshold, than normal. Arrangements should be in place for escalating any investigation into a possible case, so that epidemiological information and laboratory testing can be obtained and coordinated rapidly.
The 2012 Games experience – life can imitate exercises

Legionella was identified as a risk to the Games, linked particularly to cooling towers and the floating hotels used on the river Thames. A scenario of a case of legionnaires’ disease on a floating hotel was played in one of the exercises, in order to raise stakeholders’ understanding of this as a risk and the normal public health response and management. Reality then reflected this, in the form of a legionella outbreak linked to a cooling tower in Edinburgh in June, just before the Olympic torch relay passed by; an outbreak in Stoke on-Trent in July; and the detection of legionella bacteria in the water system on a floating hotel.

There was some heightened interest from the media, but the assessment and response to these incidents was that they should not cause concern to those running the 2012 Games.

These did not represent any significant threat to the Games and no cases occurred in anyone connected to the Games.
AIR QUALITY & ENVIRONMENTAL RISKS

What might happen?

Unusual or extreme environmental conditions, such as excessively hot or cold weather, flooding or poor air quality can impact on the running of a mass gathering and the health of participants. For sporting mass gatherings, poor air quality is a particular issue as it can affect the performance of elite athletes. Atmospheric “ozone events” have also been linked to asthma attacks in elite athletes.

Public health responders need to include such risks in their risk assessment.

How will you know if it happens?

Typically public health systems are not as well placed to monitor environmental hazards as they are to monitor infectious disease hazards.

When planning for a mass gathering, public health systems should consider how they can access environmental monitoring information, meteorological information and plume modelling capacity in the event of an air pollution incident.

In addition, the central coordinating centre should have access to local and national meteorological advice, and should use local public health teams to monitor any health impact from adverse weather events at a local level.

What will you do if it happens?

The public health response to adverse weather should include an analysis of the likely impacts; experience from other countries; ready access to pre-prepared advice for the public and for event participants; and agreed dissemination routes for this advice.
The main risks in respect of air quality during the 2012 Games were elevated ozone levels associated with sustained high temperatures and sunshine levels, and the potential effects on air quality of the diversion of traffic due to the Olympic route network. There were also concerns about continued funding for air quality monitoring in London: the Games were a great way of ensuring this work was continued.

To provide assurance to LOCOG on air quality and any associated public health impact, the HPA established a Games Air Quality Co-ordination Group (AQCG), bringing together the necessary stakeholders including the lead UK government Department for the Environment, Food and Rural Affairs (Defra), the Greater London Authority (GLA), Local Authorities, academics and other experts to provide a consistent line on air quality and any potential health implications. This ensured that the UK was prepared to respond to any air quality issues or concerns in a timely, consistent and coordinated manner.

Londoners and visitors to the capital were able to receive information about forecast pollution levels thanks to a new airTEXT mobile phone application, along with a Twitter service and an enhanced airTEXT website. The enhancements to the air quality forecasts and the development of smart phone applications will provide a long-term legacy and improve the public’s access to air quality information.
VACCINE PREVENTABLE DISEASES

What might happen?

The prevalence of vaccine preventable disease (VPD) varies greatly around the world, as does the coverage of population vaccination programmes. Together these factors mean that the susceptibility of individuals from different countries to vaccine preventable diseases varies greatly. Some countries are close to, or have succeeded in, eliminating some VPDs (e.g. measles in North America) while those same diseases are endemic elsewhere.

This gives rise to the possibility that a mass gathering involving substantial international travel will result in the importation, or exportation, of vaccine preventable disease from one country to another and that susceptible individuals will be brought into contact with unexpected diseases. It is also probable that the normal response to cases of VPD will vary between different countries taking part in a mass gathering.

This risk can be reduced by providing advice on vaccination before travelling to the mass gathering. General advice that all travellers should be up to date with the vaccination programme of their home country is a useful preventive measure.

The host country public health system should also identify whether there are any VPDs prevalent in their country, or prevalent in countries known to be participating in the mass gathering, that might pose a particular risk, and should advise on vaccination accordingly. The Hajj is an example of an event where advice before travel has been effective in reducing the risk of VPD transmission.

How will you know if it happens?

Normal public health surveillance systems will detect cases of VPDs but the lag time for the system, plus the incubation period of the disease, may mean that participants have returned home before the problem is detected.

Improved clinician awareness will increase the probability that a VPD case will be diagnosed, and good liaison with health services will help ensure that such cases are reported promptly to public health.

What will you do if it happens?

In addition to standard outbreak control measures, mass gathering planners should review whether stockpiles of particular vaccines should be held during the event, and whether any differences to normal practice may be associated with the event (such as elite athletes not wanting vaccinations).
The 2012 Games experience – the mass gathering difference

As part of the pre-Games planning an evaluation was done on the current state of UK public health. There were high levels of measles reported from around the UK (including London) and in addition there were also measles outbreaks in some European countries. Robust national surveillance systems enabled the HPA to provide assurance that these ongoing outbreaks were not posing a risk to the Games. Some rumours persisted, however, such as an article in a tabloid paper linking an increase in measles from January 2012 to visitors to the Games.

There were several Games time cases of chicken pox in athletes, which caused some discussions about whether it was appropriate to follow standard public health processes and advice in the context of the Games. The risk assessment had to take into account the additional risks and benefits of prophylaxis and the potential impact of illness or treatment on elite athletes and their Games performance.

It was also important to provide strong consistent messaging on vaccination in the lead up to the Games for visitors and athletes. An agreed message was agreed across the HPA, WHO and the Centers for Disease Control and Prevention (CDC): follow your country’s vaccination policy.
Section 2: Technical subjects

• Chapter 3: Planning and working with partners and stakeholders
• Chapter 4: Testing and exercising
• Chapter 5: Legacy and evaluation
• Chapter 6: Enhancing surveillance systems
• Chapter 7: Syndromic surveillance
• Chapter 8: Media and communications
• Chapter 9: Chemical, Biological, Radiological and Nuclear (CBRN) terrorism
• Chapter 10: Extreme events and mass gatherings
Chapter 3
Planning and working with partners and stakeholders
Tina Endericks
Introduction – why is this important?

Excellent planning will enable any public health issues during the event to be managed with greater urgency than usual, through coordinated and appropriate command and control arrangements. It will also help ensure that the systems and capacity are in place to receive, rapidly analyse and react to surveillance, reporting and intelligence systems information, and then to identify and respond to any potential health protection threat.

The intensity and duration of international mass gatherings such as the Olympic and Paralympic Games, and the public health issues associated with them, mean that it is essential to have a coordinated strategic approach to planning and delivery. Those hosting and running the mass gathering will have to involve and work with many stakeholders. It is important that public health is included among these from an early stage to help them recognise and understand the need for preparedness and effective responses to any incidents. This starts with the development of the initial bid, and continues through the planning, the operations, evaluation, and ultimately in ensuring the legacy is sustainable. Public health officials have historically been absent from the ‘top table’ during planning for mass gatherings; however, for the London 2012 Olympic and Paralympic Games the importance of public health was recognised and integrated early on.

Working with colleagues in organisations such as the World Health Organization (WHO) is also important, as they have established links to other organisations including the International Olympic Committee (IOC) and the Fédération Internationale de Football Association (FIFA). They are working to raise awareness of the importance of public health commitments in the bid contracts of these international organising bodies and to gain recognition of the importance of public health planning by them along with the establishment of mechanisms to provide suggestions to their medical and public safety committees.

One of the most challenging aspects of the public health preparedness planning for mass gatherings is the need for unified command and coordination across the various agencies involved, who often have overlapping responsibilities.

The International Health Regulations (2005) (IHR) can be a powerful tool to raise awareness and gain engagement when planning for big international events. They have been put into place to prevent, protect against, control and provide a public health response to the international spread of disease in ways appropriate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade. In particular, they can be useful when seeking support for the enhancement and development of surveillance systems for the event. They require states to strengthen core surveillance and response capacities at the primary,
intermediate and national levels, as well as at designated international ports, airports and ground crossings. The IHR are not limited to specific diseases, but are applicable to health risks irrespective of their origin or source; they will follow the evolution of diseases and the factors affecting their emergence and transmission.

It can be useful as part of the planning process, and to gain support, to emphasise the legacy potential of sustained improvements in public health infrastructure, health services, and health security, all of which can improve the country’s international standing and image.

**Key principles – the mass gathering difference**

One of the major differences in planning for a mass gathering is the number and variety of groups that need to be included. Many of these would not normally be involved in health and so will not understand the risks and normal roles and responsibilities; some others may have been created for the event and so will not understand normal working practices. This means that in order to ensure the success of planning and delivery, it is important to engage all key partners and stakeholders early and at all levels.

This can be achieved through the establishment of a high-level public health (and/or cross health) planning committee, with all stakeholder agencies appropriately represented, and roles and responsibilities clearly agreed. This committee will provide strategic-level direction and oversight and is responsible for:

- Facilitating communication and management of joint planning and implementation processes across all partners and stakeholders.
- Securing adequate resources (including staff).
- Providing system-wide and event-specific job training.
- Providing the accountability structures important for assurance and the escalation of risks and issues.
- Formalising linkages between sectors, and specifying and agreeing when health has primacy and oversight for specific issues with sponsors, host bodies, and organisers.

**The planning process**

The risks to successfully, efficiently and effectively delivering the public health commitments for the event can be considerably reduced through robust planning. This can be done through pre-defining and agreeing protocols, rules, roles, and responsibilities across functions and administrative levels to enable standardised approaches and actions and then testing these.
Risk management
Risk management includes identifying and assessing risks and then responding to them. Risk has to be assessed as a combination of the likelihood of something happening and the impact that arises if it does actually happen.

The first stage of the planning process should be identifying key areas of public health risk for the event and any related gaps and concerns, then undertaking an assessment of them. Mass gatherings are very different and each one will have a diverse set of risks that need to be considered based on the nature of the event, the location, external factors, and visitor and in-country demographics; it is also useful to review the experiences of previous (similar) mass gatherings. In addition, mass gatherings can change existing public health risks, or cause new ones.

The risk management process should be planned, start early, be monitored and be an ongoing process. It provides a framework for allocating resources and facilities, planning emergency responses, taking preventive action, and planning a legacy for the mass gathering. The initial public health risk assessment for the 2012 Games took place in February 2009: it was used as a driver over the next three years to address risks and gaps. This assessment included the four key questions that need to be considered for a mass gathering (see part 1):

1. What are the existing health risks in the host country (and will they be affected, for better or worse, by the mass gathering)?
2. What health risks might be imported during the mass gathering?
3. What health risks might be exported from the host country after the mass gathering?
4. Are there particular risks from terrorism?

Risks might include imported infections and associated vectors, weather conditions, and levels of vaccination against preventable diseases. All of these need to be considered in the planning to reduce their impact, such as increased surveillance and reporting, vaccination advice for visitors, and hot or cold weather plans. The risk assessment for the mass gathering should consider the factors listed in Table 3.1.

A range of tools exists to help this process (see annex 6 for one example).

For the 2012 Games, public health risks included:

1. Minor outbreaks of infectious diseases in venue(s) (e.g. salmonella).
2. Serious food borne/infectious illness or gastrointestinal (GI) outbreaks at event sites.
3. Emerging infectious/communicable disease during the event (e.g. severe acute respiratory syndrome (SARS)-like illness).
Environmental risks during outdoor events (such as sunburn).

A heightened security risk because of the very high public profile of the Games and the fact that London was already a terrorist target.

In addition the risks associated with cross organisational delivery need to be considered, plus any others identified specifically by the event organisers. For example the 2012 Games organisers were concerned about poor air quality and the impact this might have on sports events, in particular during endurance races.

It is also important to undertake a review of current systems and processes to identify the risk from any gaps or event-related concerns. Although the surveillance and reporting systems within the UK are well established and effective, they were widely enhanced for the 2012 Games in order to reduce risks by providing additional information, facilitating real-time reporting, and enhancing the follow up of signals during the event (see chapter 6). For example, for the 2012 Games, changes in

Table 3.1: Factors of relevance to a risk assessment for a mass gathering (context).

<table>
<thead>
<tr>
<th>General factors</th>
<th>Specific factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Event factors</td>
<td>Duration of the mass gathering</td>
</tr>
<tr>
<td></td>
<td>Geographical spread: cities and/or districts involved</td>
</tr>
<tr>
<td></td>
<td>Projected crowd densities</td>
</tr>
<tr>
<td>2. Participant factors (including visitor factors)</td>
<td>Participant demographics including socio-economic status, home countries</td>
</tr>
<tr>
<td></td>
<td>Behaviour patterns of participants (including cultural differences)</td>
</tr>
<tr>
<td></td>
<td>Disease incidence &amp; prevalence among participants</td>
</tr>
<tr>
<td></td>
<td>Nature of planned accommodation</td>
</tr>
<tr>
<td>3. Local factors</td>
<td>Incidence &amp; prevalence of locally endemic diseases</td>
</tr>
<tr>
<td></td>
<td>Vaccination status of the local population</td>
</tr>
<tr>
<td></td>
<td>Seasonality of locally endemic disease</td>
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<tr>
<td></td>
<td>Systems &amp; infrastructure in the affected areas:</td>
</tr>
<tr>
<td></td>
<td>- Prevalence of temporary food vending</td>
</tr>
<tr>
<td></td>
<td>- Existing environmental hazards</td>
</tr>
<tr>
<td></td>
<td>- Transient environmental hazards, e.g. portable temporary toilets</td>
</tr>
<tr>
<td></td>
<td>Media attention (e.g. high profile event such as the 2012 Games)</td>
</tr>
<tr>
<td></td>
<td>Available resources &amp; reserves</td>
</tr>
<tr>
<td>4. International factors</td>
<td>International seasonal patterns of communicable disease (risk of disease importation)</td>
</tr>
<tr>
<td></td>
<td>Global outbreak alerts</td>
</tr>
</tbody>
</table>
visitor access to healthcare systems were identified as a risk: it was anticipated that visitors would not use primary care facilities such as General Practitioners (GPs), but go to walk-in centres or emergency departments instead. In order to capture their information, syndromic surveillance systems were expanded to include these facilities.

**Prioritising risk**

Once risks are identified, planners must prioritise them: the risk assessment. To do this, risk can be treated as a function of the likelihood of something happening, and the impact which arises if it does happen.

- Likelihood will be determined by the context of the mass gathering (Table 3.1), including venues, environmental risks, attendees’ likely immunity to infection, etc.
- Impact assessment can be based on the state of public health in the host country, surveillance data, experience, literature, and expert judgment.

This process can be done through a categorisation of risk. Using categories for high / medium / low risk in respect of each may be sufficient, and should be the minimum level of categorisation (a “3x3” risk matrix).

Risk assessment should cover all of public health and other systems that will affect the health response during the event. The HPA’s initial Games assessment was complemented by assessments of separate workstreams (e.g. microbiology testing) and linked with others from partners including event organisers, government, and security and intelligence services. As well as predictable risk, planners must also make sure health systems are strong enough to cope with risks that are not anticipated.

During the event a system for doing a case-based risk assessment is important whenever a potentially significant health event is detected. During the 2012 Games a number of these were undertaken to identify the additional Games risk associated with any incidents, none of which identified a significant risk. For example, a cluster of chicken pox cases on a ship housing Games bus drivers was assessed as having a very low public health risk. This assessment enabled the HPA to provide assurances to key stakeholders that this would not affect the Games.

**Command, control and communication (C3)**

One of the most challenging aspects of planning for mass gatherings is the need for unified command, control and communication (C3) between all stakeholders involved in delivering the event. This is very complex, as they will often have overlapping responsibilities under different national or subnational levels of government, may not normally work alongside each other, or may be newly formed for the event (like the London Organising Committee of the Olympic and Paralympic Games (LOCOG)). Effective C3 mechanisms are needed to ensure that all stakeholders understand their respective responsibilities, and that appropriate arrangements are in place to
provide the right information through agreed reporting processes, and to manage any situation as it arises.

**Ensuring resilience - event based approach versus emergency response**

One of the major benefits of a planned mass gathering is that it can be managed as an event rather than an emergency. The HPA took this approach for the 2012 Games, developing a series of specific Games delivery plans across the agency, from the national Concept of Operations (ConOps) to the operational plans for specific areas such as surveillance and reporting. However, most other health organisations followed their emergency response processes. A key rationale for the HPA’s decision was that with seven years to plan, the Games should not be considered an emergency. This approach also enabled greater resilience should a significant incident occur during the event, whether Games-related or not, because the agency could still invoke, and escalate, its emergency response mechanisms.

Whatever approach is chosen, if an incident is reported that is either directly or potentially related to the mass gathering (including through political or media interest), the standard response will need to be enhanced to enable a quicker investigation. As much as possible this should be done using standard processes, but with smarter and lower thresholds than usual.

It is also vital that there is the resilience and capacity to respond to an emergency or major public health incident during the mass gathering. This means ensuring there are sufficient resources available to continue delivering the steady state mass gathering commitments alongside the response to an incident (or more than one). Incidents may be directly related to the mass gathering or may happen elsewhere; any incident in the host country is likely to become linked to the event (e.g. the legionnaires outbreak in Stoke-on-Trent during the summer of 2012 was unrelated to the Games but caused some questions to be raised on whether there could be links).

Very close collaboration and communication between the mass gathering and the incident managers is key; being closely located will help this.

In the event of a major incident being mass gathering related, those most familiar with the key stakeholders will take the lead as there is already an established trust and working relationship and knowledge of the mass gathering. This means there needs to be another team which can step in to handle business as usual. The HPA set up three teams of senior staff to ensure resilience and capacity to respond and manage all eventualities during the 2012 Games.

**Developing a Concept of Operations (ConOps)**

The ConOps is the key planning document that captures C3 arrangements both internally and with key partners and stakeholders (see Figure 3.1, Health Protection Agency data flow chart for the Games).
The ConOps, or service delivery model, should be defined early and agreed across all stakeholders, so all involved understand and agree how public health services will be delivered during the event. This will need to link in to, and work together with, the ConOps of other partner and stakeholder organisations, of which the most important will be those of the event organisers and the cross government plans. It will be a complex document, but it needs to be readily understandable and accessible by all involved. The establishment of a daily running schedule within the ConOps will help everyone understand their operational commitments and reporting deadlines.

The ConOps should be a living document which will be updated regularly, probably until the event starts. The HPA ConOps for the 2012 Games was tested in various exercises, and was then revised following the recommendations and actions generated by these. It was supported by a number of operational plans (for surveillance, microbiology services, communications, etc.) which all linked together.

