



Department  
of Health

DB 16\_23

# Departmental Board: Risk Deep Dive

Major Infectious Diseases

28 September 2016

OFFICIAL - SENSITIVE

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## High Level Risk Register Deep Dive

In keeping with the departmental risk guidance, each quarter a risk from the Departmental High Level Risk Register is to be selected for a more in depth discussion at the Departmental Board. The aim of the discussion is for the Board to consider in more detail the mitigations for a particular risk which might not otherwise be discussed. This quarter the risk of an outbreak of a major infectious disease has been selected for the first of these risk deep dives. This risk is similar to one of the two risks the department holds on the cross government risk register.

### ***Risk Deep Dive Item***

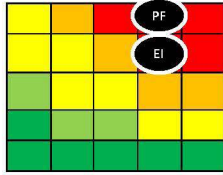
The Deep Dive discussion will include:

- An introduction to the risk, mitigation and background led by the supporting Director; and
- Will be followed by a Board discussion focusing on the key questions outlined - set out in the slide 10 (see the last slide).

The key question for the DB is how much money, time and effort do we want to invest in our insurance against these risks?

- The NRA sets out a very severe reasonable worst case scenario for pandemic flu. This drives substantial expenditure on countermeasures and extensive preparedness activity. Is our level of preparedness proportionate given the relative risk or should we scale back to a lower level, as adopted by other countries?
- In the event of a major disease outbreak the DH EPHPP Directorate would very rapidly be overwhelmed. Should we do more to raise awareness of the risk and to plan for immediate mobilisation of a large number of staff (up to 40 or more) to support a major and sustained response or are existing arrangements sufficient?
- The lack of a national forum to support and oversee planning and response in the social care sector poses challenges. Is there more that can be done to provide direction and strengthen co-ordination across the sector and with the NHS?

## The risks of a pandemic or emerging infectious disease outbreak are among the top risks on the Government’s National Risk Register



Group	Risk Owner	Date risk identified	Date last reviewed	Risk Category
DH Level	DG Global & Public Health	NA	September 2016	Strategic
<b>Risk Description: Failure to respond and mobilise adequately, as Lead Govt Department, to a major national infectious disease outbreak such as pandemic flu or other novel or emerging infection, and to maintain and sustain capacity and capability in both short and long term</b>				

Inherent/Current Risk	Previous Inherent Risk	Residual Risk RAG (after further actions)	Previous Residual RAG	Trend	Target Risk
Likelihood 3 Impact: 5 R	n/a	Likelihood 2 Impact: 4 A	n/a	→	Likelihood 2 Impact: 3 A



### Vector-borne

Eg Zika, malaria, Crimean Congo Haemorrhagic Fever

#### Likelihood of major outbreak

**Low.** Endemic / recurrent disease overseas. Possibility of sporadic travel-related cases and some risk of limited secondary infection eg via sexual transmission but vector cannot establish in UK climate.

#### Impact

Varies according to disease. Eg Zika mild / asymptomatic in population but risk of microcephaly in unborn child. CCHF: mortality rate of ca 70% (though lower with western healthcare) with particular risk to HCWs



### Respiratory

Eg Pandemic flu, MERS

#### Likelihood of major outbreak

**High.** 4 flu pandemics in the last century. Respiratory diseases spread easily. Containment impossible once community circulation established.

#### Impact

A severe flu pandemic could result in up to 50% of the population developing symptoms, 300k – 1.2m people requiring hospitalisation and up to 750,000 deaths. Significant absenteeism reaching 20% for 2-3 weeks at peak.



### Contact

Eg Ebola, Lassa fever

#### Likelihood of major outbreak

**Very low** Vectors and conditions not present in UK for endemic / recurrent disease but if travel-related cases not identified and controlled, potential for spread of disease.

#### Impact

Transmission of disease through contact with blood and bodily fluids and typically difficult in early stages. Highest risk when patient seriously ill so healthcare workers and mortuary staff most at risk in the UK context.



