Working at Colindale, national and international projects, organisation.

Pam Saunders

Public Health England

- Public Health England (PHE) is an executive agency of the Department of Health that began operating on 1st April 2013.
- PHE was formed as a result of reorganisation of the National Health service (NHS) in England as outlined in the Health and Social Care Act 2012.
- It took on the role of the Health Protection Agency, the National Treatment Agency for Substance Misuse and a number of other health bodies.

PHE's mission is "to protect and improve the nation’s health and to address inequalities".

Public Health England

The Role of PHE

- To protect the country from threats to health, including outbreaks of infectious diseases and environmental hazards, in the UK and abroad
- To improve the public's health and wellbeing and reduce health inequalities
- To improves population health through sustainable health and care services
- To build capacity and capability of the public health system

Public Health England

To deliver a broad range of products and services PHE employ 5,522 staff, (full-time equivalent), who are mostly scientists, researchers and public health professionals

- 2272 -Protection from infectious diseases
- 486 – Protection from environmental hazards and emergency preparedness
- 1010 – local centres and regions
- 319 – National disease registration
- 273 – screening programmes
- 10 – nursing
- 202 – Health and wellbeing strategy
- 65 Health marketing
- 37 global Health

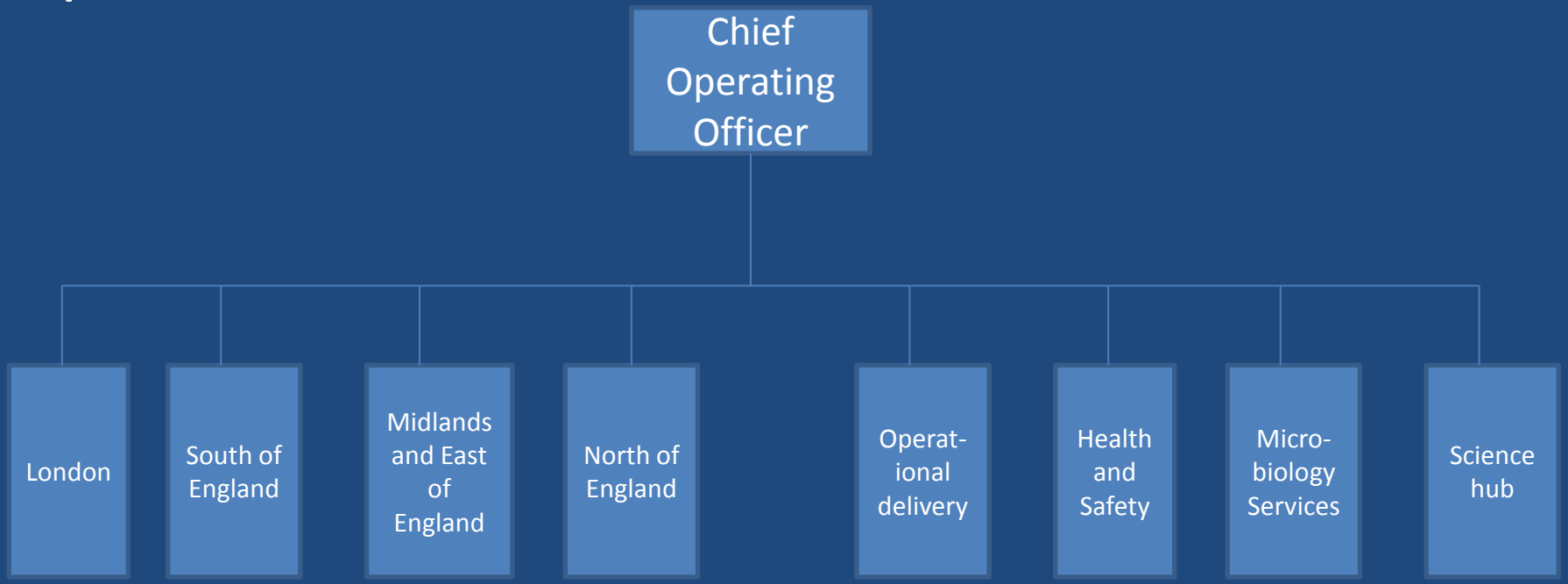
Public Health England

Structure

- Health Protection
- Health Improvement
- Knowledge and intelligence
- Operations