When developing the ConOps, it should:

- Use existing systems wherever possible and enhance them if required.
- Embed any enhancements to systems (e.g. surveillance) into routine systems.

Figure 3.1: Health Protection Agency data flow chart for the Games
It is also important to take into account a number of planning considerations and what must be delivered for these. These are explored below.

**Situation Reports (SitReps)**
The Situation Report is the key reporting mechanism during the event and should be the primary source of information for public health issues for all stakeholders. It should be understandable and accessible by non-public health experts, with a front page summary at the beginning: the HPA produced 73 daily public health Situation Reports during the 2012 Games, all of which had “nothing significant to report” on the front summary page.

The ConOps should include information on the frequency, format and primary audience of the SitReps, and whether they will be made available to the public. The primary audience for the SitReps is likely to be the event organisers, the government health department and the lead government department for the event.

During the 2012 Games the HPA acted as the single point of contact and reporting for all public health issues that could impact on the Games, including infectious diseases both in the UK and internationally; environmental hazards (such as the public health impact of poor air quality); and any related media coverage. This involved receiving reports and sharing information with other organisations and countries, and agreeing the reports that were sent to key stakeholders. Any information also reported by partner organisations was agreed before the finalisation of the daily Situation Report; this avoided the problems of parallel reporting, or of different information being reported.

To ensure this works well it is important to have close and open collaboration and communication, alongside the pre-agreed and tested roles, responsibilities and reporting arrangements. Being able to contact a colleague quickly avoids potential conflict and confusion, even if it is just to give an informal ‘heads up’ alert. For example, the HPA received notification from the event organisers of a number of potential claims of food poisoning on the main Games park, which were then reviewed against other known cases; no links or causes were identified. This robust information provided assurance that there was no food poisoning outbreak.

**Operations centre**
A single national operations centre for coordinating the public health system is invaluable. Ensuring the logistics and staffing of the operations centre early will help enable delivery of the event; robust information technology (IT) systems with 24/7 access are key. One recognised benefit for the 2012 Games was the use of modern technology. The use of smart phones and tablet computers provided increased robustness and flexibility, enabling key staff to attend meetings and work away from the operations centres, while remaining available and responsive.
The national operations centre should include the national team, the lead region (e.g. London for the Games) and the communications team. It can also be useful to include liaison officers from international organisations such as WHO.

**Roles and responsibilities (R&R)**

The roles and responsibilities for delivering the event commitments through the ConOps should be defined and agreed early, looking at both steady state operations and the additional requirements if a major public health incident occurs.

Early recognition and agreement of which agency has the lead (primacy) for specific public health issues across all partners and stakeholders will help avoid confusion. Clearly define responsibilities such as reporting and response across agencies by agreeing:

- Where public health will lead (e.g. surveillance).
- Where public health will influence (e.g. health promotion).
- Where public health will support (e.g. security).

**Stakeholder engagement**

In addition to the engagement of all relevant stakeholders at strategic level through the high-level public health planning committee, it is important to ensure excellent working across all those organisations that may be involved in a public health incident, and across government at the day-to-day, operational level (see Figure 3.2). This may be facilitated through the establishment of a number of steering and working groups. The sharing of key documents (such as the ConOps) across organisations to raise awareness and ensure standardisation is also good practice. Key to the successful delivery of the public health commitments for the 2012 Games was the early and successful engagement with partner and stakeholder organisations.

The membership of all of these groups, including the high-level committee, is unlikely to remain static. More stakeholders will come forward and need to be involved as the event gets closer and everyone realises their commitments and the complexity of the event. For example, the 2012 Games planning committee for public health went through three stages, finally establishing its broad senior level membership (internal plus LOCOG, government, local authorities, National Health Service (NHS) etc.) 18 months before the Games. There were also a number of supporting groups; for example a drinking water group was set up with members that included both commercial and health sector providers.

These groups can place a significant draw on resources as key members spend significant amounts of time in meetings with stakeholders; but it is vital to do this, and successful working relationships do require a significant investment of time. The effort will ensure all involved understand their roles, responsibilities and working
arrangements. For the 2012 Games the robust testing and exercising programme (see chapter 4) ensured these working relationships were tested, reviewed and improved.

One of the key relationships will be with the event organisers: this will require a high degree of close working, trust and openness during the event, when sharing information and providing expert advice and information. This can be facilitated formally through signing a Service Level Agreement, and enhanced by seconding a public health expert to the organisers to set up and agree data sharing, reporting and response procedures.

However, working with a commercial organisation set up specifically to deliver the event can raise a number of issues, as they will have different priorities. The event organisers work to their own timescales and deliverables, which can cause issues around areas such as access to facilities and testing reporting systems. It is important to spend time agreeing how public health incidents will be managed and who has primacy, including for media handling, venue access, and any required accreditation and systems. For the 2012 Games, there were issues with the accreditation system that meant HPA staff on duty at venues had to be escorted as visitors. This limited their flexibility and inclusion as part of the medical services team.

Figure 3.2: Stakeholder map
It is also important to agree working relationships with international partners, including clarification of what information will be shared. It is useful to have Terms of Reference (TOR) for all parties set up early, and an agreed process to meet requests for information. Having international colleagues embedded in the operations rooms worked well during the 2012 Games, and enabled many day-to-day issues to be resolved easily.

**Legal agreements**

It is important to consider whether the event requires any new legislation, policy modifications, ministerial directives, and working agreements to support joint planning and cooperation between stakeholders. The latter can be in the form of Memoranda of Understanding or Service Level Agreements, which can reduce the likelihood of conflict at a later stage (e.g. when negotiating agreements on the provision of experts to event organisers). This also needs to include any changes to legal and regulatory issues necessary to ensure delivery (such as approval of and support for operating procedures); any changes to bylaws (such as those affecting food hygiene inspectors and access to venues); and the modification of reporting forms to include event related information. For example, the UK’s notifiable disease forms were temporarily amended to include specific fields, for example Olympic venues, for the Games.

**Communications**

Communicating the planning and delivery commitments to stakeholders is vital, as it raises their awareness and understanding of both normal business and the event additionality. This can be achieved through discussions, meetings, sharing documents and contributions to partner organisations’ documents. The HPA produced and shared information and a number of documents both internally and across partners, including:

- A quarterly newsletter for key stakeholders in the three years leading up to the 2012 Games.
- A background document before the Games on public health in the UK and what we would see during a typical summer.
- A weekly web-based newsletter during the Games, produced with international partners.

Close stakeholder engagement and communications helped ensure that during the event there were no mixed or contradictory messages. Priority was given to agreeing how public messages would be produced and approved between stakeholders so that a consistent message, or “one version of the truth”, was disseminated. Considerable time was spent with partner organisations to agree how to manage this, especially for the media.

Engagement and close working with the media is critical; there will always be considerable media interest, particularly in the lead up to the event. Holding a
proactive media briefing before the 2012 Games was useful as it demonstrated a willingness to share information, which in turn helped avoid speculation and encouraged trust when public health issues were later reported.

For more detail, please consult the dedicated chapter of this book: chapter 8.

**Event time staffing arrangements**

Staffing is probably one of the most complex, challenging and sensitive aspects of preparations for the mass gathering. If, like the 2012 Games, the event spans several months it can have a considerable impact on the working arrangements of staff, such as annual leave arrangements. In the HPA in 2012, agreement was made to allow key staff to carry leave into the next financial year. Any additional financial arrangements or staffing should be agreed early, and an evaluation should be carried out of the expertise required; it is often the case that there is a limited number of experts available to cover both the event and normal business. The establishment of pre-agreed rotas and shift arrangements for all roles will help address some of these issues.

Careful consideration should be given to these arrangements to ensure engagement, continued goodwill and flexibility. For the 2012 Games, staffing was reduced in the changeover time between the Olympics and Paralympics (though the resilience was always there to escalate up if required).

**Funding**

A key part of the planning process is to ensure adequate funding for public health. This should be based on an assessment of public health risks and the review of systems, which then informs the development of specific prevention strategies, monitoring systems, and contingency planning. It is, however, difficult to evaluate requirements for steady state arrangements and those required if a public health incident occurs. To date there is little evidence on the costs for delivering public health for a mass gathering as it is hard to separate this out from normal business if nothing significant occurs.

**Testing and exercising**

Robust testing and exercising is essential in order to provide assurance that the plans work. Exercises should be designed to assess the competence of individuals and organisations to respond to the event and/or emergencies and in particular their decision making and communication skills.

For more detail, please consult the dedicated chapter of this book: chapter 4.

**Discussion and recommendations**

The HPA started planning for the 2012 Games when it was announced that London had won the bid, seven years before the event. This early start certainly helped
delivery of this complex commitment; however it must be recognised that getting
engagement from colleagues, both internal and external, at such an early stage can
be very difficult. For the Games this challenge was increased because of changes
within the political environment and the UK National Health Service.

Additionally, staff often had to combine Games work with their “day jobs.” To counter
this problem it is useful to have a dedicated team for the event. This does not require
a large number of staff: the HPA’s Olympic Office consisted of a dedicated Programme
Director, Project Manager and Administrator. It is important that the senior manager
has enough authority to represent the organisation with government and the event
organisers, and to take decisions on internal planning requirements. It was also useful
to embed someone part time with the event organisers.

There were three stages to the HPA’s planning process:

1. The first three years were spent:
   - reviewing the experience from previous mass gatherings by talking to those
     involved (e.g. colleagues from Vancouver, Sydney, Athens and WHO)
   - undertaking a public health risk assessment, reviewing the systems within the
     UK, assessing capacity capability, and identifying gaps and possible solutions
     (the WHO / HPA toolkit [see annex 6] was useful in this)
   - developing a programme plan.
2. The next three years were spent delivering the agency’s programme through
   nine major workstreams covering all aspects of public health delivery, logistics
   and support services such as Human Resources/Personnel. During this stage the
   ConOps and other operational plans were developed and tested. The agency
   worked to the principle that everything should be in place with one year to go.
3. The last year was spent testing and exercising, training, and fine tuning the plans.
   This provided the HPA with a high degree of assurance that it was Games ready.
   The processes for evaluating delivery and capturing the lessons and the legacy
   were also put in place.

One of the benefits of running a planned mass gathering was that the daily working
arrangements were developed, agreed, tried and tested early before being fully
operational. Some very useful principles that were adopted included:

- Using teleconferences as a forum for reporting (not discussion), which avoided
  experts being tied up in long calls.
- The establishment of single point of contact information, with dedicated email
  addresses and phone numbers for the key roles.

A high profile mass gathering such as the 2012 Games means a thirst for information.
Particularly in the run up there can be considerable interest from political
organisations seeking assurance, and from the media searching for stories. This means
that a large proportion of time can be spent managing queries from stakeholders (in the case of the 2012 Games this included the Department of Health, LOCOG and the media). Due to the robustness of the 2012 Games reporting systems, when questions were received the HPA was able to provide quick, accurate assurance that there was nothing to report, or that a reported incident was of low risk to the Games. This prevented the escalation of rumours and managed stakeholder expectations.

However, along with the anticipated enhanced and rapid response to routine incidents (especially those linked to athletes), when something does occur quick decision making becomes a necessity, as the politics can drive decision making faster than science drives answers.

Extensive work with stakeholders beforehand, such as providing background information on public health in the UK and what would be seen during a typical summer, raised the level of confidence in these statements, as did proactive media engagement. For example: there was a nearby fire at the time of the closing ceremony that was the largest fire in London for several years, but it aroused less interest than normal. The HPA provided reliable assurance that there was no public health risk, which was accepted by the organisers, media and government.

Some of the key learning from the 2012 Games has been around the unexpected issues that arose or which caused more concern than they should have done; at times the response to incidents was disproportionate to the public health risk or benefit. Examples of such issues include:

- There may be little to do: there were times when there were very few public health issues. There was the potential to overreact to what should have been business as usual, which together with organisational involvement at a national level caused additional requests for information and confusion on the ground.

- Maintaining appropriate, and motivated, levels of staffing over the duration of a long event can be challenging. There may be periods during the event when it is very quiet, so the flexibility to scale up or down is useful. However, it is important to ensure that if the resource is scaled back, it can be reactivated immediately if needed.

- It also proved difficult for senior staff to take time off effectively; they were known to be the Olympic leads by stakeholders, and were perceived as the “few who knew everything.” There was an expectation that they would always be available. It should be the role that is important, not the person.

- The use of social media (such as Twitter) means that some event participants will post information on their illnesses; for example, some 2012 Games athletes posted on Twitter that they had diarrhoea and vomiting. These cases are difficult to follow up, may attract media interest, and often do not get reported through formal reporting processes as the athletes choose not to do this.
• There was interest before and during the 2012 Games in air quality issues (with the concern that these might affect endurance athletes). There was political focus on improving air quality, despite the fact that this was largely due to transport emissions (from congested traffic in an old city) combined with London weather, and as such difficult to change. Additional resources were put in place to monitor and provide information on the public health impact of air quality, which provided important assurance to the event organisers.

• There is great benefit in taking a proactive approach to the development of a media handling plan, and engaging thoroughly with media before and during the event; this was certainly the case during the 2012 Games. Key messages for media were developed to accompany incidents included in the SitRep; however most of these were not required, as there was little interest from media in these low level incidents; they were more interested in the Games.
Recommendations from the London 2012 Olympic and Paralympic Games

- Ensure public health representation at all key levels and in all key organising structures including the policy and decision-making groups. A dedicated team may help this.
- Ensure excellent and early stakeholder engagement – build relationships and trust. In particular ensure early engagement with event organisers to obtain clear agreement on roles and responsibilities, reporting, and working arrangements. Consider the demands of managing political expectations.
- Planning should be based on a public health risk assessment and review of current surveillance systems. Gaps should be identified, and any enhancements addressed.
- Consider managing this as a planned event rather than as an emergency.
- Ensure understanding of the public health background of the host country’s population, so an incident that relates to the mass gathering can be easily identified. Have a baseline of evidence against which to quantify.
- Ensure a clear, well tested ConOps (C3) and reporting requirements; internal engagement; and understanding of roles and responsibilities.
- Plan for a flexible approach for staff, with the ability to step up and step down easily, to avoid a sense of overkill. Develop contingency plans to scale up response rapidly if needed, to ensure rapid response and escalation when required. Know in advance where surge capacity will come from.
- Ensure robust and tested systems to provide assurance that everything is reported: nil returns are fine.
- Set up processes to ensure everyone involved understands and agrees ‘a single version of the truth’ for reporting and media statements; share and agree this information with external partners so messages are consistent and aligned.
- Learn from others (e.g. attend observer programmes and study legacy reports).
- Plan early for legacy and take an all/cross government approach.

After the 2012 Games there were also some areas identified specifically as guidance for future Olympic and Paralympic Games or similar events:

- Have a public health expert present in the Polyclinic, and set up and test reporting early from Games venues.
- Accreditation for venue access should be sorted out well in advance of the Games.
- Embed someone within the event organisers’ medical team during planning.
Legacy

Public health legacy and sustainability issues should be considered at the highest level and in all aspects of planning: what long-term benefit can public health and the country gain from the mass gathering?

Close working with different stakeholders during the planning process can help to raise the profile and understanding of public health, and in particular government departments. It can also help strengthen coordination and collaborative working with partner organisations, especially across the health community. Legacy benefits are possible through these new and improved relationships. In London in 2012, for example, a group was set up across all key stakeholders to enhance air quality forecasts and develop smart phone applications: this will provide a long-term legacy and improve the public’s access to air quality information.

Mass gatherings can also be an excellent driver to improve systems and processes. Many of the enhanced systems and processes put in place for the 2012 Games are being maintained and developed further: the UK now enjoys increased resilience through improved reporting, data and analysis systems and processes, and the ability to move quickly from weekly to daily reporting in the event of a significant incident. In addition there is a broader cadre of staff experienced in managing event based response, and a larger body of staff trained to work in emergency response.

Tools

HPA/WHO mass gathering toolkit (online resource) – Online toolkit developed for use by public health professionals responsible for the management of communicable disease alert and response during mass gatherings. Provides an assessment of preparedness for hosting an event. To request access, please contact: massgatherings@phe.gov.uk


Chapter 4

Testing and exercising

Tina Endericks
Introduction – why is this important?

It is vital to prepare for a major event by testing the plans, skills, knowledge and expertise required to deliver them, and the ability to respond to any eventuality. A robust testing and exercising programme can help ensure that the wide cross-section of organisations involved in delivering a mass gathering can respond in a rapid and co-ordinated way to a range of incidents. Exercises should be designed to assess the competence, decision making and communication skills of both individuals and organisations to respond to the event and/or emergencies.

As each public health system has a different level of preparedness, it is important to ensure that a testing and exercising programme is built into the planning process for a mass gathering across all stakeholders from the very start. This provides continuous assurance that the planning is operationally ready internally and for all partners, and that roles and responsibilities are understood.

The event delivery will be the responsibility of various organisations, each charged with developing a Concept of Operations, or ConOps (see chapter 3), that lays out the operational strategy. There will be a number of these, all of which need to work and be tested together. Many organisations will also have pre-existing emergency plans (e.g. for pandemic flu) which should be reviewed against the event plans. A robust programme of exercising and training will ensure that all of these are fit for purpose and that staff are adequately trained to implement them.

It is also important that testing covers day-to-day activities and working arrangements for the mass gathering and that these are tested before arrangements for major incidents or emergency response. If steady state working is not robust then it is likely that the management of any significant incidents will not be appropriate or adequate.

The aim of the HPA’s 2012 Games programme was to ensure, through the programme of testing and exercising, that during the event public health data and information flows would be timely and accurate, and the appropriate public health response, advice and information would be actioned in the event of a public health incident.

Key principles - the mass gathering difference

While many of the organisations involved in delivering a mass gathering will have regular testing and exercising programmes (either because they are involved in emergency response or as part of business continuity arrangements), the testing and exercising required for planning a mass gathering is different for a number of reasons.

- It should be informed by the event risk assessment.
- The complexity of the event involves a broad range of stakeholders who do not always understand public health issues or how things would normally work (for
example some government departments and event organisers). New venues may also come into play.

- There is a requirement to test steady state operations, due to changes imposed by the event additionality and the lower tolerance to any incidents.
- It should cover the broad range of incidents that could be associated with the event; the majority of these will have some public health impact (e.g. a major transport problem may include inhalation of smoke or chemicals, or people stuck in old and poorly ventilated tunnels).
- Planned mass gatherings should be run as an event rather than an emergency so that there is resilience to escalate the response if something untoward happens.
- The threshold for media or political engagement is lowered.
- For planned mass gatherings, expectations are different: there can be no excuse for failure.
- Responses to major incidents affecting previous mass gatherings can be reviewed and can provide useful lessons.

