Health Protection Services Colindale: preparedness and response
London 2012 Olympic and Paralympic Games

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Pertussis and Measles: As a major international hub and large multinational city, London often sees infectious diseases imported from around the globe. Most of these are diagnosed in small numbers and usually do not give rise to major outbreaks. However at the time of the Games, England was experiencing two large outbreaks of infectious disease. Both were vaccine preventable, and both had the potential to cause problems to athletes and visitors. Firstly, high levels of measles cases had been reported from around the UK (including London) and measles was also causing outbreaks in some European countries. The second was pertussis, with whooping cough notifications in England at levels not seen for over 20 years. Recent resurgences had been reported in many developed countries; in common with many other such countries, the UK outbreak was affecting older children and young adults, who were exposing vulnerable neonates too young to be vaccinated. As an

illustration of the potential significance of pertussis, the Australian swimming team cancelled their final pre-Olympic event in Australia after several team members became ill[1].

Gastrointestinal outbreaks: In summer months in the UK, salmonella and Vero cytotoxin-producing *Escherichia coli* (VTEC) outbreaks often occur. Potential for such outbreaks exist within the Games venues and in catering for the Games.

Viral gastroenteritis outbreaks in the UK are due predominantly to the 'winter vomiting disease,' or norovirus; but norovirus can sometimes occur in summer months, with the potential for rapid spread, as it is usually highly contagious. The large number of anticipated travellers from the Southern Hemisphere arriving from the winter season in their home countries meant the potential for norovirus outbreaks was anticipated to be higher than normal for the UK summer months.

Respiratory viruses (especially influenza): The emergence and global spread of pandemic H1N1 influenza in the summer months of 2009 highlighted the potential for spread of respiratory viruses, even in summer months. The influx of visitors and Games participants from the southern hemisphere, where influenza and other winter viruses would typically be circulating in the months prior to the Games, meant that imported respiratory viruses had the potential to cause problematic outbreaks.

Factsheets
Many other infections also had the potential to spread. HPS-Colindale, collaborating with microbiology colleagues and the HPA press office, produced a series of factsheets for press and general use on around 50 infections and their control. These were mainly based on existing material on the HPA website, drawn together prior to the Games.

UK context - surveillance of infections

The UK has well-developed, internationally recognised surveillance systems for infectious diseases. Notifications are reported to the Consultant in Communicable Disease Control for public health action locally, and these are then collated nationally (an approach which historically has provided the mainstay for prompt surveillance activities). Since a 2010 revision of the system, notifications now include statutory laboratory reporting: laboratory reports enable application of an 'exceedance score' to the weekly reports that can help detect low level outbreaks which may have otherwise gone unrecognised. The 'exceedance score' is a statistical check to detect case numbers in excess of those that would be expected, enabling epidemiologists to identify outbreaks or an increase in cases above that which would be expected on the basis of historical patterns of the particular infection. This exceedance system was enhanced during the Games to operate each weekday on a rolling seven-day basis for the period of the Games.

There are many other surveillance systems, including well-developed, real-time primary care surveillance systems – which supplement notifications.

[1] http://www.smh.com.au/olympics/swimming-london-2012/olympic-swim-meeting-cancelled-over-whooping-cough-scare-20120620-20nbk.html

Immediate situation in summer of 2012

'Level 3' outbreaks ongoing at start of Games

At the start of the Games, there were two ongoing national problems with vaccine-preventable infections that were causing concern. Both were classified as 'level 3' on the outbreak scale widely used within the HPA. Both pertussis and measles also had the potential to cause problems for participants and visitors.

Global situation and possible impact in the UK

The international aspects of the Games and the potential for global events to impact on London or other Games venues made the international aspects of surveillance very important. Links were established (including through an exchange of staff) with European Centre for Disease Control (ECDC), and the global risk assessments undertaken by ECDC (together with the HPA's Travel and Migrant Health section, National Travel Health Network and Centre (NaTHNaC), staff at HPA Porton, and the Emerging Infections and Zoonosis section) played an important role in international surveillance for the Games. A detailed description of these international surveillance arrangements is covered in the International Infectious Disease Surveillance report for London 2012.

