

# Written evidence submitted by Public Health England (EME012)

## ABOUT PUBLIC HEALTH ENGLAND

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

## EXECUTIVE SUMMARY

- In response to this Ebola outbreak in West Africa during 2014/15 activities undertaken by PHE ranged from participation in international efforts to control Ebola disease in West Africa to drafting, helping to formulate and implementing government policy (including risk management of returning travellers at UK ports through the screening and returning workers scheme) and acting as a technical repository of knowledge on virology, biosafety, standards and use of personal protective equipment and support for clinical management of disease cases in the UK.
- PHE provided assistance to the National Health Service (NHS) locally and nationally in preparing for, diagnosing and managing people returning to the UK whilst incubating Ebola infection is an extension of highly specialist PHE acute diagnostic and clinical advisory services for rare diseases provided on a daily basis in the UK. PHE also provided specific ad hoc advice to clinicians involved in treating individual Ebola patients on specific management and infection control risk as requested. This NHS support role also builds on the local leadership of PHE's health protection teams supporting the NHS throughout England in protecting the public's health.
- PHE's scientific and medical advice was provided to World Health Organisation (WHO), Non-Governmental Organisations (NGOs), the European Mobile Laboratory and other international organisations to support disease control activities in West Africa. It was also provided to DH, Cabinet Office Briefing Room (COBR) meetings and through UK government advisory committees such as Scientific Advisory Group on Emergencies (SAGE) and the Advisory Committee on Dangerous Pathogens (ACDP) to shape national preparedness and response.
- PHE established three high capacity laboratories in Sierra Leone for rapid diagnosis of Ebola and malaria infection. These handled over a third of all samples tested in the country as part of the immediate response to the crisis in 2014/15. Over 350 PHE laboratory and epidemiology staff and health protection leaders were deployed to Sierra Leone to staff these laboratories, support the Ministry of Defence (MoD) hospital in Kerrytown and assist the Sierra Leone government command and control efforts as part of the UK Government's response both in Sierra Leone and in support of the WHO.
- As the outbreak evolved, PHE laboratories introduced additional clinical testing to improve patient management. Our staff also advised on issues such as the standards and use of personal protective equipment in protecting staff against Ebola in West Africa and in the NHS when testing returning travelers. This expertise, enhanced by the experience of dealing with large numbers of Ebola cases in the field has been used to provide advice on all aspects of Ebola disease in humans, and provided the clinical and virological support for the management of Ebola patients treated by the NHS. PHE is now providing practical support, alongside the Department for International Development (DfID), to build the legacy of assisting the development of health system infrastructure in West Africa, which will continue in the coming years.

## INTRODUCTION

- Public Health England (PHE) is a Category 1 responder under the Civil Contingencies Act 2014, and plays a central role in the operational response to protect the United Kingdom (UK) population from any new emerging infection or developing radiation, chemical or environmental hazard.

- PHE routinely identifies and monitors new and emerging infectious disease outbreaks throughout the world, such as viral haemorrhagic fevers, Middle Eastern Respiratory Syndrome – MERS, and avian influenza. This role is underpinned by several international surveillance systems. PHE identified this outbreak of Ebola at its outset and provided advice and information accordingly to the Department of Health (DH) and other government departments.
- PHE’s submission in response to the call for evidence reflects the organisational experience of both providing expert advice to partners and the public and also being responsible for implementing many different aspects of the national and international response to emerging infections. Day to day operational delivery of risk assessment, risk management, disease burden forecasting, laboratory testing, scientific and medical expertise in the field in West Africa and in the UK provide PHE with a unique but holistic perspective on the impact of an emerging infectious disease. PHE has detailed operational understanding and insights directly relevant to the questions posed.
  1. How prepared is the Government for a similar type of emergency? Is it effectively mitigating and increasing resilience to the disease hazards identified in the National Risk Register?
  2. What lessons were, or should have been, drawn from the Ebola emergency for gathering, assessing, using and communicating scientific advice across Government during this type of emergency?
  3. How successful was the Government in communicating advice to the UK public about the emergency?
  4. Since the Ebola emergency, how well has scientific advice been used to inform or revise the Government’s planned response to similar emergencies in future?
  5. Could the evidence base and sources of scientific advice to Government on emergency mitigation, planning and response be improved? If so, how?
  6. What are the strengths and weaknesses in the system for weighting the risk of a future Ebola-type emergency, including the possible scale of impacts for the UK and their likelihood?

