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Infectious Disease Control at Airports

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Port Health, Public Health England

Context

- 266 entry points with a Border Force presence (HM Treasury) but 3000 plus “ports”

- Multiple stakeholders involved at each port such as
  - government and local government agencies (at least 15 per port)
  - port operators (includes freight handling companies and other support infrastructure)
  - conveyance operators e.g. There are 80 airlines at London Heathrow alone

- High levels of traffic (Gov.uk - DfT)
  - 2.2. million powered vehicles (roll on roll off) left for Europe
  - 2,230,000 air transport movements and 264,397,000 passengers in 2017

Approach and overarching principles

- Risk stratification of ports using intelligence and information
- Planning
  - Local plans and response
  - Designation of and building core capacities at DPEs
  - Dynamic risk assessment and three states readiness model for HCID
  - National Arrangements and standards
  - Information handling strategy
  - Logistical preparation
  - Preparedness using all available stakeholders
- Continuous improvement

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Risk Stratification

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Risk stratification

- Used to prioritise where effort is to be focused as finite resource
- Used to partially inform designation of PoEs
- Two approaches used in UK
  - Risk proxy model
  - Risk factor matrix model
- Regardless of application of the above, the results are the same
  - Likelihood of HCID is highest at the bigger hub airports
  - Likelihood of imported food issues highest at a few key seaports

Risk stratification – Risk Factor matrix

			Risk Factor		
Variable	Very Low The risks are so low as to be unnoticeable.	Low Risks are recognised but easily managed.	Moderate Risks recognised but acceptable in view of the costs involved in mitigating them.	High Risks are high, managing them will be costly.	Very High The risks are so high that they cannot be accepted.
Severity Does the range of diseases expected at this port cause human morbidity and if so do they cause measurable human mortality?	*No known morbidity or mortality known to be associated with diseases associated with this port. There are few travellers and goods arriving at this port from outside the UK.*	*Some mild morbidity has been associated with the port in the past.*	*Incidents are reported from time to time of infections imported through this port causing modest morbidity.*	*The port is associated with regular importations of infectious conditions causing morbidity, rarely there is serious illness.*	*Repeated importations of diseases with high morbidity and mortality. Many travellers and goods arriving from tropical locations in developing countries.*
Spread Is the range of diseases expected at this port associated with a high incidence of spread?	*No anecdotal or documented evidence of any incidents or outbreaks associated with this port.*	*Single incident, of a minor nature, associated with the port 5 years ago.*	*Some infections have been traced back to the port, but this is unusual and there is no clear pattern*	*Some infections have beentraced back to the port, but this is uncommon although there is a clear pattern.*	*Repeated incidents and outbreaks documented as associated with importations through this port.*
Confidence Is the disease profile associated with this port known and understood? Is the profile one that includes diseases associated with significant morbidity or mortality?	*No information available. This is probably because it has never been an issue.*	*Limited data available on diseases that might be imported at this port.*	*Profile of diseases that might be imported at this port is known and containment measures are in place.*	*Good understanding of the diseases likely to be imported at this port*	*Significant data on profile of serious disease problems associated with this port.*

Risk stratification – example of proxy model

Stratification of ports and airports - HCID
Airports, based on flight origin and profile

Tier 1	
Multiple intercontinental scheduled flights	Heathrow Gatwick
Tier 2	
Daily intercontinental scheduled flights	Birmingham Manchester Newcastle
Tier 3	
European flights	Stansted Luton Bristol East Midlands London city (+ New York) Leeds/Bradford Southampton
Tier 4	
Minor or seasonal (bucket and spade)	All others

Risk stratification – example of proxy model

based on the frequency and origin of food imports, with the subsequent likelihood of introduction of a foodborne disease into the UK, and the frequency of passenger ship movements, with the subsequent potential for Legionella cases.