The testing and exercising process should be iterative (see Figure 4.1), consisting of: exercise planning; delivery; evaluation; identification of lessons; analysing how these can be taken forward; actions; and monitoring delivery of recommendations. During

![Figure 4.1: Iterative testing](image-url)
the testing, programme gaps and internal requirements may be identified that will require setting up specific exercises.

The process should be started at least 18 months before the beginning of the event, to ensure time for adequate testing and exercising (see Figure 4.2), but goals should be realistic. It is often difficult to get the necessary engagement from all stakeholders far out from an event, and regardless of how early planning is initiated, it is important to remember that the world will change. Stakeholders, their needs and the context will continue to evolve throughout the planning period.

Testing will provide an opportunity to raise awareness of public health risks and improve key stakeholders’ understanding of them, how they are managed and the roles and responsibilities.

Ensuring that public health is represented on the cross organisation testing and exercising planning groups will help these groups understand public health risks and will ensure that public health scenarios are included in the testing and exercising programme. For more information on these groups, see chapter 3, which covers planning and working with partners and stakeholders.
Exercises should:

- Bring together those involved; inform and motivate staff; assess performance; and identify training needs.
- Assess whether there is a competent workforce, able to deliver and meet their responsibilities, with the capacity to function during the event and/or an emergency.
- Assess the potential impact of the event on the organisation; ensure resilience under the event pressures (choosing an event-based approach to the mass gathering over an emergency response approach will help in this regard); and ensure that resources are available.
- Test the Concept of Operations (and/or emergency response plans).
- Include a rapid debrief process to identify lessons and recommendations; ensure a rapid response to learning from exercises; and ensure that these lessons have been embedded.

Risk assessments
The main focus for testing and exercising should be based on a risk assessment of event additionality – what is different because of the mass gathering? This will often be focused on the public health risks; however an event delivery risk assessment should also inform the testing and exercise programme.

This assessment should lead to the identification of the areas that should be tested – i.e. the event differences in the command, control and communication (C3) structures and working arrangements. These risks should be linked into the exercise programmes led by government, partner organisations and event organisers.

Core components
Testing or exercising should provide assurance on one or more of the core components listed here:

- Event additionality: testing the new/additional roles, organisations, capabilities and structures required to deliver the event and which could not be delivered through business as usual.
- Roles and responsibilities / stakeholder engagement: testing the understanding of roles, responsibilities and reporting arrangements within and between organisations; whether staff are in role and fully trained; the boundaries of decision making; and the presence and robustness of clear arrangements for managing routine events, incidents and crises.
- Command, control and communication arrangements laid out in the Concept of Operations (ConOps): whether these are defined, in place and tested, both internally and across organisations. Lessons identified need to be embedded in updated versions of the ConOps.
• Communications: testing whether information flows and reporting processes have been tested and are fit for purpose.
• Event systems: testing whether these have been established, information and intelligence flows work, and the relevant infrastructures have been approved and tested (e.g. phones or other networks, open or classified).
• Integrating the event stakeholders: these include event organisers, government, safety and security actors (police/military), transport, and local government.
• Resilience: testing the capacity to provide event commitments and response at the same time as providing a response to incidents not associated with the mass gathering.

Types of testing & exercising
Exercises should be appropriate and cost effective, and should deliver against aims and objectives that are set out clearly and agreed in advance. Testing and exercising should validate plans and staff competencies.

The type and timing of exercises is important. A selection of table top (TTX), command post (CPX) and live events (LIVEX) exercises could be used. Examples of these used for the 2012 Games are included below.

• Table Top Exercises (TTX): These are good for testing realistic key procedures and the basic concepts in the event plan; raising awareness and understanding of plans, roles and responsibilities; and for training purposes:
  - for the Games these were used internally, across health and across all stakeholders. For example, the first cross organisational exercise was a TTX involving around 100 stakeholders and looking at a number of likely risks, including a food poisoning outbreak.
• Command Post Exercise (CPX): For the Games, three major cross-stakeholder CPXs were run, covering a variety of situations. These ranged from approximately 200 small incidents across the UK and all stakeholders in CPX 1, where several low-level public health incidents were run to raise awareness of normal business, to four major incidents in CPX III, one of which included a major chemical fire near the main stadium with significant public health issues.
• Live Exercises (LIVEX): these provide the best assurance and most robust testing, e.g. of evacuation, casualties, and media handling under ‘live’ conditions:
  - for the Games, live exercises were used to test responses to major incidents. For example, a security-led exercise linked to an incident on the London Underground railway system.

There are various levels of testing, from service level to that of event organisers. Figure 4.3 outlines the respective focus areas of these levels of testing and gives examples (boxed) of how they were done for the Games.
If possible, scheduled events linked to the mass gathering should be used for testing. In London, a series of test sporting competitions were held at the Olympic and Paralympic venues as part of the 2012 Games assurance process. The HPA took the opportunity to link exercises with these to develop key working relationships and improve plans and procedures, such as gaining access to venues for water testing.

**Discussion and recommendations**

It is important not to underestimate the complexity of the testing and exercising programme for a major mass gathering; because of the event additionality it will require a diverse and intense programme. The HPA was involved in three significant internal exercises plus three government-led CPXs, and went through three major versions of its ConOps between February 2010 and the final tested and approved version (revised following the final CPX) completed in May 2012, just six weeks before going operational.

One of the significant benefits of the HPA being actively involved in the planning of cross organisation testing and exercising was that the public health risks were included in the exercise schedule. This ensured a greater understanding of the risks, response and working arrangements across all involved. Scenarios should be used that are
based on the risks identified across all key partners e.g. the cross-government risk assessment, the public health risk register, and the operational risks.

Whether an event-based approach or a revised version of the normal emergency preparedness response is chosen, the event additionality will still need to be tested. It is very unlikely that the standard emergency response plans will be fit for the event, especially as daily routine reporting will be required across all public health, and not just for specific emergencies (such as, for instance, chemical fires). If a significant non related incident occurs during the mass gathering the routine reporting for the mass gathering will still be expected, and so the parallel running requires testing.

It is important to learn from, and build on, normal practice, including routine emergency response planning and exercises, and standard internal, and stakeholder, roles and responsibilities. Learning should also include looking at the management of previous events or the response to major incidents and emergencies (for example, the learning from the H1N1 influenza pandemic informed the development of the event ConOps for the 2012 Games). Learning should also be linked in to the exercises planned for the event.

It can be useful to use any regular (non event related) exercises undertaken within the organisation; these provide opportunities to run the event-additional systems in parallel. For example, in the run up to the 2012 Games, the annual London region TTX in 2011 included an additional table for key Olympic players from across health organisations in London to consider the impact if the exercise scenario had happened during the Games.

The emphasis on testing internal steady state arrangements first is important. Only when steady state working can be done competently should planners move on to test steady state arrangements with other health organisations, government and the event organisers.

It is important to be open about lessons and recommendations from exercises, internally and externally. Due to the limited time available these will need to be addressed very quickly, often requiring discussion and agreement with stakeholders, with specific actions and tight deadlines agreed. Further exercises should challenge these changes and include a review to ensure they are implemented and fit for purpose.

Early identification of key roles and responsibilities and those delivering these roles (e.g. liaison roles within government) will enable specialist training to be undertaken. In London, training needs were reviewed for the 2012 Games and training provided specifically for Games time operations and for those less experienced in emergency response. Training should be sufficiently generic to ensure flexibility and robustness: a number of people should be available who can do each role and be interchangeable. This is particularly important if the event continues over a period of time, like the 12-
week Olympic and Paralympic period.

One of the key areas on which the HPA focused before the 2012 Games was ensuring that all staff were comfortable and familiar with their roles and responsibilities, logistics and standard operating procedures (SOPs), accurate reporting and documentation of information (in case of any future inquiry). The agency also began Games time procedures a week early to test everything across all internal operations cells and undertake some final training.

During high profile events, such as the 2012 Games, it is important to be able to make rapid decisions, which due to pressurised circumstances are often not evidence-led, but rather based on the information available at the time and on experience. Those leading the response need to be able to do this under pressure from external forces such as the event organisers, who might, for example, need a rapid decision on closure of an event or venue.

This was tested during CPX III with a scenario of a large industrial fire near the main Olympic Park which threatened the running of some events and closure of venues due to the risk of smoke and chemical inhalation. Decisions had to be made on these before all the information on the risks could be gathered and results of the air quality testing were received. Considerable pressure was put on HPA by the London Organising Committee of the Olympic and Paralympic Games (LOCOG) and government to take early decisions, and so a precautionary approach had to be taken. The drive for this was very complex and included athletes’ health, public perception (globally and locally), cost, public health risk, media, etc. All of these factors can put unexpected pressures on those involved, so rapid and robust decisions are critical. This exercise was excellent for raising awareness of the complexities and different, often conflicting, agendas of all those involved. The resilience planning in the ConOps was significantly enhanced following this.

**Testing public health and event based risks**

As part of the planning process (see chapter 3) a risk assessment will be undertaken. This will identify public health risks; but in addition the cross organisational/delivery risks need to be identified and included in the testing and exercise programme. For the 2012 Games these included:

- Inadequate resourcing, training and experience to deliver commitments sustainably over the three month period of the Games.
- Lack of high quality, timely surveillance, reporting and intelligence data (if moving to providing daily data, the ability to do this sustainably needs to be challenged).
- Event C3 and data flows internally and across all stakeholders that are poorly defined and not fit for purpose.
- Restricted access to event sites (accreditation).
• Procedures for escalation and ensuring public health information and advice in the event of a deliberate release that are not fit for purpose.

Although it will not be possible to include all the risks in the exercises, the exercise programme must provide assurance that the systems can respond to anything. The inclusion of a range of public health risks in the 2012 Games exercise programme presented a number of opportunities to improve working arrangements, address some of the recognised risks, and also highlighted some unexpected issues. Some examples are listed here:

• Steady state, daily reporting across all stakeholders was used to raise awareness and understanding of normal public health issues, focusing on those identified as most likely to occur. Including an unusual imported infection to the UK (Chikungunya) and an animal disease with possible human transmission (Glanders) in CPX I raised concerns with those unfamiliar with public health, and discussions were escalated beyond what the risks would justify, demonstrating the low risk threshold in government. This helped raise awareness of ‘normal business’ and the range of public health issues, and led to the development of a baseline / background document for non-public health experts.

• One risk identified for the Games was the potential increased risk of legionella associated with ships being used as floating hotels. A case of legionnaires was played in CPX II and caused a lot of concern, again largely due to limited understanding of public health. However, during the Games the reality was that legionella was found on a ship (though no cases occurred), and due to a better understanding of the associated risks there was little interest when it was reported.

• Carefully chosen scenarios can help raise known issues; e.g. collaborative working across a number of partners on air quality monitoring and sharing information was tested during the fire in CPX III. This enabled problems to be identified and resolved for the Games.

• Those incidents that are likely to happen (such as a significant food poisoning incident) should be used to test escalation and surge response capability, clarify working arrangements between partner organisations, and test links for surveillance, food providers, microbiology testing, event organisers, etc. This type of incident could rapidly escalate, and so exercising this will highlight the need for escalation processes to be finely tuned internally, and for excellent communication across partners.

The ability to test all the risks sufficiently is often outside the control of planners. For example, in London, LOCOG took very late delivery of the Polyclinic and Medical Reporting systems, which meant the information flows and reporting from these were not tested, which caused considerable teething problems. Additionally, the issue of HPA staff needing to be escorted in order to gain access to the Polyclinic raised concerns about how rapid access would be achieved if it was required for a major incident. Fortunately this was never tested, but it continued to raise concerns during
the Olympic Games. The issue was resolved by the start of the Paralympic Games.

One of the key outcomes of a robust and extensive testing and exercise programme is the ability to provide assurance to all involved that you are event-ready. The HPA was able to state in May 2012 that the systems and capacity were in place to receive, rapidly analyse and react to surveillance, reporting and intelligence information, and to identify and respond to any potential health protection threat, seven days per week, from steady state to emergency.

**Recommendations from the London 2012 Olympic and Paralympic Games**

- Test, test, test – start with internal steady state working and ensure this is fit for purpose (“get your own house in order first”) before testing arrangements with partners and stakeholders and escalating to significant and major events.
- Gain early engagement in planning for exercises with all stakeholders.
- Test across partner organisations and all stakeholders to ensure multi-agency command, control and communication works, and that all stakeholders understand their roles and responsibilities.
- Ensure clarity of reporting to non-experts (provide background/baseline documents where necessary). Ensure an understanding of normal public health issues.
- Test the ability to respond rapidly and robustly to information requests/requirements from event organisers, government, and media (responses may not always be evidence-led).
- Include communications to clarify arrangements for formulating, agreeing and disseminating public health advice across partners.
- Review and learn from real experiences (e.g. the H1N1 flu pandemic) and see what can be adopted.
- Run exercises to very tight timescales with rapid debriefs; identify the actions with tight deadlines, and ensure close monitoring of these. These actions should then be challenged during subsequent exercises.
- Ensure staff are sufficiently trained and involved in exercises, especially if the event response is managed outside business as usual.
- Start early to ensure operations centres and roles, staff training and logistics are fit for purpose – including support functions such as human resources (HR) and information technology (IT).
Legacy

An often unrecognised legacy from mass gatherings is that the participating organisations will have been involved in a number of tests and exercises, which will enhance both their internal resilience and multi-agency working arrangements and understanding.

Before the London 2012 Olympic and Paralympic Games, exercises helped raise awareness and understanding of public health issues across government, and also helped clarify some of the cross health communications – in particular the dissemination of public health messages.

The learning and recommendations from the 2012 Games have subsequently been fed into the HPA’s emergency response planning (such as the use of the single point of contact approach) and will enhance responses to future emergencies and events. These recommendations are also summarised elsewhere in this book and in more detail in the Summary Report of the HPA’s Games Time Activities (see annex 3).

In addition the organisation now has:

- A broader cadre of staff experienced in public health for a major mass gathering.
- More staff trained through the UK Government Emergency Response Training courses.
- A network of experienced experts on the response to global health issues, in particular if related to mass gatherings.

References


Chapter 5

Legacy and evaluation

Tina Endericks
Introduction – why is this important?

Leaving a viable public health legacy and creating sustainable improvements in public health infrastructure and capacity should be key aims when preparing for a major mass gathering. This legacy can include improvements in the host country’s public health systems, environmental health and the health behaviour and health status of the population.

One of the key legacies from major mass gatherings such as the London 2012 Olympic and Paralympic Games is the capturing and passing on of knowledge, experience and recommendations for those delivering future events, not just domestically but globally. This helps improve health protection aspects of future events, and can enable countries with less developed public health systems to identify what they will need when planning mass gatherings. This can help improve public health capacity globally and can lead to a legacy of a reduction in the global impact and spread of infectious diseases. Public health legacy can be developed in line with the core capacities of the International Health Regulations (2005).

A focus on creating a public health legacy will also extend into national security through better surveillance capacity and cross-sector working, and can help build a coherent approach to public health security issues across government and globally.

After the mass gathering, the evaluation of the planning and delivery of public health will help inform those involved in future events. It is important to ensure that any such evaluations are considered early in the planning process, to gain stakeholder engagement, agree terms of data sharing, and enable prospective data collection.

Measuring health legacy may also help to justify the investment in public health made in preparation for the mass gathering, demonstrating that the system enhancements were not short-lived but will have lasting positive impacts.

Key principles – the mass gathering difference

Whilst it is easy to be focused on delivering the mass gathering, it is important to ensure that public health legacy and sustainability issues are considered in all aspects of the planning. A key question which could be considered to help frame the legacy work during the planning is: what long-term benefit can the event provide for public health, the country, and potentially the international community? Early consideration needs to be given to evaluating, capturing and sharing the knowledge and experience gained from the event.

The legacy for public health from mass gatherings can be broad, ranging from improved services to better cross-organisational working. It has been noted previously...
that one of the legacies from major mass gatherings such as the 2012 Games has been improved public health services in host countries.

The International Observer Programme for mass gatherings
The legacy benefits of sharing expertise can be enhanced through running an international observer programme during the mass gathering, with the goal of transferring knowledge and experience gained in preparing and running an event to others. This allows those delivering future events to see, and often be involved in, operational delivery. The observer programmes also give participants opportunities to share experience from their countries and to establish a small network of mass gathering practitioners. The World Health Organization (WHO) regularly leads observer programmes alongside major mass gathering events to facilitate this.

During the 2012 Games the HPA worked in collaboration with WHO to run such a programme. This provided an opportunity for attendees involved in planning future events to share learning from the delivery of the Games. When running such a programme it is important to ensure it covers all aspects of health planning. The London 2012 observer programme was delivered by the HPA and WHO in partnership with the Department of Health, National Health Service (NHS) London, and the London Ambulance Service NHS Trust.

It can also be useful to link these independent programmes with other observer programmes being run by the event organisers (such as the International Olympic Committee (IOC) or the Fédération Internationale de Football Association (FIFA)). These may be linked to the WHO programmes or can be separate; for example, the IOC ran separate medical services observer programmes to London 2012 for those running and bidding for future Games.

Evaluation
It can be useful to build the public health legacy on the robust evaluation of the delivery of the event. This evaluation should be considered early in planning. A number of approaches can be taken. For example, there should be an ongoing evaluation process during the planning stages, such as the debrief, lessons identified and recommendations process following every operational exercise (see chapter 4), as part of the readiness assurance process. In reality, the majority of the evaluations will be done post event.

As part of the evaluation process, it is useful to undertake a review with key stakeholders, both internally and externally, to identify recommendations for the host organisation and for future mass gatherings. The HPA undertook a number of these, including:

- An internal debrief (held between the Olympic and Paralympic Games).
- Formal internal and external stakeholder surveys, as well as verbal and written
feedback from stakeholders.

- The following system evaluations:
  - overall evaluation of surveillance systems.
  - event based surveillance survey.
  - syndromic surveillance survey.
  - communications debrief.
  - microbiology services debrief.

The evaluation process should inform part of the legacy through the development of recommendations, for example:

- To improve normal working practice for the public health organisation, e.g. improved working across the HPA and better overall understanding of the work that is done across the agency.
- Improved emergency response arrangements, e.g. the HPA’s Games Concept of Operations to run as a sleeping resource.
- The strong recommendation for future mass gatherings of ensuring a single source of information / expertise – “one version of the truth”.