Public Health England

Operation Directorate



PHE operates through nine centres in four regions (North, South Midlands and East and London). PHE has eight regional public health laboratories (PHL) based in large NHS laboratories

- PHE West Midlands
- PHE North East (PHL)
- PHE North West (PHL)
- PHE South East (PHL)
- PHE London (PHL)
- PHE Yorkshire and Humber (PHL)
- PHE South West (PHL)
- PHE East Midlands (PHL)

Public England

PHE Harlow
PHE national centre, bringing together work of PHE Colindale and PHE Porton, from 2019 onwards

PHE Colindale
includes infectious disease surveillance and control, reference microbiology, other specialist services such as sequencing and high containment microbiology, plus food, water and environmental services

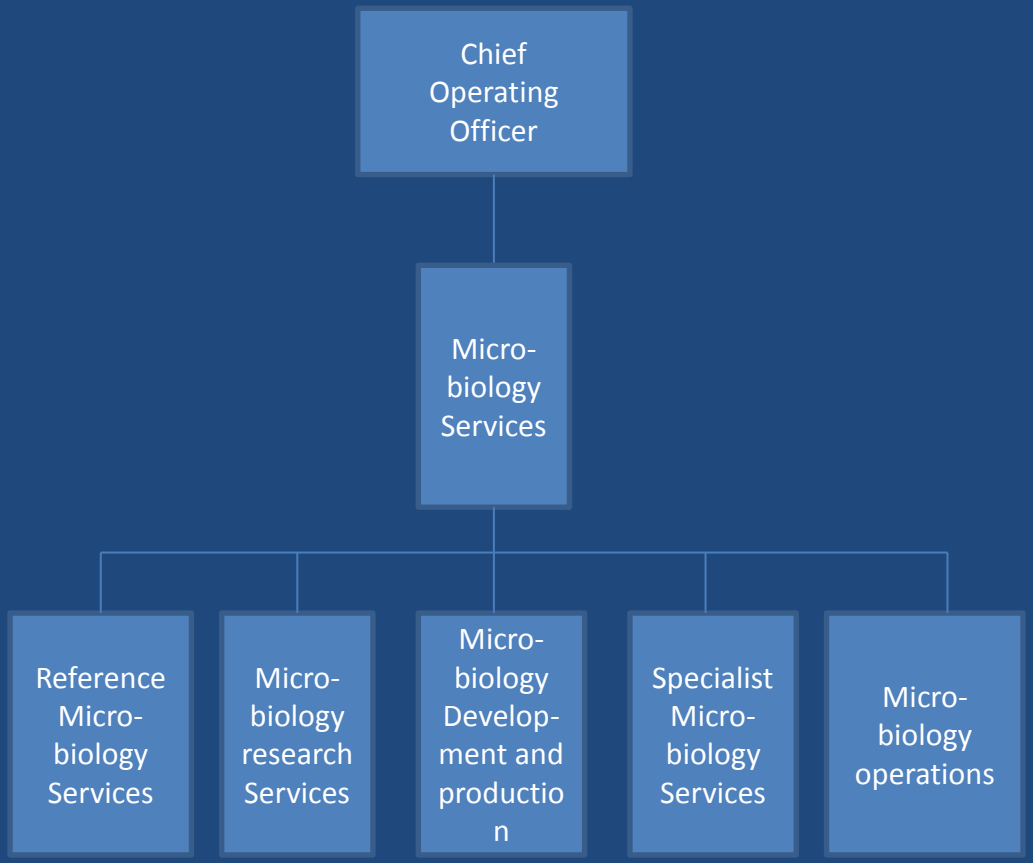
PHE Chilton
includes the headquarters of the Centre for Radiation, Chemical and Environmental Hazards (CRCE). CRCE operates from 11 locations over England, Scotland and Wales

PHE Porton
includes departments for rare and imported pathogens, research, PHE Culture Collections and emergency response, plus food, water and environmental services

We operate through nine centres in four regions:
North, South, Midlands and East, and London
Our staff work from 74 locations