Co-ordination of reporting from other parts of the UK outside England

HPS-Colindale collates information from other parts of the UK to report on UK infectious diseases to ECDC, WHO etc. It also acts as the UK Focal Point for the International Health Regulations 2005. It was appropriate therefore that reporting from other UK countries came via HPS-Colindale.

One issue of interest was a legionella outbreak in Edinburgh in the weeks immediately preceding the Olympic torch relay, posing a possible risk to participants and viewers as the relay passed through Edinburgh. While it was thought the source had been identified, it was impossible to confirm whether control measures taken had been effective in eliminating risk to residents and visitors. With the benefit of hindsight the measures were effective, since no further cases occurred, but this was not known with certainty at the time.

Description of surveillance systems, enhancements and new systems which were put in place

Details of the surveillance enhancements introduced are covered in more detail in the Eurosurveillance article *(Severi; Eurosurveillance*). In brief these were as follows:

<u>Enhancements to existing or previously run systems</u>:

- **Daily exceedance**: the laboratory exceedance system is normally run weekly on Mondays and examined prior to the weekly Tuesday morning teleconference. During the Games there was a daily running of the exceedance scores (weekdays only) covering a rolling 7 day period.
- **Notifications:** Modifications to the reporting form for notifications included the requirement for information on whether an incident had any Games links. These were examined at a local and national level on a daily basis.
- **HPZone dashboard**: Looking each weekday at the HPZone dashboard and the numbers of outbreaks and incidents (follow-up of these, especially in the vicinity

of venues, was usually undertaken by the Event Based Surveillance team). This was produced in tabular form and circulated by the information management department to relevant heads of sections and departments, to assess the necessity for follow-up.

- **Duty Doctor**: There was active daily examination of duty doctor calls that might have had Games relevance, and daily liaison between Duty Doctor and the Colindale Operations Cell.
- **Mortality monitoring**: Running a daily system looking at excess all-cause deaths in heat-waves had previously shown to be feasible and timely (*Green BMJ 2012*). The system was sensitive enough to detect a mortality excess in London and the East of England during a short heat-wave at the end of June in 2011 (the excess deaths in this brief period occurring in the age group of 85 and above). This daily monitoring system for excess mortality was run when data were available, before, during and after the Games period. Considerable effort was needed to establish the system for the Games as unexpected legal advice at the General Registry Office (GRO) declared the provision of daily mortality data to the HPA (a process that had previously operated for heat, cold and flu periods) was not covered by current legal gateways between GRO and HPA. Challenging the legal advice and getting a system operational entailed great effort from several senior staff and from the HPA legal department. As the system could not be set up until the initial data had been sent through and analysed, this placed additional pressure on the Respiratory Diseases Department, with data only finalised on the day of the Olympic opening ceremony.

New systems

- **Undiagnosed Serious Infectious Illness** (**USII):** A new surveillance system was developed to detect possible new or emerging infections presenting as serious infectious illnesses that were undiagnosed. Any reported cases were investigated for epidemiological links. A pilot study had previously shown that the system was viable (*Ref Ellen Heinsbroek Eurosurveillance*), and reporters used an online reporting tool or provided a weekly nil notification. USII surveillance used during the Games involved a total of 19 sentinel units (adult and paediatric intensive care units) in London and the south-east of England. This system was run by the emerging infections section within the Gastrointestinal, Emerging and Zoonotic Infections department (GEZI).

Other new systems are reported in the following reports, these can be found at: *http://www.hpa.org.uk/Publications/EmergencyPreparationAndResponse/0113London2012report*

- Event Based Surveillance London 2012 report
- Syndromic Surveillance London 2012 report
- International Infectious Disease Surveillance report for London 2012.

HPS-Colindale – planning and structures which were in place:

Rotas and general planning

A significant amount of workforce planning with departments took place prior to the Games to ensure that departmental operational plans and requirements were fully understood.