In order to build on any enhanced surveillance and response systems developed for the event, it is good practice to evaluate whether or not they met the objectives for which they were developed: how successful were the system(s) in serving the requirements of public health action? The HPA undertook an in depth evaluation looking at the extent to which the surveillance systems used during the Games met the specific objectives set for the Games.

**Discussion and recommendations**

It can be difficult to maintain a focus on legacy in the face of other pressures while preparing for the event but, if done, it can be successful and rewarding. This also needs to be sustainable; a process of ongoing review and evaluation will help maintain the momentum.

One major issue highlighted by the Games is that learning and experience need to be captured very quickly, as those involved rapidly move on to new jobs after the event is over, and the event host organisation can cease to exist entirely (as was the case with the London Organising Committee of the Olympic and Paralympic Games (LOCOG)). There is a short window of opportunity and interest in the event: media and politicians will want a quick return. There may also be a need to publicise and advocate the event’s health legacy: enhanced public health systems are often not a recognised legacy field. For example, the public focus for Games legacy in the UK is on sports participation and regeneration of the area where the development of the Olympic Park took place.
Sharing experience and expertise internationally is an important part of the legacy. This can be done through working with those organisations that have a longstanding and active interest in mass gathering legacy and evaluation, such as WHO. Undertaking this work in collaboration with WHO experts will ensure it adds the greatest possible value to global health, in particular by reducing the public health and security risks associated with mass gatherings. Mass gatherings are a relatively newly-recognised field, and there is now a growing network of WHO Collaborating Centres for mass gatherings designed to help add this value, to which the HPA is a major contributor. The HPA has a strong commitment to facilitating the global sharing of good practice and lessons identified from event planning and execution.

Host country legacy
Hosting major mass gatherings can be an excellent driver for improvements in public health and across health systems, processes and working arrangements, both within the lead organisations and with key partners. As a result of the 2012 Games the HPA (and therefore the UK) now has enhanced public health systems, processes and stakeholder relationships. Many of these are being maintained and developed further after the Games.

Identification of specific enhancements, such as those listed below for the HPA, should be included in the planning. Those listed below could be considered during planning for any event, and targeting them can help gain engagement.

Systems/processes
- Improved surveillance systems, including the extension of syndromic surveillance systems to include Emergency Departments and out of hours GP services, and the newly established Undiagnosed Serious Infectious Illness surveillance.
- Improved microbiological detection systems: more rapid testing for infectious illnesses such as influenza and those caused by food poisoning.

Stakeholder relationships/working
- Enhanced working with partner organisations (e.g. expert groups such as the air quality group containing representatives from the Environment Agency, the Department of the Environment, Food and Rural Affairs (Defra), Met Office and King’s College).
- Enhanced international networks with organisations such as WHO, the European Centre for Disease Prevention and Control (ECDC), the US Centers for Disease Control and Prevention (CDC), and the network of WHO Collaborating Centres for Mass Gatherings.

Response arrangements
- Increased resilience through improved reporting, data, analysis systems and processes, and the ability to move from weekly to daily reporting in the event...
of a significant incident (this includes through enhanced systems for emergency preparedness, resilience and response [EPRR]).

**Awareness of public health**
- Raised awareness and understanding of public health issues both on the part of the public and across government; for the 2012 Games this was through health promotion work with the NHS on water consumption, use of sunscreen, hygiene.
- Better understanding of the state of health protection issues in the UK: HPA experts produced a background document for the Department of Health (DH) and LOCOG.

**Improved environmental health**
- The regeneration of the area of the main Olympic Park in East London; cleaner water, soil and air; sustainable developments; a better living and working environment; and improved transport links.
- Through additional training and resources for food business owners to improve hygiene standards and food safety.

**There will also be some elements that were not expected:**
- Staff working in the LOCOG Polyclinic raised public health issues around the work of the Polyclinic, and discussed these with the General Practitioners and medical services teams; resultant learning from this will be taken back to their ‘day jobs’.

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**References**


Recommendations from the London 2012 Olympic and Paralympic Games

• Legacy should be treated as an ongoing process included as part of the planning. Evaluations can be done regularly – for example, this was done between the Olympic and the Paralympic Games periods to ensure the operational delivery was fit for purpose.

• Including legacy and evaluation in planning means setting up systems and processes and agreeing them before the event begins, as it will be impossible to get buy in and stakeholder engagement otherwise.

• Learn from others: attend observer programmes, and talk as much as possible to those already experienced.

• Agree a process for capturing the experience and sharing it – for example, the HPA Summary Report of Games time activities (see annex 3) and this book.

• Review and evaluate longer term legacy and follow it up: check periodically whether the legacy recommendations have been implemented and the enhancements embedded and built on.

• Work with international organisations such as WHO to ensure legacy and share it internationally.

• Identify opportunities for future research and development.

• Run an international observer programme.

• Ensure that plans for evaluation of surveillance are considered early in the planning process, to enable engagement of stakeholders in the evaluation. Agree the terms of data sharing and data collection, so that credible evidence can be gathered regarding the system’s performance.
Chapter 6
Enhancing surveillance systems
Tina Endericks, Brian McCloskey
Introduction - why is this important?

International mass gatherings raise concerns about the potential impact of public health incidents on the event, the host population, and the countries to which visitors return. Surveillance systems are often enhanced to enable early identification of potential public health threats associated with such events, including those that may arise outside the host country, so that appropriate responses may mitigate any significant risk detected.

The key strengths considered essential for surveillance at a mass gathering are sensitivity and timeliness. This is because it is necessary to ensure early and highly sensitive detection of cases, outbreaks and other health-related events (e.g. unusual patterns of disease or injury), which allows public health teams to respond with timely control measures to prevent further illness or reduce morbidity and mortality at an individual level. In addition, in the case of a bioterrorist attack, this minimises the potential effects of deliberate covert release of infectious agents. Establishing additional systems and undertaking enhanced surveillance may also provide more accurate data on the disease burden related to mass gatherings.

In general, there are two main objectives for surveillance: alert and response, and trend monitoring. The former requires fast detection of threats to trigger rapid control, with accuracy potentially a secondary consideration (e.g. the WHO alert and response system uses rumours from the media and informal sources to trigger further investigation and confirmation of incidents).

Many differences exist between the mass gathering and ‘steady-state’ contexts, not only in terms of surveillance needs, but also in the challenges in interpreting what is detected (the ‘signals’ generated by the surveillance system(s)), and the challenges in public health response to those ‘signals’.

The surveillance and reporting systems within the UK are well established and effective; however, based on the 2012 Games public health risk assessment and gap analysis, they were enhanced. These changes would provide additional sensitivity, assurance and information, facilitate real-time reporting, and allow enhanced follow up of signals during the event.

Key principles – the mass gathering difference

As outlined in the chapter on planning (see chapter 3), there are a number of health risks associated with mass gatherings, to both visitors and host populations. Under these pressures the enhancement of systems to cope with the additional requirements of the mass gathering is of great value.
Reasons for this may include:

• Increases in the number of cases reported and the required speed of reporting.
• The need for systems to detect evidence of non-endemic or atypical disease.
• Revised priorities of conditions according to their potential impact on the event.
• The need for public health organisations to work with others (e.g. environmental health, the military sector, etc.) and use information from non-health sources (such as police and travel data) more than usual.
• Pressure on surveillance systems to provide reassurance (even through nil reporting) during an event with a high public profile.
• The need to continue with business as usual.

It is important to ensure that surveillance and reporting systems are fit for purpose. The identification of any enhancements should be based on the event risk assessment and a review of current systems and processes to identify any gaps or event-related concerns (for more information, see chapter 3). Any new systems must add value to public health data.

• Risk assessment: to determine the type and level of surveillance required for the mass gathering based on the identified risks. The scope of surveillance may need to be broader or narrower depending on the nature of the event.
• Gap analysis: to assess existing surveillance capacities to identify where improvements are needed. The analysis should cover:
  - potential enhancements based on the comparison of the actual surveillance capacity with what is required
  - review of the existing systems (structure, technical means and attributes).

To facilitate this, the HPA/World Health Organization (WHO) Toolkit for Mass Gatherings (see annex 6) presents key areas to be considered in setting up and implementing communicable disease alert, response and operation plans for mass gatherings.

Any enhancements need to be put in place and embedded early so that they are tested, evaluated and normalised well before the event, and so that surveillance baselines can be established. The overall approach to surveillance during the London 2012 Games was intended by the HPA to be one of enhanced ‘business as usual’.

The use of surveillance systems must balance the risk of an outbreak, the value of early intervention, the finite resources for investigation, and the enhanced political and media interest in a mass gathering context. Feedback from the surveillance enhancements put in place by the HPA for the 2012 Games identified concerns about workload and capacity. However, the assurance that there was nothing to
report, which the HPA could give to key stakeholders as a result of these enhanced systems, was invaluable. This should be taken into consideration when agreeing event surveillance.

With additional new systems there is a risk that routine systems get bypassed. This can mean that those who ‘need to know’, from a risk assessment and response perspective, are not informed.

Due to the event pressures there can also be challenges to the incident based risk assessment: how it is decided (and crucially, who decides) which ‘signals’ are acted on and how they are acted on. The intense media and political scrutiny may sometimes mean that the responsibility for risk assessment is at a different organisational level than it would be during steady state operations (e.g. at a national level rather than at local level). This clearly necessitates good command, control and communication (C3) arrangements and understanding.

Priority conditions for the mass gathering
Ideally, surveillance systems for mass gatherings should take an ‘all-hazards’ approach to public health risks, covering communicable disease (CD) risks; alerts/early warning for non-CD threats (e.g. chemical-related events); deliberate covert release of biological/chemical/radiological agents; and events triggered by extremes of heat or cold.

Surveillance systems should also be specifically enhanced for the detection of designated ‘priority conditions’, based on the experience of previous events and the characteristics of those diseases. These might include the following:

- **Endemic diseases that are most likely to affect the event, such as those that:**
  - are highly infectious so have outbreak potential (e.g. measles, viral hepatitis)
  - have modes of transmission which may be enhanced in a mass gathering, such as airborne transmission (because of highly concentrated populations) – e.g. influenza
  - have a short incubation period and so may present while the event is still occurring (e.g. some organisms causing gastroenteritis)
  - need investigation and/or the application of control measures (such as quarantine or exclusion) for a single case (e.g. typhoid).

- **Non-endemic diseases that may be imported, such as:**
  - diseases with potential for importation and transmission (e.g. acute flaccid paralysis, or polio where there is a risk of re-introduction from endemic countries)
  - agents that may be of particular use as bioterrorism agents (e.g. anthrax)
  - conditions that may require a response under the International Health
Regulations (e.g. severe acute respiratory syndrome (SARS), which is immediately notifiable under the IHR)
- diseases that are of particular media interest (e.g. viral haemorrhagic fevers).

It is important also to be aware that a condition which is designated a priority for the specific event may not be considered a priority by public health authorities of the host country. For example, the risk assessment for measles was higher for the 2012 Games when athletes were infected, as it had to consider the risk of transmission against the implications of vaccinating close contacts who were training and competing.

**Defining data sources for surveillance**
Specific consideration should be given to defining data sources for a surveillance system for mass gatherings, including:

- Standardised mass gathering case definitions, e.g. an ‘event-related incident’ or ‘participant’, so relevant cases/events can be flagged in the system.
- Agreed baselines for the incidence of specific diseases/syndromes.
- Zero reporting.
- Ensuring speed of results.
- Signals or triggers for defined action.
- Integration of all hazard surveillance systems covering infectious diseases and chemical and environmental incidents.

**Enhancing routine surveillance systems**
Routine systems should be the starting point for all surveillance activities and enhancements. Enhancements to routine systems might include:

- Improving reporting by requesting more timely and complete reports from clinicians and laboratories and encouraging electronic reporting with the automated transfer of designated data.
- Accelerating data transmission from weekly to daily.
- Strengthening communication and coordination between stakeholders within the country, within and outside the health sector and internationally.
- Adapting existing sentinel systems (e.g. those for influenza-like illnesses) for additional conditions.
- Introducing additional reporting fields for the event (for example, ‘athletes’ and the ‘Olympic family’ were added as fields to the HPA’s routine reporting systems).
- Monitoring domestic and international media sources.
- Enhancing laboratory capacity to facilitate quicker diagnoses (e.g. diagnosis of gastrointestinal illnesses in hours rather than days).
- Enhancing existing syndromic surveillance to include services more likely to be
used by overseas visitors (e.g. emergency departments, walk-in-centres and out-of-hours General Practitioner (GP) services).

Enhanced systems that can add value to surveillance at mass gatherings

**Syndromic surveillance (for more information see Chapter 7)**
Syndromic surveillance has been used with increasing frequency as a practical method for detection and early identification of a significant infectious disease outbreak. The HPA has used its syndromic surveillance systems for a number of planned mass gatherings including the 2009 G20 Summit in London, the 2010 Ryder Cup in Wales, and the 2012 Games.

Syndromic surveillance systems, although less specific, have the advantage of more rapid reporting, especially if information is actively obtained, directly entered into an electronic system, and automatically categorised. There is a risk, however, that they may not be as well connected to response systems as traditional/routine systems are. To address this, actions resulting from a signal generated by syndromic surveillance need to be clearly defined and assigned in advance.

**Venue-specific surveillance systems**
Some mass gatherings have clinics on-site at venues or specific locations (e.g. an Olympic Village Polyclinic or media centre). Managing these facilities is usually the responsibility of the Organising Committee. It is recommended that there should be daily reporting to public health authorities of activity (the number of consultations) classified according to a predefined shortlist of syndromes.

However, there were some limitations when this was done during the 2012 Games:

- The population of people with access to medical services via the Polyclinic was not static, as athletes moved in and out of the Village and the workforce varied. The denominator population was not accurately recorded, and it varied daily.
- There was no background data available for the usual level of illness or syndromes expected in the population accessing the Polyclinic, which made interpretation of reported numbers difficult. Baseline data would have facilitated interpretation of observed numbers for each syndrome through comparison with expected numbers.
- Many countries had their own team doctors, who saw athletes and officials outside the Polyclinic, and therefore some cases would not have been reported through the Polyclinic system. The number of cases detected via syndromic surveillance may therefore be an underestimate of the true disease burden.

**Event-based surveillance**
Event-based surveillance is recommended for mass gatherings, as an addition to the basic systems of indicator-based surveillance. This can fill potential gaps and detect cases or
outbreaks which did not enter the basic surveillance net or which were not detected in it. It can also help detect unusual patterns of illness when visitors return home.

During the 2012 Games a national event-based surveillance team acted as the hub for reporting from across the UK to inform a rapid (and appropriate) response at the front line in as close to real time as possible. The team reviewed and collated the daily incident and response reports submitted from local teams across the UK using routine reporting systems. This data was reported, together with a risk assessment identifying:

- Whether anything was happening near an Olympic venue.
- Whether anything unusual was occurring.
- Any further investigations that might be required, and progress against these.
- Feedback on the health impact and appropriate response.
- Progress on response.

*International surveillance*

Each country hosting a mass gathering will need to consider the threat of international public health issues against the country situation and public health infrastructure (considering such factors as, for example, whether the presence of insect vectors and hygiene factors at the event might facilitate the transmission of disease). There are already excellent systems in place globally that should be utilised; international surveillance is now an important and routine part of many countries’ general public health preparedness.

Both the World Health Organization (WHO) and the European Commission have established restricted-access web-based communication platforms so that member states can share information about public health incidents; these include the WHO Event Information Site for International Health Regulation (IHR) national focal points and the European Early Warning and Response System (EWRS). These platforms provide alerts about significant international public health incidents to Member States, which may also perform additional information gathering of their own.

The HPA worked with international partners, in particular the European Centre for Disease Prevention and Control (ECDC), to set up enhanced international surveillance for the 2012 Games. This monitored and assessed 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 team undertook joint risk assessments of incidents identified as relevant through an agreed set of criteria designed for the Games, using tools developed for this purpose. Although team members responded to a range of international disease incidents as part of their routine roles during this period, none were identified that represented a threat to London 2012.
Microbiology Services
Enhanced clinical, public health and environmental microbiology laboratory capability and capacity is required to meet the increased demands of a mass gathering. As well as additional routine testing requirements there needs to be the ability to rapidly scale up the testing capability as part of the response to an infectious disease outbreak. The lower threshold for potential public health incidents requires the provision of rapid, accurate diagnoses and expert advice, as well as the provision of surge capacity.

The HPA’s risk assessment for the 2012 Games identified the likely communicable disease threats, including: gastrointestinal; respiratory; water borne; and vaccine preventable diseases. As a result enhanced frontline microbiology services and, in the case of gastrointestinal pathogens, a more rapid diagnostic assay was established.

Testing water, food and environmental samples is an important element of the work to inspect venues. Additional testing is often requested by the event organisers; for the 2012 Games these included marinas, hotels, training camps and ships as well as samples from swimming pools, spa pools, water systems, food services, and mobile food vendors. This included a request to assess the water quality of the water features on the Olympic Park.

Discussion and recommendations

The surveillance for the London 2012 Olympic and Paralympic Games was built on existing robust routine surveillance systems at local and national level within the HPA. New systems and modifications to existing systems (identified through risk assessment and gap analysis) complemented the robust routine local and national processes.

This comprehensive, and complex, daily and ‘real-time’ HPA surveillance network for the Games included national syndromic, indicator-based and event-based surveillance. It provided early and highly sensitive detection of cases, outbreaks and other health-related events and facilitated the rapid public health response, risk assessment and management. This enabled the HPA to provide the assurances necessary in the high-pressure political and media context of the Games. Good international epidemic intelligence supported this.

Tools
A number of toolkits offer checklists/risk matrices for prioritisation of diseases, taking past experience of mass gatherings into consideration. These include the REACT Project Toolbox for Implementation of Surveillance at Mass Gatherings, available from: http://www.rki.de/EN/Content/Prevention/React/Work/wp4/WP_4_ToolBox.pdf?__blob=publicationFile
Recommendations from the London 2012 Olympic and Paralympic Games

• Public health risk assessment and disease surveillance should maintain an integrated ‘all hazards’ approach.

• Enhancements should be based on normal systems.

• New systems for surveillance and response should be implemented early enough to allow time for testing; the amount of training needed to implement a change in surveillance systems can be significant. Early protocols should be produced providing examples of what needs to be reported and, importantly, what does not. These protocols should be tested; this is helpful in identifying issues and familiarising stakeholders.

• For Polyclinic surveillance:
  - case definitions are needed for (syndromic) surveillance to ensure the epidemic potential of reported cases is clearer; categorisations should be agreed well in advance, with data coding enabled (e.g. consider automated data extraction from the medical encounter forms [MEF])
  - ensure better understanding of what baselines to expect – consider discussions with the International Olympic Committee (IOC) medical staff about making this information available.