#### INQUIRY QUESTIONS

### **1. How prepared is the Government for a similar type of emergency? Is it effectively mitigating and increasing resilience to the disease hazards identified in the National Risk Register?**

- *Key messages:*
  - Strong systems are in place to detect and respond, particularly focused on new emerging infectious disease risks
  - There is a need for regular exercising and assurance as such emerging threats happen rarely but it is critically important to respond effectively when they do
  - Ensuring that these systems are equally strong for all types of new emerging infection and for radiation, chemical and environmental hazards is important
  - A newly developed field epidemiology training programme provides a group of epidemiologists each year who, during their two year training programme, are available to deploy and participate in outbreak response nationally or internationally. There is a need to ensure that the capacity from this programme is sufficient to meet future need.
- The risk from Ebola as a specific disease was not highlighted in the national risk register prior to the events of 2014/15. However, pandemic influenza is identified as the number one civil emergency in the national risk register and an emerging infectious disease is also recognised as a separate risk, with reasonable worst case scenarios that could apply to Ebola. Therefore the risk of a severe new transmissible infection is clearly an important driver for overall national emergency preparedness. The following entry in the 2015 National Risk Register gives an overview of the arrangements for addressing these threats:

#### 2.10

*The Department of Health (DH) and the devolved administrations have contingency plans in place for dealing with emerging infections. SARS and pandemic influenza contingency plans would provide the basis for dealing with any future outbreak of an emerging infectious disease.*

#### 2.11

*The NHS and Public Health England (PHE) have plans in place for dealing with both the emergence of an existing disease, such as the Ebola virus disease (EVD), or a new emerging infection, whether arising abroad or in the UK.*

## 2.12

*PHE provides specialist health protection, epidemiology and microbiology services across England and collaborates with the health protection agencies (providing similar specialised services) in the devolved administrations. PHE is the lead for the UK on the International Health Regulations, and this extends to protecting the UK from international health hazards, most obviously from communicable diseases.*