Operational risks and workforce issues were highlighted and financial requirements set out. Communication was key and workshops were held to keep staff updated on progress and to respond to queries. A significant amount of work was done with HR to ensure that working practices adopted for the Games were in line with HR policy and procedures and staff entitlements were fully understood, agreed and documented. Workshops were arranged to inform staff.

A recruitment exercise took place to identify and engage necessary additional support within departments, including locum consultants for the duty doctor rota. Those departments required to report daily organised seven-day-a-week rotas for surveillance and expert advice. Staffing of these rotas varied between departments, but all included some out-of-hours and weekend working. Within GEZI the rota included separate experts for GI infections and zoonoses and emerging infections. The EIZ section provided expert advice on EIZ, daily reporting on zoonoses and undiagnosed infections, and contributions to the international rota.

Colindale Operations Centre (jointly run between MS and HPS)

Health Protection Services Colindale (HPS-C) and Microbiology Services Colindale (MS-C) ran the Colindale Operations Centre (COC) jointly within the EOC (Emergency Operations Centre). Also based within the EOC were the MS-C and the sitrep teams. Being in close proximity within Colindale's EOC facilitated close working between all these teams.

Two daily shifts operated the main COC (usually 0800-1330hrs for the first shift and 1300-1830 for the second), with a short lunchtime handover period. One of the main functions of the COC was to provide single points of contact for email and phone systems. Paradoxically, because it was not at all busy in the COC, sometimes these were not handled or followed up well (see *lessons identified* section). Although the rota had three staff on at any one time, it quickly became apparent that only two staff were required (at most) so this was decreased. During the period after the Olympics and during the Paralympics, weekend shifts were covered with just one shift from mid-morning to late afternoon, finishing once the Colindale sitrep input had been sent to Victoria.

Daily situation assessment reporting from departments

Colindale departments had active liaison with microbiology colleagues and produced a daily report that was provided in a daily 1215hrs Colindale meeting prior to the daily HPA-wide 1230hrs teleconference.

Every incident highlighted by the exceedance report or by daily liaison with MS Colleagues was investigated to ascertain importance and/or relevance to the Games. Within some departments (e.g. the Gastrointestinal Diseases Department) a dedicated resource was brought in during Games time to respond to the additional workload resulting from these investigations. Each incident was reviewed prior to the 1215hrs meeting to assess risk and determine whether it should be reported. Departmental and other reports were assimilated into a daily digest of cases / events / situations that might be of Games relevance, or which might be picked up by the media as being of potential Games relevance.

- Immunisation (daily exception reporting and weekly analysis)
- Respiratory (acute)and mortality
- Gastrointestinal
- Emerging and Zoonotic Infections

- Syndromic surveillance
- International
- MS Cell

The daily cycle of incident risk assessment and reporting at the daily teleconference also took place during weekends.

a) *The Gastrointestinal Diseases Department*

During 70 days of Games time, this department actively followed up 587 exceedance reports of 65 pathogens on a national basis and 943 exceedance reports of 61 pathogens on a regional basis. The true cause of the exceedance was determined in each case to be of one of the following artefacts of surveillance:

- Heterogeneous antimicrobial resistance profiles
- Travel associations
- Laboratory reporting without adequate sub-typing (e.g. *Salmonella Enteritidis*)
- Primary laboratory typing (e.g. Campylobacter).

This represented a considerable additional burden on the Department, which was eased by the scientist seconded for the duration of the enhanced surveillance period.

b) The Respiratory Diseases Department (including mortality)

Routine weekly data sources that fed into the weekly influenza report (which continued to be published on the HPA website over the Olympic reporting period) were monitored by the respiratory department for Games relevance. Additionally, information was available daily on acute respiratory and Legionnaires outbreaks; respiratory outputs from the syndromic surveillance schemes; and virological testing of respiratory specimens. The latter came through a pre-existing weekly system adapted for daily reporting for the Games surveillance period.