• The approach for international surveillance should be proportionate to the country’s resources and an evaluation of the risks. For example, it may be adequate to rely on existing international alerting mechanisms (e.g. IHR alerts); whereas in others it may be necessary to closely monitor particular international incidents that could significantly impact on the event. Working with partners such as WHO and ECDC will help deliver this.

• Establish a system for deciding which events merit full risk assessments.
Chapter 7

Syndromic surveillance

Gillian Smith
Introduction – why is this important?

Syndromic surveillance (see definition in Box 7.1) monitors changes in symptoms experienced by the general public that are reported via routes such as general practice or emergency departments.

Box 7.1: definition of syndromic surveillance

Syndromic surveillance is the real-time (or near real-time) collection, analysis, interpretation and dissemination of health-related data to enable the early identification of the impact (or absence of impact) of potential public-health threats which require effective public health action.

Syndromic surveillance was developed in response to the deliberate release of anthrax in the United States following the 9/11 terrorist attacks. Its particular strength was seen as the ability to detect unusual activity quickly even if the impact is spread across a wide geographical area. It is based not on the laboratory confirmed diagnosis of a disease, but rather on the presentation of signs and symptoms or proxy measures that constitute a syndrome or provisional diagnosis. It uses syndromic case definitions for conditions presenting a potential risk, such as diarrhoeal diseases or lower respiratory syndromes.

Syndromic systems will usually be of help in mass gathering surveillance, where it is likely that established systems will be under stress; and if they are established and automated systems they should have the advantage of historical data for comparison.

The information is used to identify possible trends or clusters based on ‘syndromic’ indicators including respiratory, gastrointestinal and cardiac illnesses, as well as indicators such as meningitis and the impact of environmental factors such as heat.

Enhancements for the 2012 Games helped improve the speed with which public health experts could respond to outbreaks of infectious disease, as well as incidents such as heat waves. The ability to rapidly identify and respond to the challenges of cluster illnesses was important during the Games, when London experienced an influx of visitors from overseas and large numbers of UK residents spent time in the UK away from their own homes, making it difficult for them to visit their own GP when they became ill.

Key principles – the mass gathering difference

The pressure imposed by mass gatherings can be used as a driver to create systems
that provide a positive public health legacy. This was the case for the 2012 Games: while the need for syndromic surveillance in these health care settings had been previously highlighted as of potential importance, the Games gave priority and impetus to the work.

In order to minimise potential infectious disease threats, the HPA set up a suite of robust and multi-source surveillance systems. These included enhancements of already established systems, as well as new systems created for the Games. This needs to be started early if legal agreements and technical enhancements are required to access the data.

The decision was taken to incorporate syndromic surveillance into overall planning for the Games, to ensure that it was complementary to other systems and covered the risks identified as specific to the mass gathering. Before the Games, the HPA already had well established experience coordinating two syndromic surveillance systems. These were:

- The HPA/National Health Service (NHS) Direct Syndromic Surveillance System, which provides “pre-primary care” data using telephone health advice line service call information for a range of syndromes.
- The HPA/QSurveillance National General Practitioner (GP) Surveillance System, one of the largest GP surveillance systems in Europe, monitoring weekly consultation data from a network of over 3,500 GP practices across the UK.

In the context of a mass gathering, such as the London 2012 Olympic and Paralympic Games, the aims of syndromic surveillance could be summarised as follows:

- To provide early warning of incidents.
- To describe the extent and spread of known incidents (i.e. provide ‘situational awareness’).
- To provide reassurance that no major incident has gone undetected.

The Games risk assessment process revealed that one area lacking for the Games was a system for surveillance of those visitors who might attend an out of hours provider of primary care (GP services) or an emergency department because of their illness. It was also highlighted that data from all systems were needed daily in advance of and throughout the Games period. The range of syndromes monitored was not expanded in advance of the Games, as the risk assessment confirmed that all relevant indicators were monitored.

When implementing these systems it is important to ensure the appropriate expertise is available to assess and evaluate this data. This was highlighted when there was a requirement for daily reports rather than standard weekly ones (which also had to be maintained as business as usual).
The new systems are summarised below.

Emergency Department Syndromic Surveillance System
The Emergency Department Syndromic Surveillance System (EDSSS) was developed in collaboration with the College of Emergency Medicine. Work started three to four years in advance of the Games: it is important to establish new systems early so that any necessary refinements can be carried out well in advance of the event.

The EDSSS network monitors anonymised data from emergency departments (EDs) across England. The data contain information on attendances at each ED including age and gender, triage, diagnoses and outcome of attendance (e.g. whether the patient has been admitted or sent home). The scheme was reporting on a daily basis from 27 EDs by the start of the Games, and continues to grow post-Games. As a good example of event legacy, it is maintained as an active scheme of use in early warning, monitoring of incidents, and for future mass gatherings.

This work is described in more detail in the paper Establishing an emergency department syndromic surveillance system to support the London 2012 Olympic and Paralympic Games.

GP out of hours surveillance (GPOOHS)
Ensuring that work incorporates all relevant stakeholders, including those outside the health provision sector, can greatly improve attempts to strengthen systems. For example, HPA surveillance teams worked closely with a major UK provider of unscheduled care software for General Practitioners (GPs, the UK’s primary care doctors) and out-of-hours providers, to monitor daily data. This meant consultation data from evenings, nights, weekends and public holidays could be monitored in a way that was impossible for other GP surveillance systems.

Scale up should always be gradual, ensuring that the basic functions of the system are in order before increasing the scope. Work on GPOOHS focussed particularly on ensuring that the new system had good coverage across London, and only once this had been established was work expanded to achieve good coverage across the rest of England.

This work is described in more detail in the paper Developing a new syndromic surveillance system for the London 2012 Olympic and Paralympic Games.

Statistical foundations for syndromic surveillance
Prior to the 2012 Games, scenarios were developed to help quantify what size of incident would be detectable by the syndromic systems and the timeliness of detection expected; such estimates would be helpful in the event of an incident during a mass gathering. It was noted that the greatest uncertainty was about the health care seeking behaviour (and subsequent coding of symptoms) of those with specific diseases.
During mass gatherings it is important to analyse the syndromic data to detect any changes in acute community morbidity. This process requires a solid baseline and should be started well in advance of the event. Where possible planning should take the need for historical data into account, and so systems should be established early; a year’s data should be the minimum.

For the Games this involved considerable development work and was complicated by the fact that, although two of the systems were well established and had several years’ historical data, the two new systems were not and did not. In summary:

- Nearly 4,000 different ‘signals’ were tested daily to see if there had been a rise in activity, with baselines based on previous years’ data or recent activity if historical data were not available.
- Baselines were calculated taking into account many confounding factors including seasonal effects, days of the week, holidays and changes in coverage.
- For the HPA/Qsurveillance system baselines were calculated as the average of the previous three years, using the same week of the year as the current one, plus two weeks either side (data related to exceptional activity during the H1N1 pandemic were excluded from the baselines).
- For the HPA/Qsurveillance system thresholds were based on the upper 99% prediction levels, and were modified in the following ways, to allow for individual problems with the data:
  - a minimum threshold applied where numbers were very low
  - a smoothing factor was applied to remove step-changes in the baseline data caused by the H1N1 pandemic
  - the Benjamini Hochberg formula was used to allow for multiple hypotheses testing and prioritise alarms based on their p-values.
- Significant increases generated ‘alarms’ that were further filtered and prioritised prior to a risk assessment.

It is important during mass gatherings that systems do not produce a daily report with multiple un-interpreted statistical alarms that would be of little use to decision makers. To counter this danger, in advance of the 2012 Games, a new process was developed by which all statistical alarms were assessed by both scientists and consultant epidemiologists. This involved a two stage scored risk assessment. The first stage was carried out by a scientist; if the risk was considered to be of importance, a second stage public health assessment took place involving a consultant epidemiologist. It is the first time (to our knowledge) that such a public health assessment has been systematically incorporated into a working syndromic surveillance system.

To ensure that GPOOHS alarms were not generated just by changes to the number of providers, for each day baselines, thresholds and the day’s consultations were
calculated considering only ‘established’ providers (those providers for which HPA had data for that day and each of the previous 21 days). Across this system there is a big increase in consultations on non-working days (weekends and bank holidays). Therefore separate baselines and thresholds are calculated for working and non-working days; e.g. if the most recent data is for a Sunday then the alarm threshold will be based on the data for the non-working days within the previous three weeks.

Daily activity
During an event it is important to continue business as usual, in addition to event-related games work. For the Games, daily activity was structured around meeting these two needs, and the HPA’s syndromic surveillance team continued to produce its routine externally-facing weekly syndromic surveillance bulletins.

The role of the syndromic surveillance team during the 2012 Games period was to:

- Produce an agreed routine daily surveillance output to be incorporated into the HPA’s overall surveillance output, which in turn informed the HPA’s daily Situation Report (SitRep) to the London Organising Committee of the Olympic and Paralympic Games (LOCOG) and the UK Department of Health (DH).
- Alert HPA colleagues as necessary to syndromic surveillance trends that might carry public health implications.
- Respond to national queries about the routine syndromic surveillance Olympic and Paralympic outputs.
- Respond, within expectations agreed in advance of the Games, to national requests for further information, analysis or interpretation should an incident occur with public health implications.

In meeting these types of requirements standardised, predictable timetables are helpful. The team developed and adhered to a set daily rhythm, which ensured that all stakeholders were aware of the relevant timescales and knew what to expect.

Managing data flows and systems
Syndromic surveillance involves monitoring data from various systems to obtain as accurate a surveillance picture as possible. Standardised and tested procedures need to be in place for collating, transferring, analysing and communicating this data. During the 2012 Games, the HPA’s service incorporated data from systems including:

- NHS Direct telehealth calls.
- HPA/QSurveillance GP consultations.
- GP out of hours consultations.
- Emergency Department attendances.
- NHS24 (Scotland) telehealth calls.
A system was developed and tested to receive, process, analyse and interpret data from each syndromic surveillance system on a daily basis. Figure 7.1 provides a summary of the data flows, from data provider to the HPA syndromic surveillance team, for each system.

During the 2012 Games, a number of key clinical and syndromic indicators were monitored on a daily basis. The list of syndromes was based on those that might be helpful during a mass gathering: most are included in the syndromic routine outputs, which are available from:

http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/RealtimeSyndromicSurveillance/

Figure 7.1: Overview of the data flows and systems for Games surveillance
Figures 7.2 and 7.3 provide examples of the syndromes that were monitored on a daily basis. Figure 7.4 is an overview table displaying signals for selected syndromes over a 14-day period. The numbers in each cell are the daily number of patient contacts (using a 7-day moving average for HPA/QSurveillance).

Figure 7.2: NHS Direct daily syndromic data for diarrhoea and vomiting calls (Source: HPA/NHS Direct Syndromic Surveillance Bulletin)

Figure 7.3: HPA/QSurveillance daily syndromic GP consultations for influenza-like illness (Source: HPA/QSurveillance Bulletin)
### Figure 7.4: Syndromic signals overview table displaying signals for selected syndromes over a 14-day period.

The numbers in each cell are the daily number of patient contacts (using a 7-day moving average for HPA/QSurveillance).

<table>
<thead>
<tr>
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<th>03/01/2012</th>
<th>04/01/2012</th>
<th>05/01/2012</th>
<th>06/01/2012</th>
<th>07/01/2012</th>
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<th>31/07/2012</th>
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<td>2144</td>
<td>2144</td>
<td>2079</td>
<td>2064</td>
<td>2012</td>
<td>1968</td>
<td>1921</td>
<td>1951</td>
<td>1935</td>
<td>0</td>
<td>Excess cases</td>
<td></td>
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<td>5532</td>
<td>5446</td>
<td>5283</td>
<td>5163</td>
<td>5050</td>
<td>4940</td>
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<td></td>
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<td>1343</td>
<td>1276</td>
<td>5058</td>
<td>4522</td>
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<td>164</td>
<td>172</td>
<td>354</td>
<td>311</td>
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<td>0</td>
<td>Excess cases</td>
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**GREEN within expected variation**
**AMBER above expected variation**
**RED assessed as important by ReSST team**

Excess cases: the number of cases above the upper threshold (shown for the last date in the date range only).
The daily syndromic surveillance 2012 Games report

Under the pressure imposed by a mass gathering, standardised procedures are of great value in delivering event commitments. Outputs that are regular (including for nil reporting), expected and easily understood greatly assist decision making and the provision of assurance. In advance of the 2012 Games the team agreed the format of the outputs, the risk assessment for ‘alarms’ and the methods of communications to be made in the event of ‘alerts’ with the Games incident directors and other recipients of the outputs.

During Games time this was delivered through a daily syndromic surveillance report containing all key data, including counts of the number of consultations seen for key indicators at national and regional levels. To make important information as accessible as possible, where a statistically significant increase in activity was noted this was highlighted in amber in the report; if it was considered to have a potential public health impact, it was highlighted in red. Other issues of importance were highlighted in comments on the front page of the report, which also contained an easily accessible overall key message that pulled together the data from all the systems. Summary messages were also included for each individual system. Over the Olympic and Paralympic periods (2 July – 12 September 2012) the syndromic surveillance team produced 73 such reports.

Reports like this play an important role by providing a platform to illustrate current trends in syndromic data, provide context with regard to historical data, and provide public health interpretation of the surveillance data in order to include key messages that could either warn of unusual findings, or provide reassurance that there is nothing of public health significance occurring.

Structuring surveillance teams to cope with the event work schedule

Mass gatherings often stress surveillance systems to surge capacity. As discussed in the chapter on planning (see chapter 3), event time staffing arrangements can be one of the most complex challenges of preparing for an event, and enhanced surveillance is likely to impose demands on staff for reporting seven days a week, including weekends and public holidays. Planning should take this into account, ensuring that sufficient resources are in place to meet the surveillance requirements of the event.

For the 2012 Games, the syndromic surveillance team developed a rota enabling each team to work a ‘four days on, four days off’ working pattern. This provided a syndromic surveillance service during weekends and public holidays, whilst also providing the staff with a more beneficial working pattern over the length of the Games reporting period. This arrangement also provided some flexibility within each team to allow for limited staff holiday leave, and mitigated the risk of staff sickness absence. This rota required a structured handover process between shifts to ensure smooth transitions between teams. A standardised process was developed to ensure this, and each handover documented:
• All outstanding actions.
• Key messages on incidents alarms/alerts.
• Enquiries (internal/external).
• Technical problems with information technology (IT) systems.

Discussion and recommendations

It is helpful to agree the role of any syndromic surveillance systems in advance with those coordinating the overall mass gathering response, so that all are clear about the scope and expectations of the surveillance and service. It is also important that the business as usual syndromic surveillance continues during a mass gathering, as other incidents not related to the event can also require support.

Recommendations from the London 2012 Olympic and Paralympic Games

• Ensure that any surveillance gaps for the mass gathering are identified, and assess whether syndromic surveillance might be of help in filling the gaps.
• Plan early and ensure the type of service and outputs are agreed in advance with the mass gathering public health leads, thereby ensuring expectations are clear.
• Use existing syndromic systems where possible (most syndromic systems are multi-purpose and ideal for mass gathering surveillance). Ideally a year’s data is needed to enable historical comparisons.
• Identify key locations linked to the mass gathering, try to ensure good coverage for syndromic systems, and ensure that any variations in coverage are well understood before the event.
• Focus on a syndromic ‘service’ linked to public health response, not a ‘stand alone’ system simply flagging alarms.
• Public health input is essential for interpretation. Multiple un-interpreted alarms will not be helpful for incident directors and will just cause extra work.
• Try to simplify outputs for the end users and include key messages.
• Do not underestimate the value of reassurance: this was the main use of syndromic surveillance during the Games.
• Plan and agree a process for the validation and evaluation of the consistent systems.
• Provide lots of cake for the team.
As a caveat it should be noted that the role and value of syndromic surveillance in mass gatherings has not been clearly determined in the literature. Particular concern exists around the benefits of establishing such systems for mass gatherings in low resource settings where routine surveillance in itself may be challenging and, because the potential low specificity of syndromic surveillance requires high levels of human resources to administer.

**Legacy**

The UK now has a more comprehensive surveillance system and will maintain the systems established for the 2012 Games. In addition to the wider UK public health legacy of the systems such as the Emergency Department Systems, the Games experience highlighted the key fact that syndromic systems should not be operating ‘in isolation’, but should be closely integrated and linked to the public health response: producing large numbers of automated statistical alarms without wider public health interpretation and context undervalues the utility of such systems and can generate considerable extra work with no benefit.

An additional benefit for the HPA is the continuation of working practices involving surveillance rotas and standardised operating procedures, which have made surveillance work more efficient and effective.

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**References**


Chapter 8
Media and communications
Tycie West
Introduction – why is this important?

Organisations involved in the planning and delivery of mass gatherings should prepare for significant interest in their work from media, the public, government, and other stakeholders. The World Health Organization (WHO) has noted that dealing with the public and media attention brought about by hosting a mass gathering can be one of the most demanding aspects and one that requires effective communications.

Communications professionals should therefore be involved in the planning process from an early stage to produce a communications strategy for engaging with these important audiences. The strategy will need to define the key messages that will be associated with the event, from planning through to delivery, to ensure consistency and alignment with partners to reduce the risk of miscommunication and reputational damage.

The lowered threshold for media, public and political scrutiny is inevitable given the scale and high profile nature of international mass gatherings. The Olympic Park’s Main Press Centre was able to host over 20,000 broadcasters, photographers and journalists who were looking for news 24 hours a day.

The broadcast of the opening ceremony for the Olympics attracted an estimated audience of 26.3 million and some national UK newspapers credit the Games with increasing sales by 1 million.

With so much invested, so many journalists covering the event and so many millions of people watching, it is crucial to the reputations of all organisations with a role in the delivery of a mass gathering to ‘get it right’, as those who ‘get it wrong’ can quickly become front page news when crisis strikes. The organisation that provided the security for the 2012 Games can attest to this following the critical media coverage it received after it failed to provide enough security staff.

Once a mass gathering begins, media attention is likely to be focused primarily on coverage of the event itself. However, it is the nature of the media to look further afield to tell ‘the whole story’ around any given topic; that is, to seek out any newsworthy information surrounding the main event, whether directly linked or not, and particularly that with social and political impact.