PHE has eight regional public health laboratories
based in large NHS hospitals

Microbiology Services

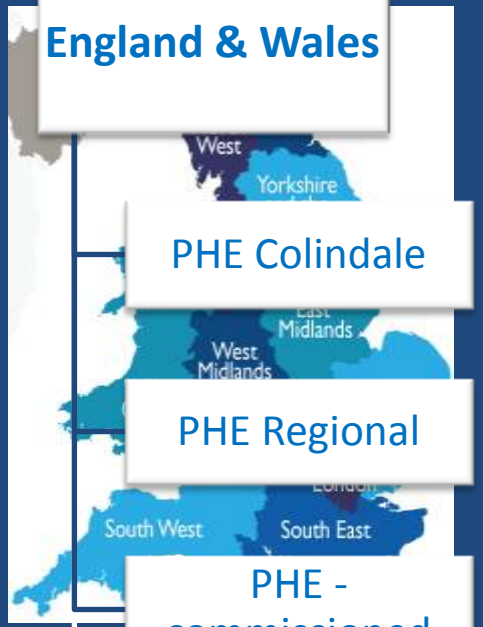


Overview of Reference Laboratory Provision in UK

UK

Northern Ireland

England & Wales



PHE Colindale

PHE Regional

PHE - commissioned

Non-PHE (Wales and others

Scotland

UK single member state at WHO and EU

Role of Reference Laboratories

Get it right: Complex Diagnostics

Spotting Trends: Custodian of Databases & Collections

Leadership: Organism Specific expertise

IHR: International Relations

Advice: Scientific, Risk Assessment & Policy

Surveillance: Coordination & design national surveillance

Quality Assurance & Reference Materials

NEW DIFFICULT DANGEROUS

National Reference Functions

Bacteriology Reference Department

Virus Reference Department

External Reference Units

External Reference Units

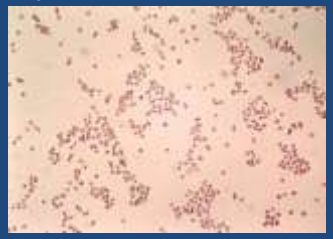
Public Health England

Malaria
(LSHTM)

Mycobacterium
(Whitechapel)

Mycology
(Bristol)

Meningococcal
(Manchester)



Leptospirosis
(Hereford)

Structure of PHE Colindale Reference Departments

BACTERIOLOGY REFERENCE DEPARTMENT

REFERENCE UNITS

- ANTIMICROBIAL RESISTANCE AND HEALTHCARE ASSOCIATED INFECTION
- GASTROINTESTINAL BACTERIA REFERENCE UNIT
- RESPIRATORY AND VACCINE PREVENTABLE BACTERIA REFERENCE UNIT
- SEXUAL TRANSMITTED BACTERIA REFERENCE UNIT

TECHNICAL MANAGEMENT & ADMIN

- SPECIMEN RECEPTION
- INFORMATION ANALYSIS
- SAFETY
- TRAINING
- QUALITY
- ADMINISTRATION
- OPERATIONS

Structure of PHE Colindale Reference Departments

VIRUS REFERENCE DEPARTMENT

REFERENCE UNITS

- BLOOD BORNE VIRUSES
- IMMUNISATION & DIAGNOSIS
- RESPIRATORY VIRUSES
- ENTERIC VIRUSES
- HUMAN PAPILLOMAVIRUS & SURVEILLANCE
- ANTI VIRAL
- SEROLOGICAL DEVELOPMENT
- SEROMOLECULAR SERVICES