- PHE also manages surveillance systems to detect such new and emerging international threats. These systems are monitored and alerts provided to DH, the NHS and other government departments as appropriate to the level of risk and concern identified. This reflects PHE's extensive experience in identifying, assessing risk, and leading responses to control outbreaks of infectious disease and environmental hazards. The importance of effective incident management arrangements as well as technical expertise in the control of infections and hazards of concern are critical to maintaining public health safety.
- The requirement for a response capability for emerging infections as well as for radiation, chemical and environmental hazards, needs to encompass the following very different scenarios
  - Threat of a new emerging infection or hazard when we would expect the population of the UK to be affected / at significant risk
  - Threat of epidemics or hazards in other parts of the world that may pose a small risk to the population in the UK but may pose a risk to travelers. This may need a UK response to support affected countries, therefore also potentially posing a risk to humanitarian and UK-government workers.
- Overall, there has been more planning and preparedness for the first scenario, particularly for infectious diseases, than for the second, which is more difficult to predict and to achieve a proportionate response from a myriad of diverse international infectious disease threats.
- It is important to remember that the risk to UK residents from Ebola remained low throughout the recent outbreak, but PHE played a key role in both the domestic and international aspects of the response to the Ebola outbreak in West Africa. It is essential that PHE has the appropriate range, capacity, level and quality of infrastructure to support such rare but potentially major threats to UK and global health. The key assets are the agency's specialist laboratories and databases, systems for the surveillance of developing threats internationally, preparedness and response systems for protecting health locally in the event of importation of an individual with Ebola and critically a seamless national to local link through a national public health system.
- Effective national preparedness is based on the importance of strong international and intergovernmental partnerships, including work with the WHO, to provide support for low income countries which may be disproportionately affected by infectious diseases. There is recognition that the development of capacity and capability of health systems overseas is an important contributor to global health security, and this in turn is part of national preparedness. As a consequence, there has been longstanding support to, and leadership of, international surveillance and disease control programmes from the UK.
- PHE provides trained field epidemiologists from its two year field epidemiology training programme, to support outbreak investigation and containment when required. The programme is based on the Epidemic Intelligence Service (EIS) programme developed by the Centers for Disease Control and Prevention of the United States (US CDC) and the European Centre for Disease Control model European Programme for Intervention Epidemiology Training (EPIET). Further work is underway on the capacity provided by the PHE field epidemiology training programme, which at present trains under 10 young epidemiologists each year as an increase in its intake to a minimum of 25 each year, would ensure a more flexible rapid response capacity within government, and would enhance the possibility of PHE and other UK institutions to work internationally in outbreak situations such as that West Africa.
- A traditional academic strength in the UK is that of biomedical science relating to infectious diseases, with upstream investment from research councils over many years in UK in discovery, science and technology to improve vaccines and other interventions. Innovations in this area increase the options for disease control, but it is increasingly obvious that the links between upstream pre-clinical development work and early stages of clinical development for new interventions needs to be strengthened, particularly for infectious diseases with epidemic potential which occur in low income countries. Further downstream, there has been a considerable commitment to exercising operational preparedness within the overall health system.

- Much of this work has focused on respiratory infections, especially influenza, because this has been agreed as the major risk for the UK population. Other infections with different transmission mechanisms have also been included in the planning and preparation. Considerable work to improve surveillance systems for detection of rare and imported pathogens and on zoonotic disease i.e. infections passed from animals to humans has taken place in recent years. Since the science changes rapidly with new and emerging infections it is critically important to maintain ongoing investment in this area.
- Recent independent assessment of UK surveillance systems in relation to global health security (<https://www.gov.uk/government/publications/global-health-security-agenda-pilot-assessment-of-the-uk>) indicate a well prepared health system. Although the extent of planning and preparation for non-respiratory infections and non-infectious threats to health has been less extensive, this is a reasonable position given the assessment of risk to the UK population.

**2. What lessons were, or should have been, drawn from the Ebola emergency for gathering, assessing, using and communicating scientific advice across Government during this type of emergency?**

- *Key messages:*
  - High quality expert scientific advice came from a number of different sources including PHE, the Department of Health, academic institutions, DfID's Chief Scientific Advisor, Government Office for Science (GO-Science) and others
  - In a major national or international situation, the Chief Medical Officer (CMO), drawing on PHE (as the Government's specialist public health agency) and other sources is responsible for providing expert scientific advice. In the Ebola response she convened an independent expert group to advise her alongside the expert advice from PHE
  - The communication of the scientific rationale for some aspects of the response (such as screening individuals returning to the UK from affected countries) did not persuade all commentators (this is covered in the response to question 5).
- The UK response benefitted from a long history of overall health system awareness and planning (via the tripartite DH, NHS England, PHE emergency planning structure) providing a coordinated response and a strong command and control structure. The bioterrorism response preparedness activities also laid the foundation for dealing with a range of infectious agents in an emergency situation.
- While DfID led on UK's effort in international sphere, it was clear that potential impact of the outbreak domestically would require communication, collaboration and co-ordination across government. DH led on the domestic preparedness of the health system.
- PHE's role was to provide support and expert advice and to deploy its staff in national scientific and response leadership, in supporting local preparation and implementation, in the UK through PHE's local teams and overseas through running laboratories and deploying scientific and medical staff. PHE also supported DH and NHS England by translating scientific and public health advice to provide evidence and appropriate advice to the NHS corporately, to individual professionals and to the public (e.g. advice regarding PPE and response protocols for patients attending Accident and Emergency/ primary care). Again the CMO played a critical role in convening an expert group to finalise advice on some of these specific matters. PHE provided quantitative data to DH and NHS England to assist with surge planning.
- The Ebola SAGE which provides scientific and technical advice to support government decision making during emergencies had its first meeting in mid-October. By this stage the outbreak in West Africa was out of control and it was clear that an international response from many countries would be required to bring it under control. PHE senior officials were in attendance at all SAGE meetings and PHE modellers contributed to work alongside academic institutions forecasting the disease burden. The co-ordination by the Department of Health brought together the key response agencies in health and it was important that advice from government responders, especially the NHS, was embedded in the scientific advisory channels and thus into the advice to government and COBR.
- More than 400 organisations (hospital trusts and stakeholder organisations) were required to be prepared for UK cases of Ebola. In advance of the first Ebola case diagnosed on UK soil, a national preparedness programme was put in place on a large-scale to reduce public concern and reassure staff. This required rapid and thorough preparation and co-ordination of the entire health system, with the operational underpinning to ensure that every