Seaports (prioritised by shipping traffic and food imports)

Tier 1	
Major entry point for imported foods / Border Inspection Post	Southampton Felixstowe (Suffolk Coastal) Port of London
Tier 2	
Regular imported foods Regular ferry throughput Regular cruise port (seasonal)	Portsmouth Dover Plymouth Tyne Liverpool Hull
Tier 3	
Infrequent imported food / animal feed Minor or seasonal ferry	Folkestone Harwich Newhaven Poole Falmouth Bristol
Tier 4	
Occasional cruise ports of call Cargo ports	All others

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Planning

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Local and National Level Plans

- There are several levels of planning
- Responsibility for day to day operations delegated to local structures

BUT

- This is linked to national surveillance activity and a National Emergency Planning and Response structure which is in turn linked to international agreements such as IHR
- Operates within a three states of readiness model
- Uses wider mechanisms within government which comes with further plans and agreements. Some examples are
    - Home office - information on historical travel patterns and numbers
    - Border Force - Immigration officers as a force multiplier
    - Foreign and Commonwealth Office – overseas intelligence

Three State Model

A Business as usual - Sporadic suspect case(s)	B Increasing incidence HCID/ Confirmed case in UK resulting in a change to the UK threat assessment	C Declared HCID situation as a result of a change to the UK threat assessment.
• Pre-preparedness • Passive but intelligence led local interventions • Background UK threat assessment	• Temporary national structures assembled if appropriate • Cross government planning and preparation if appropriate • Analysis of available information on historic patterns of travel to gauge possible activity and formulate a strategy • Awareness raised with paramedics and other relevant port staff	• Public health prevention activity commenced • Enhanced case recognition implemented • Intermediate public health risk assessment implemented • Transfer to designated assessment centre

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Planning – local level

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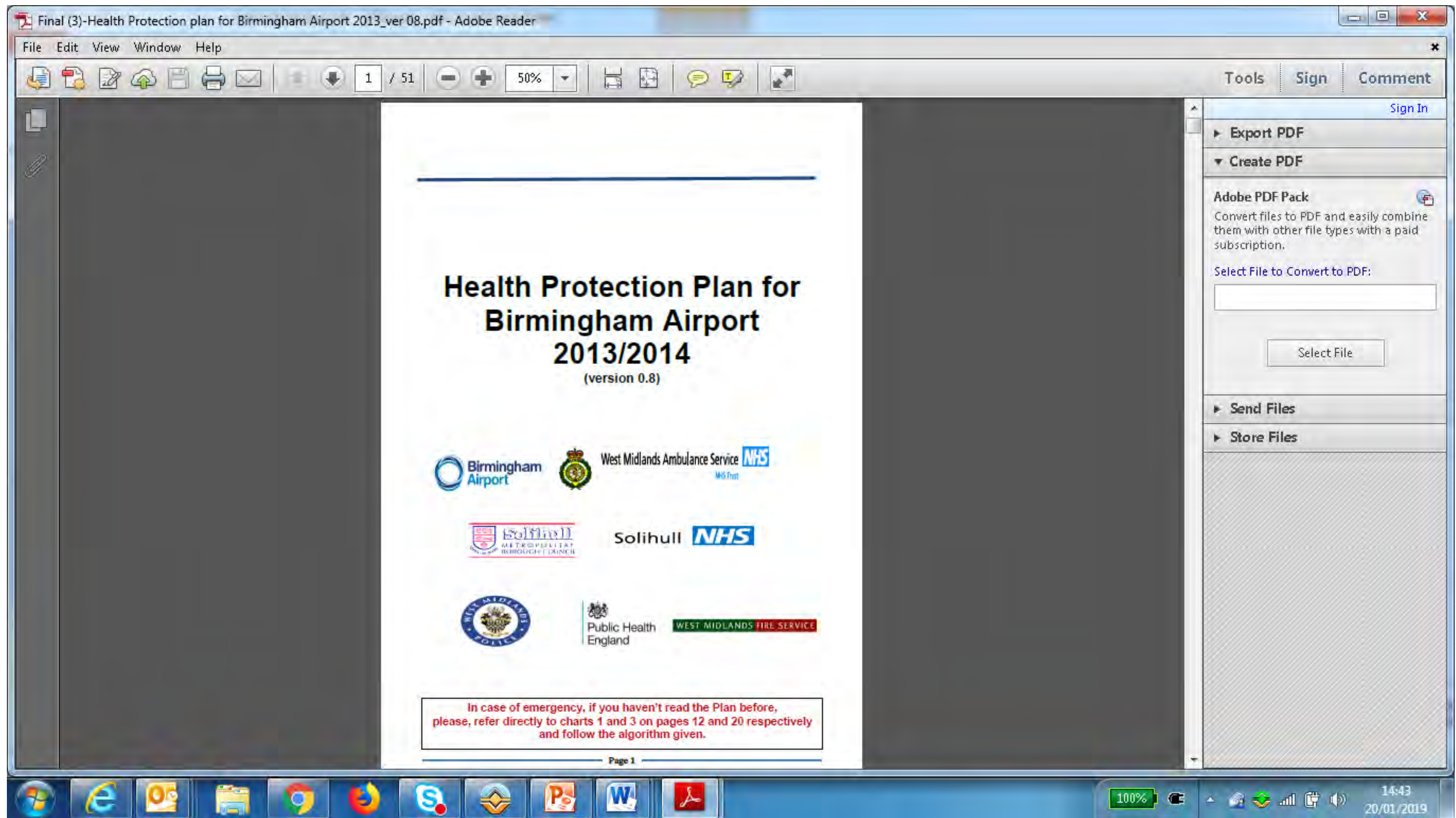
Example of a Local Plan (LHR matrix)