The reach of the London 2012 Games also encompassed the rapidly evolving online landscape and it has been described by London Organising Committee of the Olympic and Paralympic Games (LOCOG) as ‘the first fully digital and social media’ Games. This claim is supported by the 4.7 million followers LOCOG gained on social media (including Twitter and Facebook) and the 431 million visits to its website during Games-time. Communications strategies should therefore give consideration
to the new and important role of social media, its reach, and the speed with which information can be communicated using such tools.

**Key principles – the mass gathering difference**

Risk communication should be a key consideration when planning for a mass gathering. Prior to the 2012 Games, journalists who contacted the HPA were particularly interested in what could possibly go wrong from a public health perspective. After all, bad news probably sells more newspapers than good news. Journalists were also seeking the HPA’s reassurance that the UK was fully prepared and able to respond to any incident that could pose a risk to public health. It is important to also provide this assurance to the public.

The HPA produced a number of key messages based on the overall risk assessment which were communicated to the media to reassure the public in the months preceding the 2012 Games. These messages were that the HPA had:

- Worked with public health experts across the world to learn from their experiences with mass gatherings, such as previous Olympic and Paralympic Games, in order to provide the best possible protection to the public and Games participants from threats to their health.
- Worked closely with partners to put in place world class systems to monitor and respond rapidly to outbreaks of infectious diseases or environmental hazards, building on existing tested, high quality capacity within the UK public health system.
- Undertaken risk assessments that indicated only a slight increased risk of infectious disease during the Games, such as diarrhoea and vomiting, and the reality is that serious outbreaks are uncommon.

The media’s appetite for information during a public health incident is significant. For example, in June 2009, the HPA released almost daily media statements on the H1N1 flu pandemic to meet demand, and weekly statements were provided up until January 2010. A public health incident in the context of a mass gathering event would undoubtedly intensify media interest.

The UK’s former Risk and Regulation Advisory Council (RRAC) stated that distrust is created when a public risk is not properly addressed and communicated, and referred to the controversy around the Measles Mumps Rubella (MMR) vaccine scare as a notable high profile example. Risk communication has an important role in forming a dialogue between an organisation, its stakeholders and the public, and building trust in the official advice provided during an incident or outbreak. This enables an organisation to better manage public understanding of the risks by raising awareness of these, so that people can follow advice to protect themselves, or to reduce anxiety.
around any perceived risks to prevent unfounded fear and anxiety disrupting daily life.

For mass gatherings improperly managed risk communication could have a significant impact on the running of an event. For example, if a new flu pandemic coincided with a mass gathering, the public would seek information about how to best protect themselves. People would be likely to question whether attending the event and sitting next to hundreds of other spectators would put them at risk of contracting flu. They may have anxiety around travelling to the event on public transport and being in close proximity to other commuters. If the risk assessment and advice to the public is not clear and reassuring, the event organisers could have an empty stadium based on misconception of the risks. Conversely, risk communication could help protect health if there was a real threat of a public health emergency, such as the deliberate or accidental release of a biological, chemical or radiological agent for example.

The RRAC identified ‘Five key elements of public risk communication’ to assist communications practitioners in their work:

• Assemble the evidence - demonstrate that you have a credible basis for your position.
• Acknowledge public perspectives - understand how those affected understand the risk.
• Analyse options - consider a broad range of options and the associated trade-offs.
• Define the authority in charge and the nature of your involvement with the risk.
• Interact with your audience – identify the audiences and the appropriate methods for communicating with them.

The WHO has similar principles for risk communication when planning for a mass gathering related health incident:

• Build, maintain or restore trust.
• Improve knowledge and understanding.
• Guide and encourage appropriate attitudes, decisions, actions and behaviours.
• Encourage collaboration and cooperation.

The response to a public health incident involves many agencies and partners, often with overlapping responsibilities, which creates the need for unified command, control and communication (C3) arrangements (see chapter 3). This can be complex for mass gatherings as organisations may work under different parts of government, may not normally work alongside each other, or may be newly formed for the event (such as LOCOG). WHO therefore recommends that communications teams liaise with their counterparts during the planning stages of a mass gathering to ensure that roles and responsibilities for delivering public communications are coordinated between
partners. For example, preparing as much information prior to the mass gathering in anticipation of feasible scenarios can aid the real-time communications response.

**Discussion and recommendations**

The HPA has a communications team which is responsible for all aspects of communications for the agency including media relations, stakeholder relations and internal communications. It is important to have a strategic communications lead when planning for a mass gathering and the HPA nominated a communications manager at an early stage of the 2012 Games planning process to do this. Part of this role included attending communications planning meetings and liaising with communications counterparts in partner organisations, such as the Department of Health (DH), Cabinet Office, LOCOG and the National Health Service (NHS).

Producing a communications strategy for a mass gathering is essential for ensuring that the organisation’s communications aims, objectives and activities support the overall goals of the project. The HPA’s 2012 Games communications strategy included:

- Media handling arrangements.
- Working with stakeholders (including roles and responsibilities).
- Key messages.
- Use of the HPA’s website and social media.
- Communications team structure and staff roles.
- Daily working patterns and reporting.
- Internal communications.

**Stakeholders and the media**

Prior to a mass gathering event, it is important to discuss with key stakeholders how media requests for information will be dealt with to limit the risk of inconsistent messages arising. Uncovering conflict between organisations is newsworthy and a lack of preparation with stakeholders can be damaging to the success of risk communications during a public health emergency. Public confusion may arise if messages are not consistent and this can damage the perceived authority and reputation of the organisations involved.

For example, the US Centers for Disease Control (CDC) advised travellers to the London 2012 Games to vaccinate themselves against measles prior to travelling. This message was covered by sections of the UK media and the HPA received enquiries asking whether it agreed with this advice or if it was disproportionate to the risk. The HPA’s message on vaccinations, based on prior planning and risk assessment, was that visitors to the Games should ensure that they are up to date with routine vaccinations.
as recommended by their home country. This message had been agreed across international stakeholders, including CDC and so supported CDC’s recommendation and provided consistent advice on the issue.

The emergence of rumours during a mass gathering is another possibility that organisations should prepare for. If partners are slow to react publicly to a situation, as a result of uncertainty about the appropriate lead for example, then there may be an information void which can encourage rumours to grow.

In today’s age of social media, information and speculation is rapidly shared online, whether an official organisation is part of this conversation or not. For example, members of the Australian badminton team talked openly on social media about a food poisoning illness they were experiencing as they prepared to take part in the 2012 Games and these accounts were reported by other media. The HPA investigated this illness, which was subsequently found to be norovirus linked to a hotel where the athletes had been staying, and received media interest about the HPA’s involvement and advice.

Scenario planning

Information from a reliable and authoritative source during a mass gathering can help limit rumours from circulating. Therefore it should be agreed in advance which organisation will take the lead for a range of possible scenarios, particularly where there are overlapping remits or where a multi-agency response is required.

In preparation for the London 2012 Games, a specific communications C3 plan was agreed which set out the media handling structures across Government and LOCOG so that all parties were clear about their responsibilities in relation to others. As part of stakeholder engagement prior to the Games, HPA communications staff worked closely with communications colleagues to agree the media handling for scenarios where multiple partners may be involved. Taking part in Command Post Exercises (CPX) and other strategic meetings and workshops was also part of the preparation.

As part of this work, a range of scenarios were considered in a communications context and included:

- A nearby fire generating smoke over a venue.
- An infectious disease outbreak amongst venue staff.
- A food poisoning outbreak affecting spectators.

The following questions were asked:

- Which organisation will lead the media response?
- Which organisations need to be involved in agreeing messages?
- Which spokespeople would be most appropriate?
Proactive media relations
Organisations involved in mass gatherings should be prepared for public interest in their work and can consider proactively engaging with the media to positively manage this. Prior to the 2012 Games, the HPA received a number of enquiries on its preparedness and risk assessment. A media briefing was held three weeks prior to the Games as a forum to address the main areas that media were interested in and to announce that the HPA was ‘Games ready’ after seven years of planning. A press release - ‘Health Protection Agency fit for Olympics challenge’ – was issued to coincide with the briefing.

The aim of the briefing was to update the media on the enhanced systems established to monitor and respond rapidly to health threats in preparation for the 2012 Games and to provide reassurance to the public. The briefing included: rapid laboratory testing, enhanced syndromic surveillance, and covered the overall risk assessment and practical steps the public could take to prevent the spread of infectious disease during the Games.

The briefing was attended by a variety of media, including national and trade media, and also key stakeholders. Together with the press release, the briefing accounted for 15% of the total media coverage on the HPA in relation to the Games between 1 January 2012 and 12 September 2012.

Box 8.1: how rumours happen

March of the killer caterpillars – Metro, 12 July 2012:
The Metro newspaper wrote about Oak Processionary Moth caterpillars in the run up to the Games – “Toxic caterpillars that could kill people with asthma are on the march...They could disrupt the Olympics by infesting trees near the Games, it is claimed”. In fact, there are no documented deaths as a result of the Oak Processionary Moth caterpillar. No caterpillar infestations were found in east London near the Olympic Park and those in other parts of London were not deemed to pose a risk to the Games.

Spot of bother as the UK catches measles – The Sun, 6 September 2012:
“The number of measles cases here in Britain has almost doubled after a surge of visitors arriving for the Olympics and Paralympics”, wrote The Sun. Although measles cases had doubled on the previous year, this was not in fact caused by visitors to the London 2012 Games. Measles was already circulating in the UK population.
Enhancing communications arrangements

In preparation for a mass gathering, it is advisable to consider communications tasks and outputs and how these might be best supported by the communications resources available to the organisation. More resources may be required based on planning assumptions or existing resources could be adjusted to meet the needs of the mass gathering.

The HPA put in place enhanced arrangements using existing resources prior to and during Games-time in anticipation of increased workload. For example, to prepare for the HPA’s 10 week Games-time reporting period (2 July 2012 to 12 September 2012) a 2012 Games planning team was put in place four months in advance to get the Communications Division ‘Games ready’. This planning team focused on specific tasks and outputs including:

- Developing a communications staff rota and role descriptions.
- Training communications staff taking part in the rota.
- Producing key messages based on the HPA’s risk assessment of possible scenarios and a sign-off protocol for approving messages.
- Attending workshops and exercises with partners to run through scenarios and establish the appropriate lead organisation and key messages.
- Working with partners to provide additional information for example the NHS Games Time Reference Pack for frontline clinicians.
- Provision of the HPA’s ‘Baseline Document’ to brief key stakeholders on health protection topics in relation to the Olympics.
- Facilitating the production of background laboratory footage to provide to media on request and producing short-films to promote the work of HPA laboratories.

The HPA’s national Olympic Coordination Centre (OCC) included a core communications team. A communications rota was devised for the duration of the Games-time reporting period as this was expected to be the busiest period for Games-related work. The Games-time core team comprised a lead communications manager and two press officers. The lead communications manager was on standby out-of-hours to maintain continuity, primarily to Games stakeholder communications colleagues. In addition, other members of the team were in place to coordinate internal information for staff as well as additional external or stakeholder communications.

This staffing structure was established to enable a robust communications response should a significant public health incident have occurred. As no significant public health incidents affected the Games these staffing arrangements were able to be scaled back appropriately for the Paralympics and during the period between the Olympics and Paralympics.
During planning it is worth considering communications resources by asking the following questions:

- How many communications staff are required to support the mass gathering?
- What are the estimated times of highest communications workload?
- Can the communications resource be scaled up or scaled down in response to demand?
- What arrangements are in place for handling media calls out of hours?
- What communications roles, tasks and outputs need to be fulfilled?

In the seven months prior to the start of London 2012, the Games generated significant interest in public health and the HPA’s preparedness and enhanced systems. Fortunately, no major events of public health significance occurred to affect the Games and this resulted in limited media interest during Games time.

However, the low level incidents that were notified to the HPA required significant reactive preparation work and liaison with external stakeholders. This ongoing ‘peacetime’ work is crucial to the success of communications during a public health incident or outbreak.

The few incidents that did attract the attention of media, including norovirus affecting a group of athletes, served as a reminder that the media were constantly on the alert for any public health incidents to occur that would generate news.

Planners of mass gatherings should therefore establish communications arrangements that enable a robust response to any incidents and outbreaks, and be able to both escalate and de-escalate these as required.
Recommendations from the London 2012 Olympic and Paralympic Games

• Strategy: produce a communications strategy for the mass gathering which covers both external and internal communications, including the use of online and social media.

• Sign-off: establish a sign-off procedure, both internally and with relevant stakeholders, for agreeing public messages and how these are released.

• Stakeholders: mass gatherings require interaction between multi-agency partners and stakeholder communication is therefore crucial. Establish relationships with communications colleagues in advance of the mass gathering and agree protocols for joint-working. This enables a good understanding of the roles and responsibilities for each organisation involved and reduces the likelihood of miscommunication.

• Spokespeople: ensure that appropriate spokespeople are available, media trained and prepared to engage with media.

• Communications lead: nominate a senior communications professional to lead on communications for the mass gathering and support the organisation’s planning. Identify staff to provide additional support to this lead during the planning stage to enable the delegation of tasks.

• Strategic input: embed communications professionals within the organisation’s central coordination centre to enable them to work alongside the event director and manager to provide strategic communications support.

• Rotas: establish a communications staffing rota for the duration of the mass gathering which is robust in times of emergency and which can be scaled back as appropriate. Out-of-hours communications arrangements should also be factored into rotas.

• Task allocation: produce role descriptions which allocate particular tasks to each member of the communications team during the mass gathering.

• Training and exercising: participate fully in any training sessions and exercises to test communications systems for the mass gathering.

• Logging: establish a shared filing system for logging media calls, saving responses provided to media and any subsequent media coverage. This will help continuity and aid the evaluation process.

• Key messages: pre-prepare communications messages for the most likely scenarios based on the risk assessments.
Recommendations from the London 2012 Olympic and Paralympic Games (cont)

• Daily rhythm: timetable the daily communications ‘rhythm’ during the mass gathering and take into account the schedule the organisation and external stakeholders are working to. For example, factor in any regular multi-agency teleconferences and deadlines for Situation Reports.

• Reporting: provide a regular communications Situation Report as part of the daily public health Situation Report. This should include key messages, updates on the communications handling of any issues and ‘horizon scanning’ for matters that could impact on the work of the organisation during a mass gathering.
Chapter 9

Chemical, biological, radiological and nuclear (CBRN) terrorism

Brian McCloskey
Introduction – why is this important?

The possibility of a terrorist attack at a mass gathering is a difficult and sensitive issue, especially when considering a chemical or biological deliberate release.

The perceived risk of such an event will vary substantially from country to country and from one mass gathering to another. The risk assessment will be driven at government level, led by the national security and intelligence services. What is essential, however, is that the health sector is involved in the assessment process and is fully informed of the risk.

Health involvement in the risk assessment is a two-way process: the intelligence services benefit from health expertise in evaluating the impact of different chemical or biological agents and understanding the full implications of a release; and the health sector benefits from the information it needs to make informed decisions about the appropriate level of response planning.

Key principles – the mass gathering difference

What might happen?
There are a number of agents considered as possible candidates for deliberate release attacks; for more information see:

- www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/DeliberateReleases/
- http://emergency.cdc.gov/agent/agentlist.asp

Each has specific implications for public health in terms of the likely health effects and the possibility of effective treatment.

Detailed discussion of the different agents is beyond the scope of this book, but there are some key parameters that influence the health response. As well as potential mortality and morbidity from different agents, the health response will depend on the immediacy of effects from a deliberate release, and the duration of those effects.

Very broadly, chemical agents will cause a more immediate effect than biological agents, with casualties seen at the site of release within a short time of the release. The health risk will often then dissipate relatively quickly as the agent is dispersed by the environment and weather. The challenge for the health sector will therefore be in getting effective treatment to the scene in a very short timescale and delivering treatment to those affected while the area is still contaminated.

Biological agents generally have a different risk profile because the health effects they cause may not manifest themselves for some time, depending on the incubation period of the organism, and may continue for a considerable period, especially if the
organism is capable of spread from person to person. This may mean that there is
greater opportunity to treat those exposed, but will also mean a longer, larger impact
on healthcare resources. This lag also means that there is the possibility of a covert
release: a release of a biological agent that is not announced by the attackers at the
time and is not visible when it happens. Such a release may not be suspected until
patients start presenting to the health service some time after the release.

The likelihood of a deliberate chemical, biological, radiological and nuclear (CBRN)
release is assessed as low in most countries, but it is not negligible (www.gov.uk/
government/publications/national-risk-register-of-civil-emergencies). It is, however, a
very high impact event if it occurs, and therefore some thought must be given to the
appropriate level of response planning.

**How will you know if it happens?**
A chemical deliberate release is likely to be self evident, with multiple casualties in the
same area in a short space of time.

Recognising a covert biological release is potentially much more challenging for the
public health system. Cases of illness among those exposed will present to the health
service over a period of time with an initial lag after the release depending on the
incubation period of the agent. Cases are likely to present to health services away
from the site of release, as participants in the mass gathering disperse back home.
Cases may present initially as a “normal” (not deliberately caused) illness, and may not
be recognised as being due to an unusual organism for a short while; even when an
unusual organism is detected, the illness may not be seen to be due to a deliberate
release until a larger number of cases has presented.

Routine public health surveillance systems may eventually detect a rise in unusual or
unexplained illnesses, but it may take some time to realise that the underlying cause
was a deliberate release at a mass gathering.

In assessing the possible health sector implications of a deliberate biological release,
public health systems need to consider:

1. How fast would cases develop after a release, and how would they present to the
   health services?
2. How long is it likely to take before an unusual illness is recognised, and how long
   before cases are linked together to recognise a deliberate release?
3. What treatment options are available, and in particular are there options for
   prophylaxis to reduce the number of people exposed who become ill?
4. If prophylaxis is possible, how soon after exposure must it be given to be
   effective?
5. Are the answers to 2 & 4 above compatible? In other words, will the health
system recognise the problem while there is still time to do something about it?

6. If prophylaxis is possible, how will the health system deliver it to large numbers of people in a very short time?

7. Are there implications for potentially scarce health resources, such as ventilation and intensive care unit (ICU) capacity?

Spatial and temporal modelling of the evolution and distribution of illness after a release will be helpful in informing the risk assessment and in evaluating the impact of different assumptions about the factors above.

**Bio-detection systems**

There is a special circumstance to do with biological releases that has particular implications for public health and mass gatherings planning: the deployment of a bio-detection system designed to pick up aerosolised releases at, or close to, the time they happen.

If the intelligence assessment of the probability or impact of a biological deliberate release is sufficient to justify action, the government may decide to put in place technology to detect a release when it happens. There are several systems available (www.nato-pa.int/Default.asp?SHORTCUT=669) and such systems are routinely installed in some United States cities (www.dhs.gov/health-threats-resilience-division).