professional and institution involved in the response understood their role and felt confident in dealing with a first case safely and decisively. Planning exercises helped with this and it is very important that preparedness, training and exercising continues in the health sector and between health and other sectors.

- Advice, treatment and PPE (personal protective equipment) protocols were developed quickly on a multi-agency basis in this event and the lessons from this success will need to be embedded. This level of response capability needs to be exercised regularly, and is relevant for avian influenza, MERS, Ebola and other severe transmissible diseases capable of explosive outbreaks.
- PHE provided a clinical diagnostic testing service for the UK, initially from two sites but then rolled out to 4 sites in total. It was crucial to link all testing facilities together to ensure consistency of testing and provide reliable data to the epidemiologists and to the national team leading the response. The ACDP provided advice on the laboratory testing network, and infection control which was supported by a specialist transport service for samples. Further investment in transportation services and review of operational testing arrangements is required to improve ability to improve diagnostic capability for suspect cases of rare infections living in more remote areas.
- PHE also provided ad hoc advice on specific questions in relation to the treatment of individuals in the UK, for example on when it was safe to leave isolation without risk to staff or the public.

### **3. How successful was the Government in communicating advice to the UK public about the emergency?**

- *Key messages:*
  - Whilst lessons can be learned, communications were largely highly effective and agile to the developing situation and public concerns
  - The drawing together of sources of scientific advice into a single coherent message for the public is vital
  - Providing appropriate public reassurance whilst recognising understandable public concern was of great importance. UK communications learned from the US experience of secondary transmissions in Texas and their impact on public confidence.
- With a worsening crisis in West Africa and the deadliest occurrence since its discovery in 1976, Ebola in 2014/15 gave rise to more than 25,000 cases with more than 10,000 people dying. The challenge faced in the UK was to maintain confidence that risk to the UK population from Ebola was very low and the NHS could manage potentially multiple cases, in the context of an international situation.
- Research and evaluation underpinned the overall emergency response campaign with a series of focus groups, testing messages and materials with members of the public and staff.
- These were revised/improved in light of public feedback, with audits demonstrating an approximately 20% reduction in concern over Ebola.
- Messages about the possibility of a case of Ebola infection being brought into the UK, and risks of subsequent transmission were clear and realistic. These included communication on the mode of transmission and the low level of risk from contact with individuals in the early stages of the disease before a diagnosis was likely to be made. The risks were agreed across Government and communicated in a consistent way. These formed part of a strong co-ordinated messages from UK government (including the devolved administrations) combined with proportionate and reassuring commentary helped set a largely supportive and measured media tone.
- In the early stages of the response key messages included reassurance on the very low risk to the UK from the Ebola outbreaks in West Africa. The US experience following a case in Texas with secondary transmission to two further healthcare workers was that excessive previous reassurance led to significant loss of public confidence in the national agencies when transmissions did occur. Therefore the development of UK public messages delivered by CMO in October 2014, drawing on PHE's expert risk assessment that a "handful" of cases should be expected in the UK, were of particular importance in setting a realistic public expectation and a sense of openness and honesty in communications.
- Hence the statements from CMO indicating that a handful of cases were to be expected met the expectations of successful risk communication. In the 3 months before the first case presenting in the UK was diagnosed at the end of December 2014, the weekly average of media coverage was 70% positive. In the week after, 78% was positive,

and the proportion of people considering Ebola a significant or moderate risk significantly decreased during the week from 40% to 28% - the lowest level since polling in October.