As previously mentioned, a near real-time daily mortality reporting system was set up and all cause excess mortality monitored daily by region and age group. As part of the weekly influenza report, weekly all cause excess mortality was calculated and this was monitored.

c) The Immunisation Department

This Department undertook active examination of vaccine preventable infections on a daily basis. This was time consuming and required weekend rotas. Virtually no resulting information reached the final report as there was little of direct relevance to the Games as an immediate threat. The Department felt that there would have been some benefit for negative reporting in the main situation report, including some information that might have been of potential interest, because it showed that the systems were in place.

The cycle of meetings included the following:

a) HPS-Colindale has a regular daily 0915hrs meeting during weekdays; this continued as normal. Part of the function of this meeting is to review who is on call on that day; look briefly at HPZone entries from the previous day; and discuss any issues/outbreaks/difficult case reports and any relevant media issues covered that day. This meeting continued throughout the Games period. It did not operate at the

weekends, but all other cycles of meetings – (b) to (e) below – did take place at weekends as well as on weekdays.

b) An international teleconference was held each day, including on weekends at 1100hrs, linking with other parts of the HPA and with ECDC and WHO.
c) A brief meeting was held each day prior to the main 1230hrs teleconference (at 1215hrs for a maximum of 15 minutes), so that anything of which the MS Cell was aware was brought to HPS' attention and vice versa.
d) The main 1230hrs HPA-wide teleconference was chaired from Victoria. It was brief and any more extensive discussions it necessitated were taken off line. Individual HPS-C departments, the sit-rep team, the Colindale Operations Cell and MS cell all reported in to this daily teleconference (including at weekends).
e) MS Cell – this ran daily at 1600hrs, with participation of all regional laboratories and specialist labs undertaking multiplex PCR testing for respiratory and gastrointestinal pathogens.

Weekly reporting from other departments

Other departments reported weekly, since the nature of the infections they covered did not make daily reporting appropriate. These reports were included in the Wednesday teleconferences and sitrep. Those departments doing weekly reporting included:

- HIV/STI
- Healthcare associated infections (plus scarlet fever)
- Respiratory – non acute infections (including TB)
- Global influenza report
- Global measles issues.

Important links

The links between the various aspects of infectious disease surveillance and control are important if escalation of outbreaks is to be prevented and infectious disease controlled. Specifically for the Games, links of particular importance included:

- Those between the MS Cell and Microbiology Services generally (reference and diagnostic)
- Those with Event Based Surveillance
- Those with Local and Regional Colleagues
- Those with the Devolved Administrations
- Those with HPA Victoria (both London Region and Olympics Co-ordinating Centre)
- Those with HPA Communications.

Internationally, links with ECDC were covered by communication on a daily basis, and links with WHO less frequently.

Lessons identified

The period from July to September 2012 proved much less busy than anticipated for HPS-Colindale, with no large outbreaks and no incidents demanding major input from the national centre. Items that necessitated some further input or investigation (or for some an estimation as to whether they posed any risk to the Games) included:

- A case of tetanus
- Anthrax in injecting drug users
- Chicken pox
- Some small diarrhoeal outbreaks including two norovirus events in Australian and Canadian badminton players in Derby pre-Games, and in Olympic sailors in Weymouth
- One Salmonella outbreak associated with a Hog Roast in South London close to the Greenwich Olympic site
- One salmonella outbreak that began between the Olympics and the Paralympics (first case onset C. August 22);
- Legionella cases in a Spanish holiday complex
- Acute respiratory syndrome in Cambodia (EV71)
- Ebola outbreak in Uganda
- H3N2 influenza cases from pig contact in the USA (and the remote possibility that a new pandemic was developing)
- Two cases of acute flaccid paralysis (which were assessed as highly unlikely to be the re-emergence of polio, with laboratory assessment confirming this).
- A legionnaires outbreak in Stoke on Trent: cases had no Olympic links and there were no Games venues nearby
- Excess mortality: a slight excess was seen in the few days prior to the Olympic opening ceremony. This coincided with raised temperatures and was detected in the elderly. It had no Olympic significance.

It was fortunate that an incident such as the novel coronavirus 2012 occurred the week after the Games teams were stood down (20 September 2012), as this would have brought considerable additional pressure onto Colindale staff if it had occurring in the Olympic period. The HPA – including those in the Respiratory Virus Unit and the Respiratory Diseases Department at Colindale who had been involved in different Games rotas – was obliged to pull out all the stops, including through weekend working, to co-ordinate the public health response to this incident.