- RABIES CLINICAL SERVICE

TECHNICAL MANAGEMENT & ADMIN

- SPECIMEN RECEPTION
- INFORMATION ANALYSIS
- SAFETY
- TRAINING
- QUALITY
- ADMINISTRATION
- OPERATIONS

Public Health England

NHS National Institute for Health Research

HPRUs

Universities
Public Health Programmes

RVPBRU

Respiratory

→ Imperial College London

→ University of Oxford

Flu/TB

GBRU

Gastrointestinal

→ University of Liverpool

Food Safety

AMRHAI

HCAI

→ University of Oxford

→ Imperial College London

AM Resistance

STBRU

Sexual Health

→ UCL

STDs

Stakeholders

International

World Health Organization

ecdc

Bill & Melinda Gates foundation

National

NHS

NHS Blood and Transplant

NHS National Institute for Health Research

Medicines and Healthcare Products Regulatory Agency

NIBSC

HSE

Department of Health

Health Protection Scotland

GIG CYMRU NHS WALES | Iechyd Cyhoeddus Cymru Public Health Wales

HSC Health and Social Care in Northern Ireland

Food Standards Agency

Responses & Threats in 2014/15

- Pandemic Influenza: H7N9
- Seasonal Influenza:
  - H3N2 vaccine mismatch
- Ebola: Contingency and positive case support
- EV68
- Hepatitis E
- MERS CoV
- Mycobacterium Chimaera