- There was a swift agile response to the first case on UK soil, and a flexible response to issues arising for public perception. The response was effective with public and staff alike reassured. In contrast to other approaches which were contentious for overseas governments e.g. Spain and US. The confidence of workforce was maintained - while the US faced nursing strikes in protest against perceived insufficient preparedness for Ebola, our survey of NHS staff found that awareness and knowledge was high (7.5 in 10 staff), and 8.5 in 10 were confident that their local health system would be able to respond quickly and effectively to suspected cases
- Consideration of successful risk communication should be factored into the lessons learnt, as a failure to provide a proportionate risk communication can undermine confidence in preparedness measures, as seen in other countries

#### **4. Since the Ebola emergency, how well has scientific advice been used to inform or revise the Government's planned response to similar emergencies in future?**

- *Key message:*
  - The structured review of the UK Ebola response to identify key lessons and revisions to plans is still in progress but immediate issues have been actioned.
- Many aspects of the Ebola response are still being delivered, both in West Africa and in the UK but potential lessons to be learnt are being reviewed across government and the health sector that are involved in mounting responses to emerging infections.
- Scientific advisory committees such as New Emerging Respiratory Virus Advisory Group (NERVTAG) and the Advisory Committee on Dangerous Pathogens (ACDP) continue to provide advice about a range of potential emerging infections.
- It is important to maintain and build on the strong systems that exist in the UK for detecting and assessing, and responding to potential emerging infectious threats, especially at the human animal interface. How the various advisory committees and other sources of scientific expertise link with SAGE and also what their remits are in response mode needs further consideration. It is necessary to ensure that there is a clear remit for each group, and that all aspects of advice from policy to practical implementation for frontline health care workers and primary care are adequately catered for by the various existing advisory committees.

#### **5. Could the evidence base and sources of scientific advice to Government on emergency mitigation, planning and response be improved? If so, how?**

- *Key message:*
  - Further strengthening the links between disease surveillance and monitoring, risk assessment and response capacity would support future responses to the threat from emerging diseases.
- Infections such as Ebola have a potential for explosive disease clusters and national and international spread, as was seen in 2014/15. Such outbreaks often arise from sporadic cases and it is difficult to predict which infections may cause such outbreaks in future.
- The need to consider the global risk and the UK role in responding to outbreaks abroad, even when they have a low risk for the UK, is being more explicitly considered as part of the lessons from the Ebola outbreak. The ability to deploy PHE/ UK personnel overseas quickly was extremely effective in supporting an overall response, though this required a re-prioritisation of existing work programmes and agile organisational arrangements. These also are being reviewed as part of the lessons from the Ebola outbreak and that greater co-ordination across UK health bodies and the UK government would be helpful.
- In advance of SAGE being convened in early October 2014, the standing surveillance systems, including the links between the UK and WHO (who were tracking the outbreaks in West Africa) informed Government about the outbreak. Scientific advice on the epidemiology and projected number of cases; diagnostics; clinical management and containment; aspects of social science; vaccination etc. largely came via SAGE and from GO-science to COBR.