### Food-borne

Eg Ecoli 104

#### Likelihood of major outbreak

**High.** However, most foodborne disease (eg Ecoli 157) is generally mild and self-limiting, other than for vulnerable individuals.

#### Impact

Potentially substantial. The source of outbreaks can be difficult to trace. The rare Ecoli104 outbreak in Germany and France in 2011 caused 4000 cases and 50 deaths, mostly due to renal failure.



### Blood-borne and sexually transmitted

Eg HIV

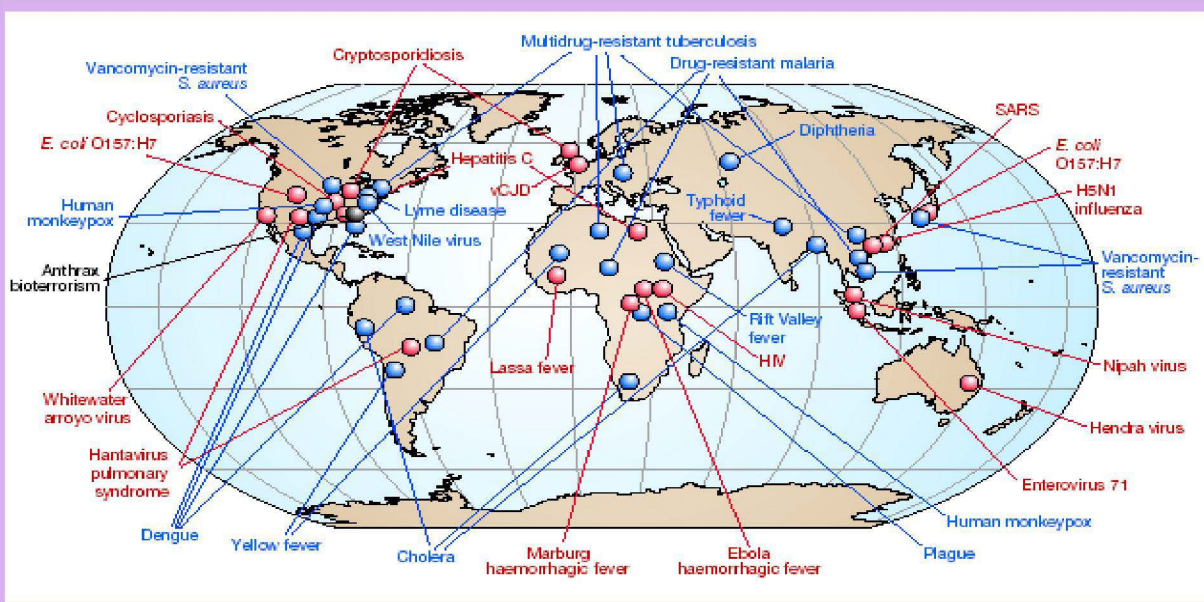
#### Likelihood of major outbreak

**Low** HIV is established in UK and numbers of cases stable.

#### Impact

Transmission prevented by infection prevention and control, practising safe sex / screening blood donations. Antiretroviral treatments available – although concern about AMR.

Since 1980, more than 35 new infectious diseases have emerged in humans. 75% of emerging diseases are zoonotic in origin