Exercises

Various exercises had been run in the 12 months prior to the Games and had proved very useful in sharpening plans for the Games. These consumed considerable resources and therefore took a toll on 'day jobs'. Exercise Apollo, for instance, replicating a hypothetical VTEC outbreak, was an enormous live exercise in terms of the pressure on normal activities at local HPUs and regional/national centres. Nevertheless, these exercises proved to be an essential part of the HPA's preparation, a fact worth emphasising. Some smaller exercises by individual teams were also held alongside those that spanned the HPA.

Structures in place, including rotas and rhythm of daily meetings

Normal structures usually worked very well. Given the relative quiet of the Games period, the Colindale Operations Centre proved to be over-rostered, and this was scaled back somewhat between the Olympics and Paralympics, and during the Paralympics themselves. Most of the surveillance teams in various departments were, however, well-used, in that there was a very considerable workload behind a 'nil return'. This fact was not apparent in

the sitrep, where the amount of work being done appeared simply as a statement of 'nothing to report'.

The 1230hrs teleconference proved an especially useful means of keeping in touch and knowing what was going on. Since it was brief (lasting a maximum of about 10 minutes), it did not encroach on time needed for other tasks.

Communications including weekly bulletin to Colindale staff

The links across the Colindale site are important, especially as different divisions of the HPA are represented in Colindale. The weekly bulletin (usually a single page) issued during the period from July to September 2012 kept staff informed of what was happening, and was widely appreciated. It aimed to provide chatty feedback on the roles of various sections and departments. Keeping up morale, especially when staff were obliged to come in at weekends and at times that were not very busy, was deemed to be important; the weekly bulletin assisted with this.

Crucial roles played by trainees in microbiology and public health (SpRs, SpTs, EPIET and EUPHEM fellows)

Trainees in Public Health and Microbiology and EPIET and EUPHEM fellows on attachment to HPS Colindale or to MS Colindale played very important roles in the Colindale Games response. Input into much of the planning and staffing rotas (especially sitrep production), liaising with other parts of the HPA, participation in teleconferences and general contributions to the operational response were all enormously appreciated by HPS-C.

One negative aspect of the involvement of SpRs, SpTs, EPIET and EUPHEM fellows was that, since they were all non-HPA employees, it proved almost impossible to recompense them for extra hours and weekend working. Some SpRs were embedded at ECDC in Stockholm to assist in the international response.

Sit-rep production

The Colindale sitrep on infectious diseases contributed to the generic sitrep produced by the Olympic Coordinating Centre (OCC) in Victoria. It was produced daily from early July to mid September. Detail was included in the earlier Colindale sitreps that was often omitted from the HPA sitrep that went to LOCOG. This was a source of some friction initially, but an agreed *modus operandi* was reached whereby the Colindale sitrep team included less initial detail and what was passed to LOCOG included slightly more of what was sent to Victoria.

Keeping the 'day-job' going

The summer was probably quieter than usual with regard to the day-to-day work of Colindale. Staff were discouraged from taking holidays during the Games period, so there were more staff around, especially in August. Having two shifts a day in the COC meant that staff would return to their job in the time they were not rostered and could catch up on much of their daily work.

Importance of scaling up and scaling back

With the benefit of hindsight, rotas for the COC were over-staffed, and ought to have more quickly scaled back (with preparations in place to scale up again quickly, as necessary).

Overall comments

Overall the services planned for were not as stretched as we thought they might be, although they were commensurate with the workload expected in the planning assumptions prior to the Games starting. The Colindale Operations Centre (COC), in particular, was not well-used. The contrast between the COC in the Games (quiet, with very little in the way of tasking or active communication with others) and the EOC set up in the same room three years previously for pandemic flu (extremely busy and problematic, combining epidemiological pulling together of data with operations) was stark.

More detail of the epidemiological monitoring of infectious disease of potential relevance to the Games was covered three publications in *Eurosurveillance*

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