- There are opportunities to create closer links between disease monitoring, risk assessment and support for response. A UK support and rapid response capability working with low income countries is necessary to reduce the risk of similar episodes occurring again, and to intervene at an earlier stage when such outbreaks or incidents do occur.
- There is also an opportunity to link the responses in low income countries to the development of early phase clinical interventions. This needs a local infrastructure that is capable of assessing interventions in field settings. This will help drive future international development of and investment in such interventions.
- The role of scientific advice to government is to inform decisions made by ministers and senior officials. PHE's role is to provide advice within the specific context of an emergency response. Inevitably there are situations and issues on which scientists disagree and thus scientific advice can vary. In these circumstances bringing together experts to review the range of scientific advice and translate it into practical decisions is particularly important. CMO undertook this on several occasions during the Ebola crisis and this was an important part of ensuring scientific advice underpinned various aspects of the response.
- To some commentators, the decision to implement screening on entry to the UK for travellers from affected countries during the Ebola response was controversial. In reality PHE established a mechanism to ensure that individuals returning from West Africa had the right information to ensure that the time from symptom onset to being in isolation and testing was as short as possible. This addressed the risk highlighted by the Texas experience where an individual's diagnosis took several days and secondary transmission took place as a result. It was put in place alongside the returning workers scheme established by PHE to advise people travelling to West Africa before leaving the UK and to actively monitor them on their return.
- Since this was labelled "screening" it provided public reassurance but stimulated a scientific debate about the expectation that "screening" would prevent infected asymptomatic individuals entering the UK – which we knew it was unlikely to do. There are lessons to learn about communication to the scientific community alongside communication to the public so that all are clear on the purpose of such an intervention and its scientific basis.
- It is important that outside the emergency situation, there is further work on the key factors that need to be considered in making decisions based on the scientific advice, including clinical and cost effectiveness and public information and confidence.
- A cross Government Ebola response exercise took place in early October 2014 – this was designed to identify areas for further work in the planning process and scientific knowledge. These included PPE, surge arrangements in the NHS in the event of more cases than could be cared for at the Royal Free Hospital, briefing and communications and the legal aspects of isolation of individuals at risk of infection. Work streams to address these issues were set-up with multi-sector involvement.

**6. What are the strengths and weaknesses in the system for weighting the risk of a future Ebola-type emergency, including the possible scale of impacts for the UK and their likelihood?**

- Strengths within the UK are
  - The National Risk Assessment (NRA), which a classified assessment of the risks of civil emergencies facing the UK over the next five years. The National Risk Register of Civil Emergencies (NRR) is the unclassified version of the NRA. This is a systematic framework for assessing threats
  - Strength in overall operational response to emergencies, with PHE providing a seamless "national to local" organisation, with expert scientific and medical advice available to local PHE teams throughout the UK, to the NHS, DH, local government and others on a range of issues impacting front line care
  - Ability to introduce a "command and control" structure when required and to establish comprehensive incident management arrangements
  - Ability to respond in a coordinated manner
  - Good system to create and maintain public trust
  - Long term investment programme into influenza, seasonal and pandemic
  - Robust systems in place for detecting and assessing potential infectious disease and other threats, especially at the human animal interface
  - Cross Government groups considering an 'all-hazards' approach to detecting threats to the UK and internationally

- Implementation of several recommendations from the Hine Report have further strengthened the ability to respond to respiratory emerging infections
- The tradition of exercising across government and across the health system for key risks is valuable. Use of scientific advice and evidence to inform scenarios, which are then used to prepare exercises is crucial.
- Areas for Improvement
  - Investment in overseas capacity building in resource poor settings. A proposal for a rapid international response force between PHE and relevant academic and other institutions is being developed to support this, which will require support through the comprehensive spending review
  - Risk assessment of infectious diseases overseas with their pandemic potential, and of radiation, chemical and environmental hazards with their potential international impact
  - Linking a risk assessment of situations overseas with risk management for scalable operational response both internationally and domestically
  - Long-term maintenance of a scalable operational response for non-respiratory infections of different transmissions
  - The need for investment in discovery research for diseases with pandemic potential which occur primarily in tropical or subtropical regions and resource poor countries
  - The need for investment in technologies to support rapid intervention responses e.g. Monoclonal antibody therapy or rapid screening of drug compound libraries
  - Development of, and investment in global clinical networks.

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