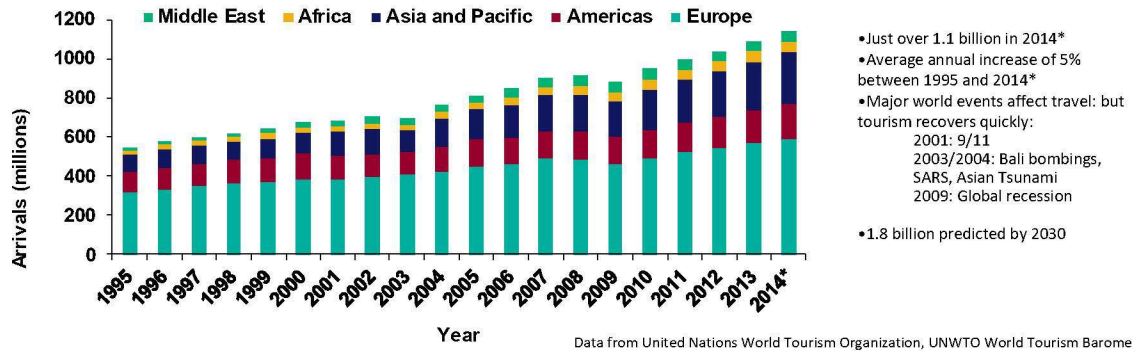


**Figure 1** Global examples of emerging and re-emerging infectious diseases, some of which are discussed in the main text. Red represents newly emerging diseases; blue, re-emerging/resurging diseases; black, a 'deliberately emerging' disease. Adapted, with permission, from ref. 23.

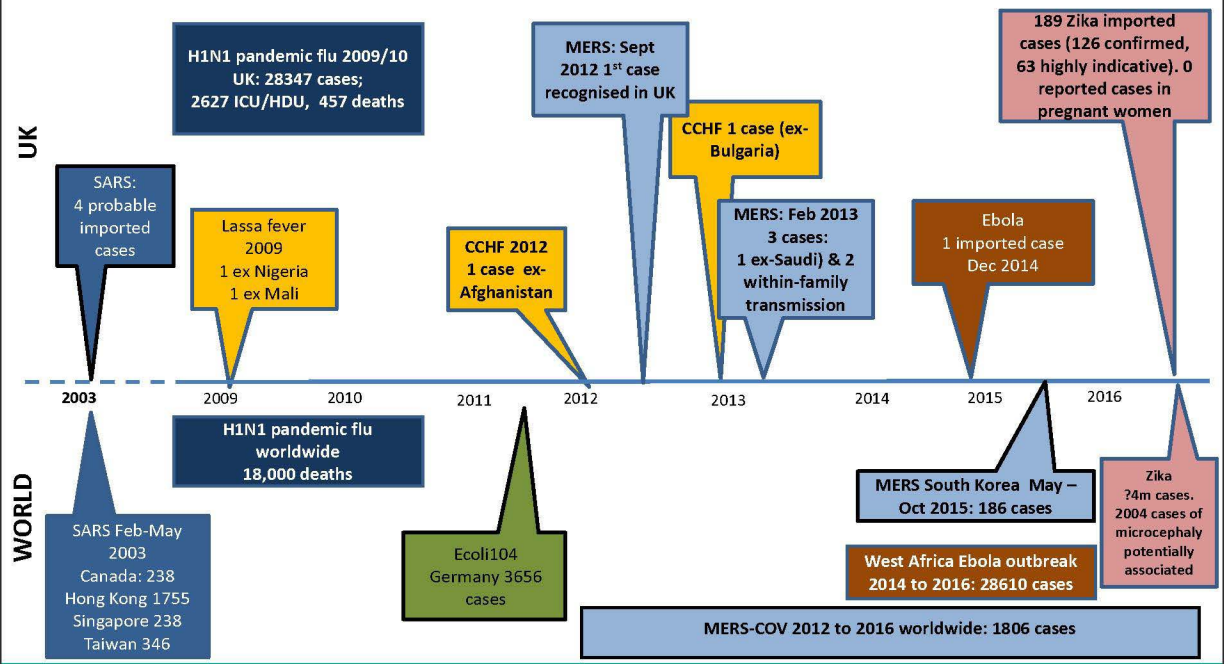
## Factors driving emergence of disease

- **Ecological & climate change** – spread of conditions favourable to vectors eg CCHF
- **Human demographics and behaviour** - rural to urban migration, sexual behaviour, IV drug use eg HIV
- **Human behaviour** – availability of animal protein, bushmeat eg Ebola
- **International travel and commerce** – eg Chikungunya, Zika,
- **Technology, industry, healthcare:** Globalisation of food supplies; changes in food processing and packaging; organ/tissue transplantation; xenotransplantation & tourism; immunosuppressive drugs; widespread use of antibiotics eg EColi104
- **Microbial adaptation and change:** response to selection in environment, antigenic shift/drift in influenza, antibiotic resistant bacteria
- **Breakdown in public health measures:** Curtailment or reduction in preventative or vector control programmes; inadequate sanitation; lack of oversight/regulation eg Resurgent TB and diphtheria, waterborne outbreaks of cryptosporidium, Monkeypox USA 2003

### International tourist arrivals by region of destination



Since 2003 there has been one pandemic and recurrent importations of emerging infections. In the UK these have had almost no onward transmission.