The deployment of these systems has the advantage of potentially providing early warning that a release has occurred some time before cases will present clinically, thus allowing time to distribute prophylaxis before people start becoming ill in large numbers.

The disadvantage of such systems is the potential for false positive alarms from the system to trigger unnecessary but very significant public health actions during the mass gathering. This is why it is crucial that public health authorities are involved in any decisions to deploy bio-detection technology, so that they can ensure that the full capacity of the system, including sensitivity and specificity, is understood before the event starts. This will inform any decisions made if the system triggers a positive signal.

**What will you do if it happens?**

A trigger suggesting a deliberate biological release, whether from public health surveillance or from a bio-detection system, will initiate a series of political and public health actions that will unfold extremely rapidly.

The implication of a positive signal will be that the health sector has to deliver prophylaxis or medical countermeasures to a very large number of people in a very short period of time. This will only be possible if there is a pre-existing plan for how to do this, and there are sufficient stockpiles of treatments available.
There will be an urgent need to decide if the trigger is real or a false positive. It is very likely that there will not be sufficient information available to make the distinction, but a decision will need to be made on the basis of prior understanding of the sensitivity and specificity of the system generating the signal, the strength and consistency of the signal, and any corroborating evidence from other surveillance systems and security and intelligence services.

If the signal is considered a true positive (or there is not enough evidence to call it a false positive) the mass distribution plan will be activated, and the public health system will need to be able to collect the further information necessary to monitor progress of the prophylaxis activity and to monitor for signs of illness developing across the population.

There will be very high expectations on the system to deliver real-time information on the progress of the illness. It is therefore advisable to rehearse this scenario in advance at a high level, so that government’s expectations of the public health system are realistic.

**Discussion and recommendations**

The possibility of a CBRN terrorist attack at a mass gathering is likely to be very low but the impact of such an event will be very high. Therefore it must be considered and a proportionate public health response developed. A positive signal from any surveillance or bio-detection system will be the most challenging incident the public health system will encounter during a mass gathering.
Recommendations from the London 2012 Olympic and Paralympic Games

• The public health system must have access to the national government’s assessment of the risk of bioterrorism.

• Given the scale of public health response that will be necessary to respond to a deliberate release, operational plans must be thought through across government before the mass gathering.

• Spatial and temporal modelling of the evolution and distribution of illness after a release will be helpful in informing the risk assessment and in evaluating the impact of different assumptions.

• If a bio-detection system is to be deployed, the public health system must be involved in the decision on what system to use and must have access to information on the sensitivity and specificity of the system chosen.
Chapter 10

Extreme events and mass gatherings

Virginia Murray
Introduction – why is this important?

Each mass gathering event has its own separate risk of extreme weather and environmental health hazards. Literature on adverse health effects arising from any mass gatherings affected by extreme events is extremely limited, with learning points difficult to identify.

Accordingly, before the London 2012 Olympic and Paralympic Games a review was undertaken by the HPA. The HPA’s environmental health protection work is part of nationwide planning, response and recovery for extreme weather events and natural disasters, and provides evidence-based information to support the development of planning for extreme events. The review (Soomaroo and Murray 2012) analysed previous cases of weather and environmental hazard disasters at mass gathering events and identified lessons to assist planning for the Games and future events.

The review defined an extreme event as any extreme weather event or other natural hazard including heat, flooding, drought, cold, snow, and other natural hazards, with the potential to cause adverse impacts on human health at mass gatherings. It identified few mass gathering events where extreme weather had an impact, but was able to identify some lessons that underlined the importance of planning for extreme events when preparing for a mass gathering. These were centred on two sets of conditions: heat; and strong wind, rain and hail. The full references are contained in the review.

Heat-related illness and dehydration were amongst the commonest causes for patient presentations during mass gathering events with a total of five reports identified. These included the following:

- A retrospective review of medical records from 47 college football games in the US at two outdoor stadiums in Winston-Salem, North Carolina and Columbus, Ohio over a five-year period found that a one-degree increase in temperature from 20°C to 21°C showed an 11% increase in patient numbers requiring medical attention.
- A 1996 review of a 9-day agricultural show in Adelaide, Australia found that high temperatures greater than 27°C resulted in an increased patient presentation rate. This same show reviewed over a period of seven years underlined this finding, showing that patient presentation rates to on-site medical facilities increased in relation to relative temperature and humidity.

Rain and hail can also cause serious accidents at mass gatherings. Two incidents just a year before the 2012 Games provided evidence:

- On 14 August 2011 a stage at a fair in Indiana, USA collapsed, killing five and injuring 45, after 70mph winds with rain and hail were reported to have torn
down the structure, trapping people below. This happened only minutes after a safety announcement was given.

- A few days later, on 19 August 2011, a strong hailstorm contributed to the deaths of five people and injuries to 70 more as a stage collapsed at the Pukkelpop festival in Belgium.

This type of knowledge can be integrated into planning to make a mass gathering safer. For example, planners at the 1996 Atlantic Olympic Games, expecting hot weather, were quick to increase public awareness of the dangers of dehydration by encouraging spectators to drink plenty of fluids, seek shade and recognise the symptoms of dehydration. This resulted in a reduction of heat-related illness in medical centres, further highlighting to emergency planners that heat has a direct bearing on health provision at mass gatherings.

Besides identifying that few mass gathering events with extreme weather events had been reported in the peer review literature, the review highlighted the importance of planning for extreme weather events, and the need to use weather surveillance and severe weather early warning systems as a key method to improve warning and informing of risks.

**Key principles – the mass gathering difference**

As mass gatherings involving large numbers of people have the potential to cause wide-scale health effects, an environmental hazard assessment of the event site(s) should be carried out that considers measures for extreme weather conditions (e.g. early warning systems, shelter, etc.).

The WHO/HPA/United Nations International Strategy on Disaster Reduction (UNISDR) Disaster Risk Management for Health Mass Gathering fact sheet (WHO/HPA/UNISDR 2012) is a planning resource developed by HPA and WHO in the period preceding the Games that identifies these issues as of major importance. It places poor preparation for extreme weather events, including sudden changes of temperatures, as key among the risk factors for incidents at a mass gathering.

For a particular mass gathering, the event risk assessment in relation to these hazards is further impacted by the diversity of spectators and participants (e.g. youth, people with limited mobility, high profile political and social figures, etc.). For risk management considerations it is important to undertake, prior to the event, a risk assessment to identify population-related, visitor-related and environmental risk factors that includes weather and local environmental hazards.

After thorough assessment of these risks as they apply locally and to the expected attendees, the following steps are invaluable to prepare for natural hazards (including extreme weather conditions) and protect against extreme events:
• Implementation of early warning systems.
• Assessment of extreme weather vulnerability.
• Provision of adequate shelter on event sites if required.
• Development and testing of evacuation plans.
• Passing information to event attendees in a clear and concise way via flyers or local media.

Planning for extreme weather events
Mass gatherings planning should take into account any weather and environment-related health risk identified by the event risk assessment. The UK’s preparation for a heatwave in summer 2012 is a good example of planning a mass gathering with the risk of extreme weather.

The Games risk assessment identified a heatwave as the weather risk of most relevance. The Met Office advised that based on analysis of climate statistics, there had been, on average, a 20 per cent incidence of a heatwave occurring during the time of year that the Games would take place. While local agencies in the UK are generally well equipped to plan and deal with such events, using well-tried and tested guidance, especially from the Health and Safety Executive Events Safety Guide (http://www.hse.gov.uk/event-safety/index.htm), Games specific planning was required.

Every summer in the UK is a time for people to get outside and enjoy themselves. Each year large scale public events, such as music and arts festivals, sports events and national celebrations, are held up and down the country, providing enjoyment to millions of people. In 2012 this was even more the case than usual. The same summer saw the Queen’s Diamond Jubilee celebrations and the London 2012 Olympic and Paralympic Games. Both mass gatherings would comprise larger than usual numbers of outdoor events.

However, the effects of excessive heat and sun exposure are sometimes not highlighted enough for such events. Mass gatherings increase exposure to heat and direct sunlight and can make organisational responses more difficult. Individual behaviours often change at large events (for example, people may be reluctant to use the toilet facilities due to long queues, and so purposely reduce fluid intake). At many mass gatherings, people get into a good position to see the event and then reduce fluid intake and heat avoidance behaviours so as not to lose their spot. This can lead to heat-related illness, dehydration and/or collapse.

In response to this risk assessment the Heatwave Plan for England: protecting health and reducing harm from severe heat and heatwaves (available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_134152) was launched on 18 May 2012, containing a dedicated section on Heatwaves and Large Public Events developed specifically for the Games. The Heatwave Plan remains a central part of the Department of Health’s support to the
National Health Service (NHS) and local authorities, providing guidance on how to prepare for and respond to heatwaves, and was in place and tested for the Games. The 2012 Plan built on over eight years’ previous experience of developing and improving the ability of the NHS and its partners to deal with significant periods of hot weather.

The heat wave plan has four levels, summarised in Table 10.1 below.

The Games were subject to particular and extensive planning, preparation and testing involving close working across government and its agencies and between the NHS, Department of Health, HPA and London Organising Committee of the Olympic and Paralympic Games (LOCOG).

Information on staying healthy during the Games was provided to visitors and included advice on sun safety and promoting hydration through drinking water during a heatwave. Advice was also provided to LOCOG on the provision of free drinking water on the venues and shade. Work was also done to obtain sponsorship for the provision of free sun screen in venues. All these activities ensured that the Games did not have significant numbers of people attending the venue medical services with heat related problems.

A quick heat-health checklist for use when planning large scale public events was developed for the Games, to help guide authorities and partners. This is reproduced in Table 10.2.

<table>
<thead>
<tr>
<th>Heatwave plan levels</th>
<th>Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Long-term Planning All Year</td>
</tr>
<tr>
<td></td>
<td>Heatwave and Summer Preparedness</td>
</tr>
<tr>
<td></td>
<td>1 June–15 September</td>
</tr>
<tr>
<td>Level 2</td>
<td>Heatwave is forecast – Alert and Readiness 60% risk of heatwave in the next 2–3 days</td>
</tr>
<tr>
<td>Level 3</td>
<td>Heatwave Action</td>
</tr>
<tr>
<td></td>
<td>Temperature reached in one or more Met Office National Severe Weather Warning Service regions</td>
</tr>
<tr>
<td>Level 4</td>
<td>Major Incident – Emergency Response</td>
</tr>
<tr>
<td></td>
<td>Central Government will declare a Level 4 alert in the event of severe or prolonged heatwave affecting sectors other than health</td>
</tr>
</tbody>
</table>

Table 10.1: Levels of the Heatwave Plan for England
<table>
<thead>
<tr>
<th>Heat-health risk</th>
<th>Actions to consider</th>
</tr>
</thead>
</table>
| Increased exposure to heat                           | • Provide temporary shaded areas at event locations (umbrellas, tents)  
• Reduce the need to queue (efficient check in, additional staffing, or staggered ticket entry)  
• Provide a water spray/mist area/spraying (showers, garden hose)  
• Make available a map of local public air-conditioned spaces where people can have respite from the heat (consider extending opening hours of these venues)  
• Divert strenuous activities for cooler days or cooler periods of the day and provide an alternative, less strenuous program for hot days |
| Communication barriers                              | • Prepare advice for tourists and distribute around hotels, money exchanges and transport hubs  
• Produce and distribute heat-health advice printed onto free fans or caps (can be used to fan/protect against sun whilst containing information on protecting against and recognising heat-related illnesses, and provide emergency phone number in case of identified heat related illness)  
• Inform your audience and/or your members about the health risks and possible preventive measures through digital screens/speakers/announcements |
| Reduced access to water                              | • Distribute water bottles or temporary water dispensers  
• Ensure an adequate supply of drinking water. On hot days it is advisable to provide free drinking water                                                                                                                                            |
| Severe heat emergency                                | • Consider moving date or location or cancelling an event in extreme heat alert (especially at a Level 4 alert)  
• Ensure adequate immediate relief for people in emergency and ensure their transport to the first aid/health unit                                                                                                                                                                                                                                    |
| Medical needs                                        | • Remember that people with asthma, heart disease and/or other additional chronic conditions are additionally health sensitive to ozone and/or heat  
• Keep in mind that alcohol and some (prescription) drugs can worsen effect of heat  
• Ensure adequately trained personnel who notify authorities as soon as there are incidences of heat illness observed                                                                                                                                                                                                                     |
| Food needs                                           | • Provide water-rich foods such as salads or yoghurt, and ensure that food is kept cool to prevent contamination                                                                                                                                                                                                                                                                                                                                                               |

The 2012 Heatwave plan was supported by a series of information guides published online (http://www.dh.gov.uk/health/category/policy-areas/public-health/) which aimed to provide an authoritative source of additional information about the effects of severe hot weather on health for:

- Looking after yourself and others during hot weather (for individuals, families and carers).
- Supporting vulnerable people before and during a heatwave: advice for health and social care professionals.
- Supporting vulnerable people before and during a heatwave: advice for care home managers and staff.

**Early warning and the Natural Hazards Partnership**

In the context of the 2012 Games, implementation of the UK’s early warning systems was of particular relevance. These systems provide a good model: the UK is well known for the variability of its weather, from day to day, season to season, year to year and place to place. Its position in the mid-latitude westerly wind belt on the edge of the relatively warm Atlantic Ocean and proximity to the continental influences of mainland Europe play a major role in this. Changes in topography and land use over relatively short distances, together with a long coastline and numerous islands, all add to the variety of weather. The UK has developed a National Severe Weather Warning Service, and provides a “traffic light” system that communicates to members of the public the potential impact of weather-related events on the UK. This takes account of not only the severity of the weather event but also its local impact, which depends on exposure and vulnerability. Warning advice is communicated in a four-colour system indicating varying levels of risk of impacts and a comment on actions to take at each level:

- **GREEN** – “No severe hazard expected”
- **YELLOW** – “Be aware”
- **AMBER** – “Be prepared”
- **RED** – “Take action”

Each “traffic light” assessment includes several scenarios. For example, an “Amber” assessment includes both “high impact, low likelihood” and “medium impact, high likelihood”.

Preparing for natural hazards, whether while planning for a mass gathering or as business as usual, involves working across government and a range of different stakeholders. In the UK the Games were used as a driver to further develop work on a recently evolved system for engaging relevant stakeholders called the Natural Hazards Partnership or NHP (http://www.hpa.org.uk/Topics/EmergencyResponse/ExtremeWeatherEventsAndNaturalDisasters/NaturalHazardsPartnership/).
The NHP provides information, research and analysis on natural hazards, produced for the development of more effective policies, communications and services for civil contingencies, benefiting governments and responders across the UK. It focuses on natural hazards that disrupt the normal activities of UK communities or damage the UK’s environmental services. The NHP also provides the international community with a model for cross-government hazard management based on a platform of world-class environmental sciences. For the purposes of the NHP natural hazards include flood,

<table>
<thead>
<tr>
<th>The Natural Hazards Partnership (NHP) includes:</th>
<th>Weblinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Agency</td>
<td><a href="http://www.environment-agency.gov.uk/">http://www.environment-agency.gov.uk/</a></td>
</tr>
<tr>
<td>Flood Forecasting Centre</td>
<td><a href="http://wwwffc-environment-agency.metoffice.gov.uk/">http://wwwffc-environment-agency.metoffice.gov.uk/</a></td>
</tr>
<tr>
<td>Health Protection Agency</td>
<td><a href="http://www.hpa.org.uk/">http://www.hpa.org.uk/</a></td>
</tr>
<tr>
<td>Health &amp; Safety Laboratory</td>
<td><a href="http://www.hsl.gov.uk/">http://www.hsl.gov.uk/</a></td>
</tr>
<tr>
<td>Met Office</td>
<td><a href="http://www.metoffice.gov.uk/">http://www.metoffice.gov.uk/</a></td>
</tr>
<tr>
<td>Natural Environment Research Council (NERC)</td>
<td><a href="http://www.nerc.ac.uk/index.asp?cookieConsent=A">http://www.nerc.ac.uk/index.asp?cookieConsent=A</a></td>
</tr>
<tr>
<td>NERC British Geological Survey</td>
<td><a href="http://www.nerc.ac.uk/research/sites/research/bgs.asp?cookieConsent=A">http://www.nerc.ac.uk/research/sites/research/bgs.asp?cookieConsent=A</a></td>
</tr>
<tr>
<td>NERC Centre for Ecology and Hydrology</td>
<td><a href="http://www.nerc.ac.uk/research/sites/research/ceh.asp?cookieConsent=A">http://www.nerc.ac.uk/research/sites/research/ceh.asp?cookieConsent=A</a></td>
</tr>
<tr>
<td>NERC National Centre for Atmospheric Science</td>
<td><a href="http://www.ncas.ac.uk/index.php/en/">http://www.ncas.ac.uk/index.php/en/</a></td>
</tr>
<tr>
<td>NERC National Oceanography Centre</td>
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</tr>
<tr>
<td>Scottish Environment Protection Agency</td>
<td><a href="http://www.sepa.org.uk/">http://www.sepa.org.uk/</a></td>
</tr>
<tr>
<td>UK Space Agency</td>
<td><a href="http://www.bis.gov.uk/ukspaceagency">http://www.bis.gov.uk/ukspaceagency</a></td>
</tr>
</tbody>
</table>

In addition, the following stakeholders are members of the NHP Steering Group:

| Cabinet Office                                | https://www.gov.uk/government/organisations/cabinet-office |
| Defra                                         | http://www.defra.gov.uk/ |
| Government Office for Science                 | http://www.bis.gov.uk/go-science |
| Scottish Government                           | http://home.scotland.gov.uk/home |
| Welsh Government                              | http://wales.gov.uk/?lang=en |

Table 10.3 Members of the Natural Hazards Partnership
drought, extreme temperatures, space weather, volcanic ash, earthquakes, land instability, wildfire, snow, ice, fog, and air quality.

The consortium of public bodies that forms the NHP consists mainly of government departments and agencies, and public sector research establishments (Figure 10.1), and provides a model of cross-government response to natural hazards. Among its many functions are several that were relevant to Games planning, including:

- Provision of a timely, common and consistent source of advice to government and emergency responders for civil contingencies and disaster response.
- Developing a daily assessment of key natural hazards of concern for the partners.

Figure 10.1 Natural Hazards Partnership.
Issued 14:00 on Monday, 06 August 2012

The Strategic Assessment is still under development and is for guidance only. You are advised to seek detailed information before taking any action.