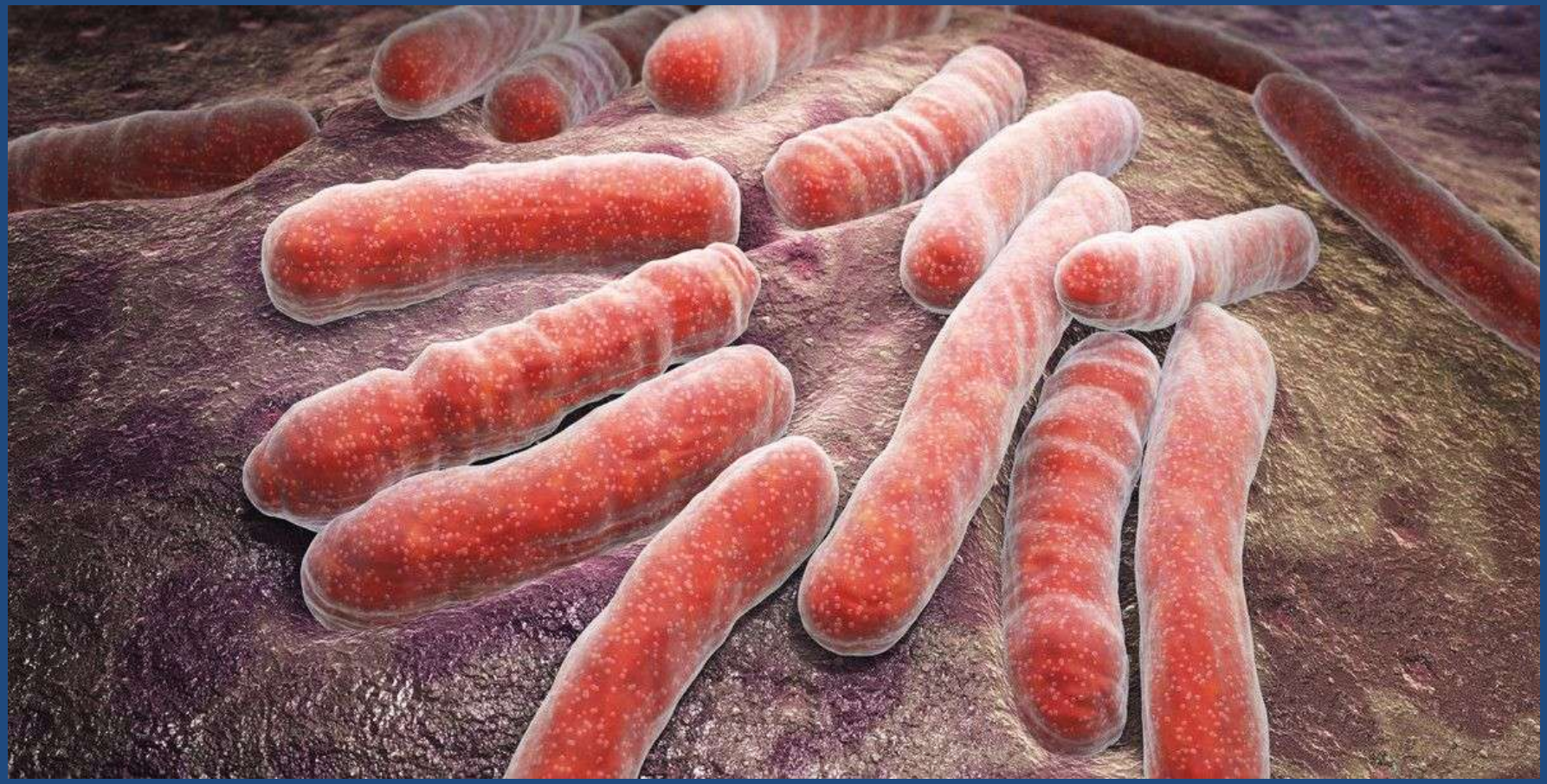
Public Health England

2014 Health Protection Overall Priorities

- Influenza Preparedness (Top Civilian threat)
- Antimicrobial Resistance / AV drug resistance
- TB
- Emerging Infections (eg polio)
- Support for New Vaccine Programmes
- Emergency response capabilities

Global team aim for faster, more effective TB diagnosis

World TB lab (24 March) marked global efforts to eliminate tuberculosis as a public health problem by 2035, Oxford University researchers, in partnership with Public Health England (PHE), will lead a new worldwide collaboration called *CRyPTIC* to speed up diagnosis of the disease.



The genomics of tuberculosis

- Tuberculosis (TB) is a vital public health problem facing England. Rates have stabilised over the past seven years, but the incidence of TB in England remains high compared to most other Western European countries.

Currently

- The main tool for examining the relatedness of cases is strain typing.
- Contact tracing from information volunteered by the patient is insufficient to find all linked cases

TB Genomics

Future

- Recently published work on the investigation of TB clusters in Canada and England has shown that whole genome sequencing offers superior discrimination to the current 24 locus MIRU-VNTR method
- The genome sequence provides information to identify the mycobacterial species and gives a prediction of the phenotypic drug resistance as well as comparing with known strains to determine their relatedness

TB Genomics

- In December 2012 the Prime Minister announced that the UK would sequence 100,000 human genomes to develop capacity and capability in genetic science.
- PHE has been asked by the Department of Health to lead developments in pathogen sequencing to link into the work on human genomes.
- PHE has decided that a pilot to use the sequencing of TB in real time should be part of this work.

Genomics

- We are now moving into an exciting phase of the work with a PHE led pilot, based initially in Birmingham. The pilot will sequence all cultured isolates of mycobacteria as rapidly as possible, in parallel with the existing reference service for identification, drug resistance testing and strain typing.

PHE Harlow

- September 2015 the Chancellor announced that PHE's laboratories at Porton would move to Harlow
- 25 November 2015 the Government announced their decision to move their science facilities from Colindale to Harlow in Essex
- Bringing together all the public health laboratories onto a single integrated campus.

PHE Harlow

- The Hub will create a centre of excellence for research, health improvement and protection and bring together world-renowned scientists
- The new integrated hub, which will include PHE's headquarters
- It will be fully operational by 2024 with the first facilities opening in 2019

PHE Response to EBOLA

This news article was published under the 2010 to 2015 Conservative and Liberal Democrat coalition government (published 8th August 2015)

WHO has declared Ebola a Public Health Emergency of International Concern.

Public Health England (PHE) has reaffirmed its commitment to supporting global efforts to arrest the outbreak of Ebola in West Africa following today's World Health Organization (WHO) announcement.

The WHO Emergency Committee announced today (8 August 2014) that the ongoing Ebola outbreak in West Africa has met the conditions for a Public Health Emergency of International Concern.

WHO has made several recommendations for affected countries, which centre around them declaring a national emergency, activating national disaster and emergency management mechanisms, ensuring the provision of quality clinical care and improving the safety and protection that health care workers receive.

They also recommend that the affected countries should conduct exit screening for unexplained illness consistent with potential Ebola infection and that Ebola cases or contacts should not undertake international travel, unless the travel is part of an appropriate medical evacuation. For unaffected states the WHO confirmed there should be no general ban on international travel or trade.

For people in the UK, there is no change in the current risk assessment which remains very low. No cases of imported Ebola have ever been reported in the UK and the risk of any traveller to West Africa contracting Ebola is very low without direct contact with the blood or body fluids of an infected person.

PHE will continue to work with government colleagues, the WHO and a wide range of partners including UNICEF, Médecins Sans Frontières (MSF), to provide support to the affected countries. This includes deployment of 10 PHE staff to support international efforts and offer support on the ground in West Africa.