Risk assessment	low	medium	high
Action by HCU	a No action		
	b Action carried out as in defined protocol without reference to NWL HPU		
	c Action to be carried out as in defined protocol, but with prior reference to NWL HPU		
	d Immediate consultation with NWL HPU		

Syndrome	**Risk assessment**		**Action by**				
			HCU		**NWL HPU**	**LAS**	**LBH**
	Frequency	Outcome severity	Action				
1 Gastroenteritis							
a single case	high	low	a	note 1a & b	No action	No action	No action
b single case with complications (see note 1.c)	low	low	b	Alert LAS. note 1d - consider stool collection Alert LBH if appropriate	No action	Clinical assessment note 1.2	Aircraft Sanitation note 1.3
c multiple cases see note 1.e)	medium	low	c	Liaise with NWL HPU Alert LAS. note 1d - consider stool collection note 1f - information collection Alert LBH if appropriate	Note 1.1	Clinical Assessment note 1.2	Aircraft sanitation note 1.3
d multiple cases with complications	low	medium	c	Liaise with NWL HPU Alert LAS. note 1d - consider stool collection note 1f - information collection Alert LBH if appropriate	Expert advice note 1.1	Clinical assessment note 1.2	Aircraft sanitation note 1.3

Example of Local Plans



Surveillance at Point of Entry

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RECOGNISE ILL TRAVELLER

- see back of card

ISOLATE

- separate ill person ≥6 feet from others

NOTIFY

- if situation is life threatening, call LAS
- alert PHE Health Control Unit Doctor

GIVE SUPPORT

- follow instructions of PHE Health Control Unit Doctor

PHE Health Control Unit

020 8745 7209

24 hours a day

RECOGNISE ILL TRAVELLER

Look, listen or ask for signs and symptoms of illness.

Alert PHE Health Control Unit Doctor for any traveller who:

Says he or she may have a **FEVER**

AND

Reports having or is observed with **ONE or more** of the following conditions:

- skin rash
- swollen glands
- jaundice
- persistent diarrhoea
- persistent cough
- persistent vomiting
- difficulty breathing
- headache with stiff neck
- decreased consciousness
- unexplained bleeding