## Left undetected or poorly managed, some emerging diseases can have a massive impact

SCIENCE VISUALIZED

**Male, 35 years old  
May 27-29**  
A man who shared a hospital room with the first patient in the South Korean MERS outbreak infected the most people. On May 27, he went to Samsung Medical Center in Seoul, where he had to wait in the emergency room for a bed to become available. Over the next two and a half days, more than 80 people who had passed through the ER contracted the virus.

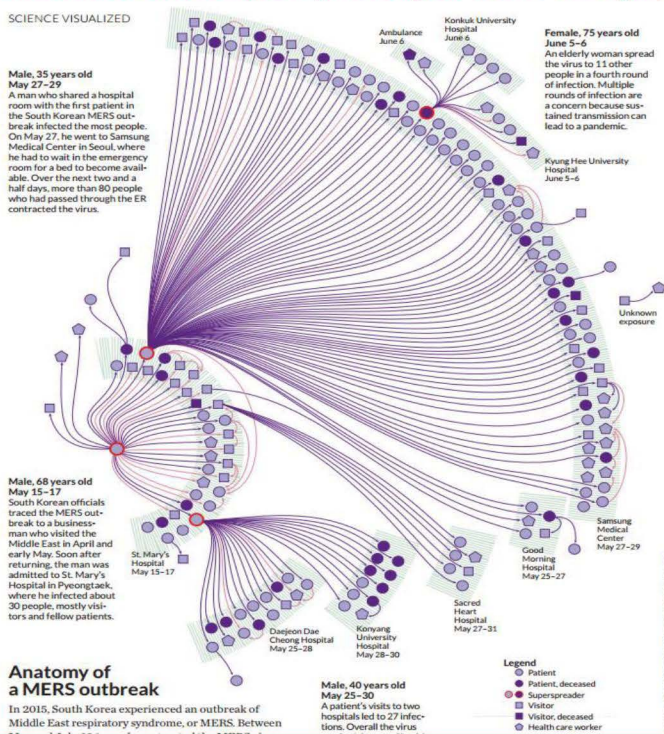
**Male, 68 years old  
May 15-17**  
South Korean officials traced the MERS outbreak to a businessman who visited the Middle East in April and early May. Soon after returning, the man was admitted to St. Mary's Hospital in Pyeongtaek, where he infected about 30 people, mostly visitors and fellow patients.

### Anatomy of a MERS outbreak

In 2015, South Korea experienced an outbreak of Middle East respiratory syndrome, or MERS. Between

**Male, 40 years old  
May 25-30**  
A patient's visits to two hospitals led to 27 infections. Overall the virus

**Female, 75 years old  
June 5-6**  
An elderly woman spread the virus to 13 other people in a fourth round of infection. Multiple rounds of infection are a concern because sustained transmission can lead to a pandemic.



### Anatomy of a MERS outbreak: South Korea: May 2015

- 186 cases,
- 36 deaths

#### Factors contributing to spread:

- Failure to implement strict isolation of patients and quarantine of contacts at the first outbreak hospital
- Poor communication and knowledge of patient movement between hospitals
- Overcrowding in the emergency room
- Inadequate ventilation
- Limited availability of isolation rooms in the emergency department
- The custom of patients seeking care at different healthcare facilities
- Having friends and family stay with patients as caregivers at already overcrowded healthcare facilities.