Within the UK, PHE has informed medical practitioners about the situation in West Africa and requested they remain vigilant for unexplained illness in those who have visited the affected area, and actions to take in the event of a possible case.

Dr Brian McCloskey, director of global health at PHE, said:

The measures recommended by WHO are needed to ensure everything that can be done to control the outbreak, is being done. We will continue to support global efforts to arrest the impact of Ebola in West Africa, including deploying Public Health England staff to the affected areas to provide strategic and public health support.

As we have seen with Middle Eastern Respiratory Syndrome, we have robust mechanisms in place for detecting and responding to any usual infections within the UK, but ultimately the best possible defence will be ensuring the outbreak in West Africa is brought under control.

Though it is possible a case could be identified in the UK in a person returning from an affected country, this is unlikely. Even if a case were identified, there is minimal risk of it spreading across the general population as UK hospitals are well prepared to handle infectious diseases. Ebola causes far more harm in countries with less developed healthcare facilities and public health capacity.

Ebola is a form of viral haemorrhagic fever and currently more than 1,500 cases have been reported in Guinea, Liberia and Sierra Leone, of which there have been more than 900 deaths. This is the first documented Ebola outbreak in West Africa, and it is the largest ever known outbreak of this disease.

Timeline of events:

February 2014 - outbreak of a haemorrhagic illness in south-east Guinea

March 2014 - outbreak of Ebola confirmed in south-east Guinea

Later that month, tests confirm Ebola has spread into Liberia

May 2014 - Sierra Leone confirms Ebola has spread to the Kailahun district, east of the country

June 2014 - MSF declares the Ebola outbreak is out of control

July 2014 - first case of Ebola confirmed in Nigeria

July to August 2014 - 2 cases diagnosed in American healthcare workers in Liberia, both have been evacuated to the US for treatment

Timeline of events:

- February 2014 - outbreak of a haemorrhagic illness in south-east Guinea
- March 2014 - outbreak of Ebola confirmed in south-east Guinea

Later that month, tests confirm Ebola has spread into Liberia

- May 2014 - Sierra Leone confirms Ebola has spread to the Kailahun district, east of the country
- June 2014 - MSF declares the Ebola outbreak is out of control
- July 2014 - first case of Ebola confirmed in Nigeria
- July to August 2014 - 2 cases diagnosed in American healthcare workers in Liberia, both have been evacuated to the US for treatment

Preparedness for UK cases

GOV.UK

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News story

National Ebola exercise concludes

From: Department of Health
First published: 11 October 2014
Part of: Ebola virus: UK government response

This news article was published under the 2010 to 2015 Conservative and Liberal Democrat coalition government

National exercise to test preparedness for Ebola in the UK as part of contingency planning concludes.

Ministers, government departments and dozens of expert medical professionals from ambulance services, hospitals and Public Health England have participated in a national exercise today to test preparedness for an Ebola case in the UK.

The Prime Minister ordered the exercise as part of the UK's ongoing contingency planning to ensure the public is protected.

There will be a handful of cases in the UK" UK CMO

Enhance capacity for testing

Problems with sample delivery
Out of hours requirement
1. Centralised courier?
2. Derogated BSL3s?

Edinburgh – Trombley assay
Newcastle – BioFire
Bart's & the London - BioFire

Strategic decisions about detection

ACDP 4 – limited number of high containment labs
Primary detection – RIPL, PHE Porton Down
Serial monitoring – VRD, PHE Colindale

PHE Colindale – Ebola response

PHE Colindale's role in the response to Ebola

- Late September 2014 PHE Colindale was instructed by the Department of Health to be operationally ready to receive and test samples for Ebola by end of October 2014:
  - Low risk clinical samples
  - Known positive samples e.g. Patient's positive for EBOV undergoing treatment at Royal Free Hospital

How was this achieved

- Acquisition of PCR protocols from RIPL for Pan Ebola and Zaire Ebola
- 2 Clinical Scientist from Colindale received training in these protocol at Porton
- Protocols implemented and validated at Colindale
- Risk Assessments and SOPs written
- Training of further staff to perform assays