Hazard Five Day Summary - FLOOD: AMBER, LIGHTNING: YELLOW, LANDSLIDE: YELLOW

FLOOD: - Slow moving heavy, thundery downpours will give a Medium risk of surface water flooding in parts of northeast England and a Low risk of surface water flooding in other parts of northern England as well as southern and eastern Scotland.

LIGHTNING: - Low risk of frequent lightning in association with slow-moving thunderstorms.

LANDSLIDE: - Heavy rainfall coupled with saturated ground in South Western and North Eastern England, Wales and Southern and Central Scotland, will give an increased likelihood of landslides and slope failures, especially in areas identified as having higher landslide potential.

Hazard Five Day Summary Detail

FLOOD: - The Met Office is forecasting heavy showers and thunderstorms to continue to affect many parts of England, Scotland and Wales through the rest of Monday. Across parts of southern and eastern Scotland, as well as parts of northern England, especially the northeast, these are expected to be slow moving and locally torrential, slowly dying away during the evening and night but with further, more isolated heavy showers developing again on Tuesday. (See Fig 1). The Flood Forecasting Centre (FFC) is forecasting a Medium risk of surface water flooding in parts of northeast England during the rest of Monday with a Low risk in other parts of northern England. (See Fig 2). The Scottish Flood Forecasting Service (SFFS) is forecasting a Low risk of surface water flooding in parts of southern and eastern Scotland. During Tuesday, the SFFS are forecasting a very low risk as showers are expected to be more isolated and less intense. (See Fig 3)

LIGHTNING: - Heavy showers and thunderstorms are expected to be accompanied by frequent lightning in places through the remainder of Monday. Areas at risk are generally as detailed in figures 1 and 3 below.

- Environment Agency - Floods
- Scottish Flood Forecasting Service (SFFS)
Figure 2. Areas of Concern maps from Flood Forecasting Centre’s (FFC) Flood Guidance Statement issued 10:30 Monday 6th August 2012, showing areas of concern for the rest of Monday (left) and Tuesday (right).

Area A - There is a medium likelihood of significant impacts associated with surface water flooding. Showers will develop during the course of Monday, becoming very heavy and slow moving in places leading to torrential downpours. Impacts could include flooding of properties and parts of communities, fast flowing deep water, disruption to travel and key sites identified within flood plans. Within this area, some rivers, particularly in rapidly responding catchments and urban watercourses will also respond to the rainfall.

MONDAY 6th August 2012

Area B - There is a medium likelihood of minor impacts associated with surface water flooding. Early showers feeding into Lancashire and Greater Manchester area could lead to localised, but heavy, downpours affecting urban areas. In the northeast, showers will develop during the course of Monday, becoming very heavy and slow moving in places during the afternoon. Minor impacts could include flooding of land, roads and individual properties and disruption to key sites identified within flood plans.

Figure 3. Areas of concern maps from Scottish Flood Forecasting Centre’s (SFFS) Flood Guidance Statement issued 10:30 Monday 6th August 2012, showing areas of concern for the rest of Monday (left) and Tuesday (right).

10:30 - 23:59hrs
06 August 2012

00:00 - 23:59hrs
07 August 2012

Fig 10.2 (cont.)
Provision of background scientific advice to support emergency response
The NHP also provides a model for scientific, evidence based response planning. The strategic direction of the NHP is led by the NHP Steering Group and delivered through working groups, which engage and are informed by an Advisory Group. Member organisations include the UK’s lead scientific agencies for relevant areas, such as flood forecasting, oceanography and atmospheric science (Table 10.3). Access to the information held on the websites listed will help inform those planning future mass gatherings.

Discussion and recommendations
Extensive work with stakeholders beforehand, and the provision of background information on the state of public health in the UK to media and other stakeholders before the 2012 Games, raised the level of confidence in extreme event planning and early warning. It was found that it was important to build on normal practice. This included any business as usual emergency response planning and exercises; routine planned exercises; and recognised roles and responsibilities both internal and across stakeholders.

Public health extreme event risks identified for London 2012
Cross-organisational/delivery risks imposed the following requirements:
• Developing the evidence base to understand what the historical risks might be to mass gatherings from extreme weather events.
• The need to reflect learning to inform planning for extreme weather events – particularly in the Heatwave plan for England 2012.

Recommendations from the London 2012 Olympic and Paralympic Games
When planning a mass gathering, the following steps are key to preparing for natural hazards, including extreme weather conditions:
• Implementation of early warning systems.
• Assessment of extreme weather vulnerability.
• Adequate provision of shelter at events sites if required.
• Development and testing of evacuation plans.
• Passing information to event attendees in a clear and concise way via flyers or local media.
• The need to improve the use of early warnings to inform of extreme weather event hazards to mass gatherings.

Steady state, daily extreme event forecasting and – where relevant – reporting across all stakeholders were used to raise awareness and understanding of normal public health issues and their relationship with extreme events, focusing on those risks identified as most likely to occur. This allowed the HPA to work with our partners to identify a range of relevant public health issues.

Legacy

Before the London 2012 Olympic and Paralympic Games, the health impact of extreme events on mass gatherings issues was raised as an issue. The consequent awareness and understanding of relevant public health issues helped to clarify some of the cross health communications and assist in supporting the dissemination of public health messages. This was assisted by the production of such resources as the Heatwave Plan for England 2012, which will continue to be used.

The learning and recommendations from the Games have subsequently been fed into the HPA’s extreme events and health protection section, and its work will enhance responses to future emergencies and events.

Acknowledgments

With thanks to Professor Yvonne Doyle and Carl Petrokofsky at the Department of Health; Dr Graham Bickler, Katie Carmichael and Dr Lee Soomaroo at the Health Protection Agency UK; and Paul Davis Chair of the Natural Hazards Partnership.

Tools


References


Annexes

1. Mass gatherings and public health: the experience of the Athens 2004 Olympic Games
2. The health legacy of the 2008 Beijing Olympic Games: successes and recommendations
3. London 2012 Olympic and Paralympic Games: summary report of the Health Protection Agency’s Games time activities
4. National Health Service (NHS) London 2012 Games Programme Reports
5. Communicable disease alert and response for mass gatherings: key considerations
6. HPA/WHO mass gathering toolkit
8. Assessment of health-system crisis preparedness
9. Lancet series on mass gatherings health
10. References
Annex 1: Mass gatherings and public health: the experience of the Athens 2004 Olympic Games

This book is the first time that the whole public health and health care experience from an Olympic Games is included in one comprehensive publication. The book contains strategic, technical and scientific information about:

- Epidemiological surveillance.
- Environmental management.
- Emergency and hospital care.
- Preparedness for the potential deliberate use of explosives, biological and chemical agents or radionuclear material.
- Disease prevention.
- Coordination and unified command.

The book also highlights the fact that mass sports gatherings such as the Olympics can be powerful platforms for promoting health messages, and especially those to do with physical activity and active living, healthy nutrition and avoidance of smoking.

Finally, the book synthesises the conclusions and lessons identified from the 2004 Games, and offers insights and strategic points for future organisers of mass gatherings.

Mass gatherings and public health: the experience of the Athens 2004 Olympic Games


Annex 2: The health legacy of the 2008 Beijing Olympic Games: successes and recommendations

This book, published by the Beijing Olympic City Development Association (BODA) and the World Health Organization (WHO), uses the experiences of Beijing 2008 to assess the long-lasting health impact of the Olympic Games on its hosts, and to draw lessons for future mass gatherings.

The book highlights the longer-lasting effects of Beijing’s initiatives to:

• Improve the capacity of medical services.
• Strengthen disease surveillance, risk management and response.
• Improve the living environment for Beijing’s citizens through air, water and tobacco-control-related initiatives.
• Increase health awareness among athletes, visitors and residents.

This book represents the first time the health legacy (defined in the book as the sustainable, positive health impacts on the host city or country, associated with hosting of the Olympic Games) has been documented in this way. It explores the thesis that it is possible to advance a public health agenda by capitalising on the attention generated by the Games among government agencies and the society at large. It is intended as an instructive example of how mass events can be organised to promote health in a value-added way.

The book stresses the need to plan well ahead and to establish clear roles and functions for the various agencies involved in partnerships, and to create a relevant combination of legal frameworks, public health interventions and information campaigns.

The Health legacy of the 2008 Beijing Olympic Games: successes and recommendations


Annex 3: London 2012 Olympic and Paralympic Games: summary report of the Health Protection Agency’s Games time activities

This report (with the supporting papers listed below) summarises the HPA’s Games time activities from July to September 2012. The report covers all areas of the HPA’s work during the London 2012 Olympic and Paralympic Games including the enhanced reporting, response, risk analysis, laboratory systems and surveillance as well as highlights from the agency’s Operational Cells and the evaluation of the agency’s Games time working. The report also discusses key legacy and recommendations for the HPA, its successor organisation Public Health England, and other stakeholders across the globe tasked with delivering mass gatherings.

Supporting documents to the HPA Summary report

All London: Health Protection Agency; 2012.
2. Full operational cell reports.
2.1 Significant events reported by the Event Based Surveillance - London 2012 Olympic and Paralympic Games.
2.2 Regional reports
   b. South West regional report - London 2012 Olympic and Paralympic Games
2.3 LOCOG Polyclinic - London 2012 Olympic and Paralympic Games.
2.4 Health Protection Services, Colindale: preparedness and response - London 2012 Olympic and Paralympic Games.
2.5 International Infectious Disease Surveillance - London 2012 Olympic and Paralympic Games.
2.7 Microbiology Services: preparedness and response - London 2012 Olympic and Paralympic Games.
2.8 Centre for Radiation, Chemical and Environmental hazards, Games time planning and delivery - London 2012 Olympic and Paralympic Games.
2.9 Communications Division report - London 2012 Olympic and Paralympic Games.

**HPA Summary report**


Available, along with supporting reports, from: http://www.hpa.org.uk/Publications/EmergencyPreparationAndResponse/0113London2012report/
Annex 4: National Health Service (NHS) London 2012 Games Programme Reports

This suite of four reports (below) provides an overview of the work led by NHS London for the 2012 Games and associated cultural events.

The reports also present key findings that are intended to be helpful to health service planners of mass gatherings and future Games cities.

NHS Games programme reports:


All available from: http://www.london.nhs.uk/2012-games-programme-reports
Annex 5: Communicable disease alert and response for mass gatherings: key considerations

The World Health Organization (WHO) has a long history of providing support to Member States in hosting mass gatherings, and regularly receives numerous requests for technical support from countries organising large events (such as FIFA World Cups, Olympic Games, the Hajj, World Youth Days, etc.). In response to this need, in 2008 WHO developed a comprehensive document to provide guidance to all those involved in the health aspects of planning for mass gatherings (not just those directly employed in the health services).

*Communicable disease alert and response for mass gatherings: key considerations* was developed as a tool to guide those responsible for the health needs of individuals attending a mass gathering, and to help them plan their actions. Its focus is outbreak alert and response, but there are many other programmes and agencies, within and outside public health, that may be impacted by the factors associated with mass gatherings. The principles and practices outlined in the document may also provide valuable initial guidance to those involved in planning other aspects of the management of major events.

Published in 2008, this is at the time of writing, WHO’s benchmark text for supporting mass gatherings. An update, ‘Key considerations 2,’ is planned, and will expand the document away from its current focus on communicable disease and towards an all-hazards approach.

The content of key considerations was extracted, refined and expanded to produce the WHO/HPA Toolkit (see Annex 6), a practical online tool with which planners can assess their readiness to host a major event.

*Communicable disease alert and response for mass gatherings: key considerations*


Available from: http://www.who.int/csr/Mass_gatherings2.pdf
Annex 6: HPA/WHO mass gathering toolkit

This toolkit presents the key areas to be considered in the process of setting up and implementing communicable disease alert, response and operation plans for mass gatherings. It was developed using the 2008 World Health Organization (WHO) document *Communicable disease alert and response for mass gatherings: key considerations* (see annex 5). The two resources should be used alongside one another.

This toolkit is designed to:

- Provide a framework for a hosting government or organisation to self-assess its current public health capacities for a mass gathering, and to determine whether enhancements are required.
- Provide considerations to be taken into account when establishing plans and structures for managing incidents that may threaten health security.
- Encourage communicable disease / public health event planning leads and key policy and decision makers to consult with other agencies and organisations throughout the planning process.
- Provide information relating to the roles of host governments, WHO and other national and international bodies.
- Ensure that the activities meet the requirements of the IHR (2005). Member states intending to host mass gatherings should consult the IHR (2005), and must ensure that their planning activities align with the revised regulations.

This toolkit should be used by communicable disease / public health event planning leads and other public health professionals responsible for the management of communicable disease alert and response during mass gatherings, as well as key policy makers, planners and executive personnel. There are also many other (non health) authorities involved in contributing to healthy outcomes at mass gatherings who will also find this document useful. It is also a valuable resource for mass gathering promoters and managers, emergency service personnel, government bodies, and any organisations or individuals who contribute to the organisation of mass gatherings.

The toolkit addresses a wide array of key considerations, irrespective of the size, nature and complexity of the mass gathering(s) in question. The sections have also been broken down to reflect different levels within the user country’s public health structure: national government (NG - policy level); and local service delivery (LSD). Depending on these factors, certain sections may have greater or lesser applicability.

To request access, please contact massgatherings@phe.gov.uk
Annex 7: International Health Regulations (2005)

In response to the increase in international travel and trade, and emergence and re-emergence of international disease threats and other health risks, 194 countries across the globe have agreed to implement the International Health Regulations (2005) (IHR). This binding instrument of international law entered into force on 15 June 2007.

Many of the regulations – such as those concerning compulsorily reportable diseases – will be of particular interest to planners of mass gatherings.

The stated purpose and scope of the IHR are “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.”

Because the IHR are not limited to specific diseases, but are applicable to health risks, irrespective of their origin or source, they will follow the evolution of diseases and the factors affecting their emergence and transmission. The IHR also require states to strengthen core surveillance and response capacities at the primary, intermediate and national level, as well as at designated international ports, airports and ground crossings. They further introduce a series of health documents, including ship sanitation certificates and an international certificate of vaccination or prophylaxis for travellers.

International Health Regulations 2005 (IHR [2005])


Annex 8: Assessment of health-system crisis preparedness

This assessment tool, available to any country or mass gatherings planner, examines a country’s risk-prevention and risk-mitigation initiatives and provides recommendations on possible action based on the World Health Organization (WHO) health-system framework.

In 2007, the European Union’s Directorate-General for Health and Consumers (DG SANCO) and WHO/Europe started a joint project to “support health security, preparedness planning and crisis management in the European Union (EU), EU accession states and neighbouring (European Neighbourhood Policy) countries”. The objectives of this project included the evaluation of the national health sector crisis preparedness and response capacities.

This included the development of a standardised toolkit for assessing health-system capacity for managing crises. On the basis of pilot assessments carried out in Armenia, Azerbaijan, Kazakhstan, Poland, the Republic of Moldova, Turkey and Ukraine between 2007 and 2010, a final toolkit was developed and published early 2012.

So far, the toolkit has been applied in 13 countries in the European Region, including England in 2011. It will be adapted and rolled out to further countries, through joint WHO expert assessment teams integrating national experts and/or through a self-assessment approach.

WHO Euro: Assessment of health-system crises preparedness
WHO Regional Office for Europe. Assessment of health-system crises preparedness. Copenhagen: WHO; 2012


Annex 9: Lancet series on mass gatherings health

This series of articles describes the scope of the emerging specialty of mass-gatherings health. This resource will continue to be built up.

To date this series of papers covers:

1. The influence that the Hajj pilgrimage has had on the development of mass gatherings health.
2. The prevention of infectious diseases associated with mass gatherings.
3. A review of non-communicable disease risks associated with mass gatherings.
4. Crowd and environmental management during mass gatherings.
6. A research agenda for the mass gatherings health specialty.

All available from: http://www.thelancet.com/series/mass-gatherings

As at January, 2012 this includes:

Anders Johansson, Michael Batty, Konrad Hayashi, Osama Al Bar, David Marcozzi, Ziad A Memish. Crowd and environmental management during mass gatherings. London; Lancet; 2012
Annex 10: References

**CBRN Incidents: a Guide to Clinical Management and Health Protection**


**Emergency response planning for mass gatherings**

**Event Safety Guide (the ‘purple book’)**

**Health emergency planning: a handbook for practitioners (2nd edition)**

**Health legacy of the 2008 Beijing Olympic Games: successes and recommendations**

**HPA Summary report and supporting documents**

**HPA / WHO mass gathering toolkit (online resource)**
Online assessment toolkit for public health professionals responsible for the management of communicable disease alert and response during mass gatherings.
To request access, please contact massgatherings@phe.gov.uk

**Initial investigation and management of outbreaks and incidents of unusual illness**

UK Health Protection Agency (HPA). Initial investigation and management of outbreaks and incidents of unusual illness: a guide for health professionals, with particular reference to events that may be due to chemical, biological or radiological causes, including deliberate and accidental releases. London: HPA; 2010. Available from: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1201265888951

**International Health Regulations 2005 (IHR [2005])**


**International Travel and Health: 2012 edition**


**Communicable disease alert and response for mass gatherings: key considerations**


**Managing crowds safely: A guide for organisers at events and venues**


**Mass gatherings and public health: the experience of the Athens 2004 Olympic Games**


**Mass gatherings: are you prepared? Online training (non-interactive print version available as pdf)**


**NHS Games programme reports**. London: NHS London; 2012:
• Programme overview

• Health service planning and delivery

• Health emergency preparedness, resilience and response

• Go London! The legacy of better health for Londoners

NHS Games time reference manual

Public Health Legacy: Experiences from Vancouver 2010 and Sydney 2000 Olympic and Paralympic Games

REACT Project workplan: enhanced surveillance for mass gatherings

Includes:

REACT Project Toolbox for implementation of surveillance at mass gatherings
Report on WHO support to the FIFA 2010 World Cup South Africa™

Available from: http://www.google.co.uk/url?q=http://www.afro.who.int/index.php?option=3Dcom_docman%26task=3Ddoc_download%26gid%3D6968&sa=U&ei=K0wnUZ-6MaWG0AX254DgDg&ved=0CBsQFjAA&usg=AFQjCNHTS7fzRekek_UT2joT77OpnoHdvS1w

Safe and Healthy Mass Gatherings


Sustainable Legacies for the 2012 Olympic Games


WHO Euro: Assessment of health-system crises preparedness

WHO Regional Office for Europe. Assessment of health-system crises preparedness. Copenhagen: WHO; 2012