[https://www.sciencenews.org/sites/default/files/sn-2015/122615\\_ScienceNews\\_MERS.pdf](https://www.sciencenews.org/sites/default/files/sn-2015/122615_ScienceNews_MERS.pdf)

## The NHS, economic and societal impact would be severe.

### Impact on NHS and PHE

#### Severe pandemic - over a 15 week period

30m people symptomatic. 9m requiring face to face assessment by health services.

300k – 1.2m requiring hospital care. 75k – 300k requiring critical care.

Peak illness rate (new cases per week): 10 – 12% of population = 6m – 7.2m

**Ebola:** entry screening cost PHE >£29m

### Impact on economy

Modelling undertaken by HMT suggests that the total economic impact to the UK of a future influenza pandemic (based on the Reasonable Worst Case Scenario), could be in the order of £2,000 billion<sup>(see note 1)</sup>.

SARS Hong Kong: Decline in air travel to HK of 50-60 percent over four month outbreak with peak decline of 75 percent. Retail sales declined by 15 percent at the peak, and by about 9 percent over the four month period (Siu and Wong, 2004) or about 5 percent on an annualized basis. (Burns et al, 2008). 40,000 jobs lost in Hong Kong tourism and travel industries.

### Lost Working Hours

Staff absence (typically 7-10 days) may reach 20% during the peak 2 – 3 weeks of a pandemic, in addition to those arising from caring responsibilities. Higher in small organisations.

Modelling suggests that during a severe flu pandemic the lost working hours from symptomatic patients (who do not require hospital admission or subsequently die) would cost the UK economy £10 billion.

### Societal disruption

School closure may be recommended but depends on the nature and stage of the pandemic. Secondary impact on workforce and risk of social gatherings outside school. Limited evidence on merits of banning mass gatherings.

Essential services, including energy and fuel providers; water and sewerage companies; mortuary services; the food supply chain; transport system and local authority services would be affected by staff absence during an influenza pandemic.

Potential for unrest and panic in severe pandemic eg for access to antivirals and other healthcare,

During SARS, Toronto health authorities placed ca 25,000 people in quarantine.

Note 1: the £2,000 billion economic impact is the short term impact of the pandemic, it includes "social value impacts" and relates to the period during which the pandemic occurs. It does not include the longer term economic effects that may follow the pandemic.



## Risk mitigation: extensive plans are in place to reduce the impact of an influenza pandemic. Planning for EIDs is by necessity more generic in nature.

### Pandemic flu

**Objectives:** Minimise the potential health, societal and economic impact of a future influenza epidemic: business continuity and surge management

- **Modelling:** detailed modelling of potential impact
- **Surveillance:** Routine syndromic surveillance for flu via primary care, NHS111, Emergency Departments. Sentinel surveillance of ca 3500 GP practices.
- **First Few 100:** case identification and contact tracing to establish epidemiological basis for modelling and response
- **Clinical countermeasures** - antivirals, antibiotics, APA for pandemic specific vaccine. Expenditure over SR period: £532m
- **Infection control:** stockpiles of facemasks and respirators
- **National Pandemic Flu Service** – online and telephony system to authorise access to antivirals and reduce burden on primary care
- **Surge plans for NHS and social care** – including triage plans, joint planning with voluntary sector and social care providers, CQC, ADASS, LGA, ADPH, Skills for Care, trade associations etc
- **Communications plan** to promote good respiratory and hand hygiene and explain changes in healthcare provision
- **Cross-government planning** for excess deaths, schools, business continuity for energy and financial sectors, etc
- **Exercise Cygnus 18-20 October**

### Emerging infectious disease outbreak

**Objectives:** Work internationally and nationally for early identification and surveillance; prevent or limit spread overseas and within UK; establish safe systems of working for the treatment of patients.