Challenges

- Staffing
  - Deployment of PHE Colindale staff to Sierra Leone
  - Deployment of staff to MS cell
  - Difficulty recruiting locum staff with the correct skills to cover the work of the staff deployed to SL
- Increase Workload
  - Flu
  - Enteric viruses

Testing

- 29th December – Pauline Cafferkey confirmed positive for EBOV

- 31st December - Colindale commence daily testing of blood and other samples

Testing

- Courier of samples daily from Royal Free to Colindale
- Samples received into Containment level 4 lab at Colindale
- Inactivation of the EBOV performed at CAT 4 to allow downstream testing in CAT2
- Pan Ebola and Zaire Ebola PCRs performed
- Results analysed and reported to Consultant Virologist
- Results reported to Royal Free Medical Team

Enhance Ebola lab work at PHE

Colindale – serial PCRs for UK patients
- 24/7 service

Not just blood – multiple sample types tested

Quantitation Assay development – serology

Support for studies e.g. convalescent plasma

Rapid WGS virus sequencing

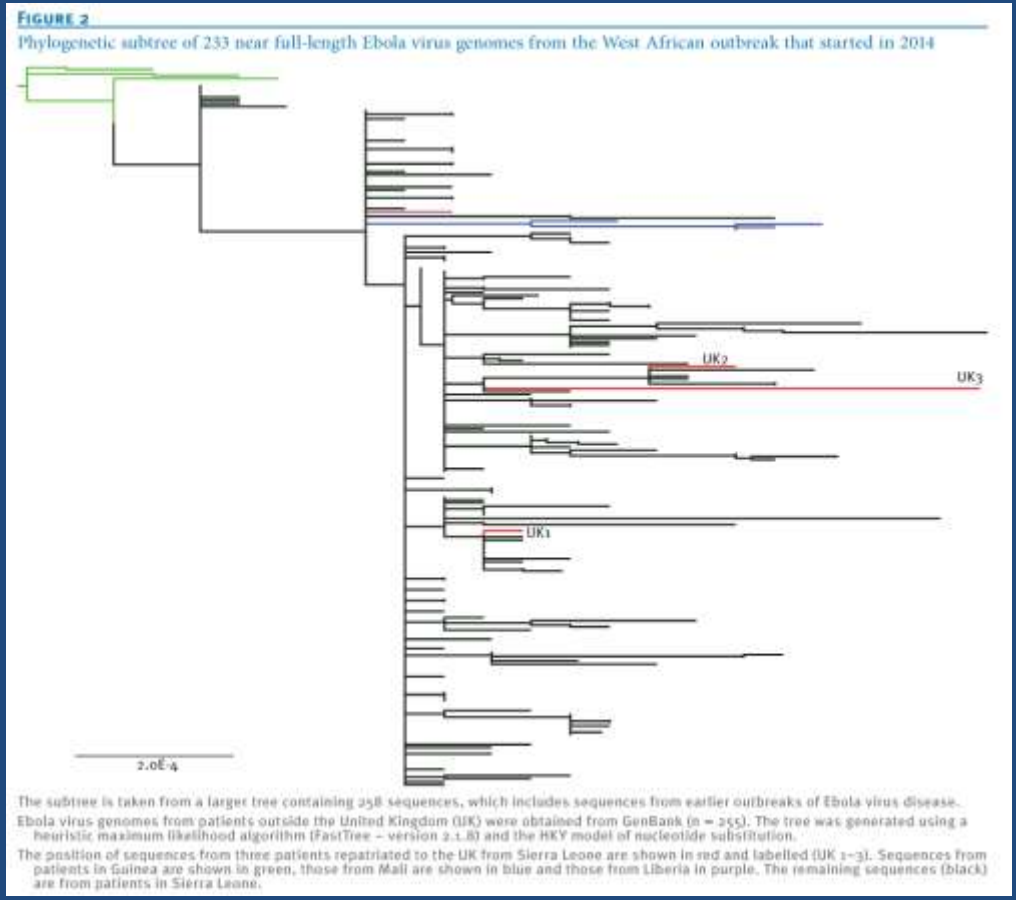

FIGURE 2

Phylogenetic subtree of 233 near full-length Ebola virus genomes from the West African outbreak that started in 2014

The subtree is taken from a larger tree containing 258 sequences, which includes sequences from earlier outbreaks of Ebola virus disease. Ebola virus genomes from patients outside the United Kingdom (UK) were obtained from GenBank (n = 255). The tree was generated using a heuristic maximum likelihood algorithm (FastTree – version 2.1.8) and the HKY model of nucleotide substitution. The position of sequences from three patients repatriated to the UK from Sierra Leone are shown in red and labelled (UK 1–3). Sequences from patients in Guinea are shown in green, those from Mali are shown in blue and those from Liberia in purple. The remaining sequences (black) are from patients in Sierra Leone.

Eurosurveillance, Volume 20, Issue 20, 21 May 2015

Rapid communications

GENOME SEQUENCE ANALYSIS OF EBOLA VIRUS IN CLINICAL SAMPLES FROM THREE BRITISH HEALTHCARE WORKERS, AUGUST 2014 TO MARCH 2015

A Bell[1,2], K Lewandowski (kuiama.lewandowski@phe.gov.uk)[1,2], R Myers[3], D Wooldridge[3], E Aarons[1], A Simpson[1], R Vipond[1,4], M Jacobs[5], S Gharbia[3,4], M Zambon[3]

The West African Ebola Epidemic

Unprecedented

- **Scale:** 28,634 cases; 11,314 deaths
- **Duration:** >18 months
- **Impact:** >£1 billion (core three countries)
- **Global health threat:** 14 countries

A paradigm shift in Ebola landscape

Unchartered territory

PHE lab activities in West Africa

Three PHE clinical diagnostic labs in Sierra Leone

- Support for other labs elsewhere e.g. EMLab Guinea
- 461 Lab Staff - PHE, academia, DSTL, NHS
- 37,000 samples (7% EBOV +VE)
- **Issues: logistics; human resources; training; turnover**

Other PHE activities – West Africa

Supporting DfID and WHO

Technical advice

Case management advice

Contact tracing, field epidemiology

Laboratory staff training

Research

- 27 studies!
  e.g. Cepheid; ReEBOV; TKM; seq
- How much can be taken on?
- How to prioritise and manage? Diagnostics: beyond Ebola PCR and malaria

Ebola: Important questions for UK PH

The past (present)

- Did we respond quickly enough?
- Did we respond in the right way?
- Did we contribute effectively?

The future

- What are our (HMG's?) priorities, at home and abroad?
- What should our role be in global outbreak response?
- How do we maintain normal activities and response effectively?
- How do we coordinate preparedness and response activities across UK?
- What to we want to achieve – should we set priorities now?

Late recrudescence in a UK survivor

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Ebola nurse Pauline Cafferkey in 'serious' condition

9 October 2015 Last updated at 18:46 BST

Pauline Cafferkey, the British nurse who contracted Ebola in Sierra Leone, is said to be in a "serious condition" after being readmitted to hospital.

Doctors say it is because of an "unusual late complication".

Collaborative effort

- Assessed in Scotland
- CSF tested at Porton
- Transferred to Royal Free
- Serial testing at Colindale
- Rapid sequencing

Lessons

Follow-up of UK survivors?

Risk assessments for clinical procedures and diagnostics

Future Plans : Overseas support

- Formation of Rapid Response Teams
- PHE & University partners
- Multidisciplinary
- Extension of Global Health Security Strategy
- Under discussion
- UK Treasury support
- Sierra Leone legacy

R&D Development support

- Sierra Leone Biobank
- Work with NIBSC developing Ebola global NAAT standards
- Serological work
- Sequencing protocols
- Clearer goals for development work

Coordination by PHE

- NICC
- Local System Preparedness
- Screening
- Returning workers
- Internal Operational delivery
- Procurement
- Ebola HR support
- Epidemiology and intelligent
- International support and deployment
- Media and public relations
- Internal and system communications
- Governance & Risk, including H&S
- Microbiology Services
- Diagnostics & in-country laboratories
- Guidance

Significant staffing – volunteers from across UK

Acknowledgments

- Professor Maria Zambon

References

- Public Health England Strategic Plan
- Collaborative Tuberculosis Strategy for England 2015 to 2020