- **Horizon Scanning and risk assessment:** jointly by PHE, other science agencies and GoScience. IHR alerts to WHO and EWRS.
- **International collaboration** to share intelligence and approach to planning and for mutual assistance where applicable
- **Public Health Regulations:** for quarantine & isolation etc
- **Surveillance:** alert clinicians, vets, PH specialists, lab scientists. Syndromic surveillance via primary care, NHS111, Emergency Departments. Sentinel surveillance of ca 3500 GP practices. Targeted vector surveillance.
- **Communication to public:** travel advice, airport information; media plans
- **Guidance for health professionals:** CAS alerts, algorithms, RIPL
- **Capacity and capability for development of diagnostics tests**
- **Network of Infectious disease units**
- **High Level Infectious Disease units** at Royal Free and Newcastle for viral haemorrhagic fevers
- **Exercise Alice** February 2016 for MERS outbreak
- **Exercise Theodore** [6 December] for Ecoli104 outbreak

- **No vaccine** is likely to be available for pandemic flu for at least six months. Few treatments or vaccines currently exist for any major emerging diseases
- **Entry screening** will not prevent disease importation but can provide opportunity for targeted information giving (as in Ebola)
- The DH **Global Health Security Programme** is investing in a public health rapid response team, capacity building for low income countries and research programmes for vaccines for diseases of epidemic potential. These programmes are funded by ODA to reduce the risk of another Ebola-type outbreak.

## How adequate is our preparedness?

### Pandemic flu

- The 2009/10 pandemic was at the lower end of severity. The NHS was able to flex its surge arrangements to cope with the extra demand for healthcare services
- In the event of a severe pandemic, such as the 1918 ‘Spanish Flu’ the NHS would rapidly exhaust its capacity to cope with the extreme pressure. Exceptional measures and difficult choices would be required. These would be politically and ethically controversial but would be inescapable.
- NHS England has developed plans to triage patients by outcome when demand exceeds capacity, prioritising care for those most likely to survive.
- Many patients who would normally receive hospital care would have to be cared for - and possibly die - at home or in other care settings. The elderly, the young, those with underlying conditions and pregnant women are likely to be most vulnerable.
- NHS England plans to triage by outcome have been discussed confidentially with the BMA and Clinical Reference Groups. They will be tested in Exercise Cygnus (18 to 20 October 2016).

### Emerging infectious disease outbreak

- Whilst we have the specialist VHF unit at the Royal Free, rapid work was needed to develop surge capacity for the Ebola outbreak.
- The experience demonstrated the need to develop an agreed approach to managing the end to end patient pathway for ‘High Consequence’ infectious diseases, including suspected and confirmed cases, and to ensure a sustainable response can be mounted promptly.
- NHS England, PHE and DH are working on a programme to address identified weaknesses. Led by Prof Sir Mike Jacobs (Royal Free) it includes:
  - a defined, tiered operational response, service specifications, clinical policies and commissioning tools,
  - response arrangements for first contact agencies,
  - a governance framework for the use of novel and experimental therapies for treatment of HCID,
  - standards and mechanisms for responsive clinical research protocols to be implemented rapidly and effectively
  - agreed arrangements for mutual aid.
- Cabinet Office are developing a cross-Government response plan for EIDs overseas.

- International collaboration and partnership are critical in preparing for and responding to major infectious disease threats. The UK is a member of the EU Health Security Committee and bound by the Serious Cross Border Health Threats Decision. The UK is also a member of the Global Health Security Initiative. Maintaining these networks gives us influence, intelligence and access to assistance and potentially mutual aid in the event of an outbreak.
- The UK is a world leader in pandemic preparedness, and in response to outbreaks. We benchmark our plans against GHSI countries on a regular basis.

## Summary

- A new pandemic or major outbreak of an emerging infectious disease are among the highest risks on the National Risk Register. The Department of Health is the Lead Government Department for these risks and accountable across Government for preparedness.
- The UK has a strong public health and NHS system that has put it in a good place to respond to the inevitable risks of cases of emerging infections but we cannot be complacent. Healthcare workers are typically at greatest risk. Work is underway to address limitations identified during the Ebola response.
- Because of the nature of flu, a pandemic cannot be 'snuffed out'. Extensive planning is in place for a flu pandemic but services would be overwhelmed at higher severity pandemic. Our plans will be tested in Exercise Cygnus in October.

The key question for the DB is how much money, time and effort do we want to invest in our insurance against these risks?

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