Wash hands for 15-20 seconds after every incident

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Planning National Level

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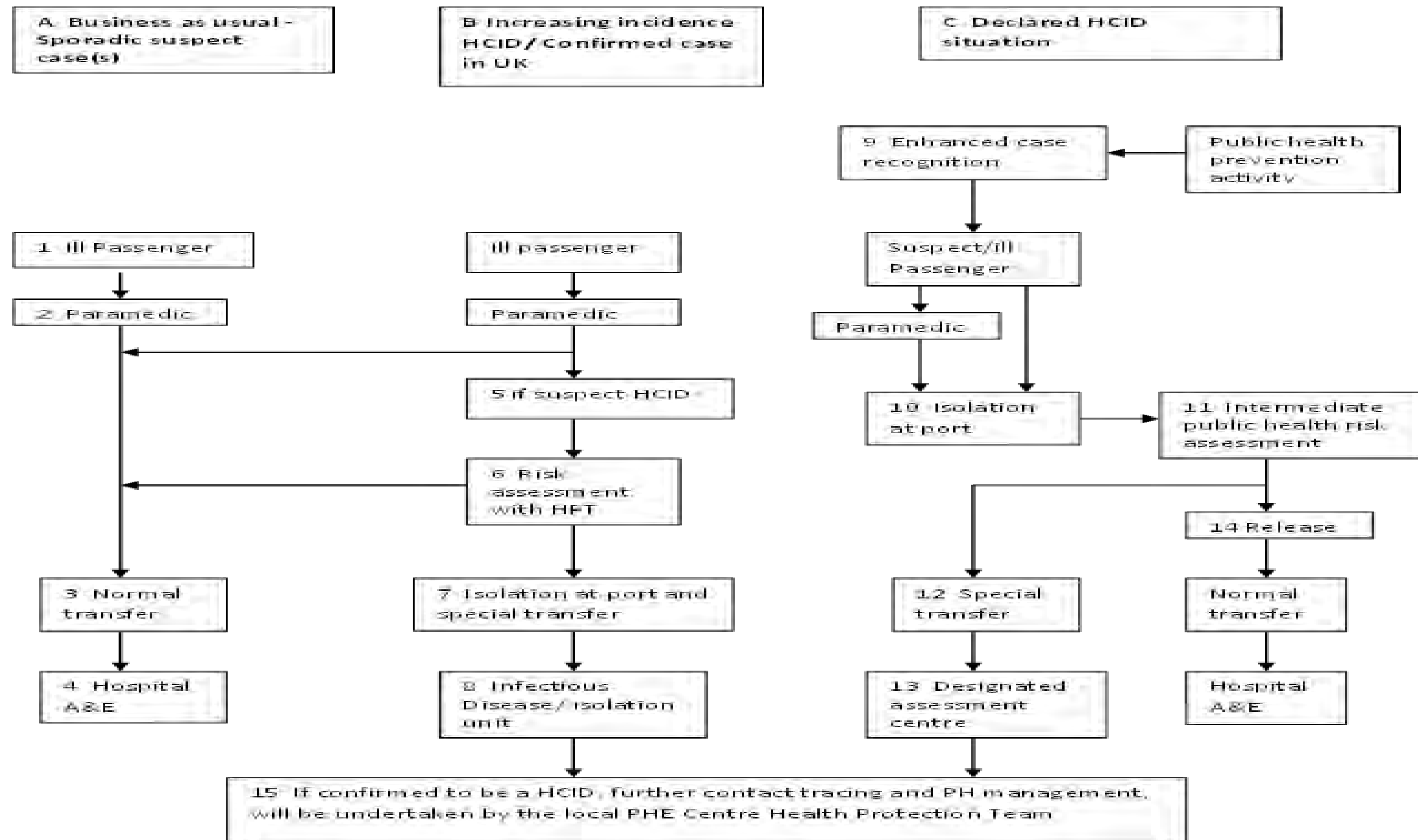
National Level Plans – HCID pathway



National Plan - UK Port Health Toolkit

- Passive information giving (posters, VDUs, leaflets)
- Active information giving (targeted distribution for at risk groups)
- Ill passenger vigilance (e.g. case recognition using BF staff, paramedics, port team at Heathrow and local teams at other ports:)
- Passive screening (all passengers, e.g. thermometers or thermal scanners)
- Active screening (selected passengers questioned) with or without temperature taking
- Isolation and then intermediate assessment of potential cases during a declared outbreak
- Registration scheme for onward community monitoring e.g. returning health care workers or travellers from affected areas
- Exit or entry controls

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Continuous Improvement

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Improvement Activities

- Further definition of national minimum standards per port tier
- Whole systems exercises – does it work in reality
- Designing a model flight processing facility
- Further development of logistical support programmes
- Better engagement with Airlines
- Better access to information for all stakeholders – a central repository is planned

Thank you and questions

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- Example response -Ebola Screening Programme

Robert Sookoo, Head of Port Health

Miami 2019

Introduction

- Establishment of UK on-entry Ebola screening programme at specific ports for passengers from West Africa (Sierra Leone, Guinea and Liberia) was set up in October 2014
- Aim of the programme was to ensure that the public's health was appropriately monitored and to protect the health of the wider UK public
- All direct flights from the affected countries were suspended by the UK following the WHO outbreak announcement. Passengers travelling to the UK did so through the means of indirect routes
- The initial approach focused on covering the operating hours at all the major ports
- The programme evolved and through good collaboration with other UK government departments, the focus was targeted screening and to use the resources effectively to target the ports with all indirect flights and passengers of interest.

Operations

- **Physical Port Screening Process:**

  - Passengers from targeted flights were referred to Public Health England for a first contact assessment upon arrival to the UK by Border Force (Immigration Control)

  - Passenger completed a Health Assessment Form (HAF)

  - Determination of Category:
    - CAT 0 – No known contact
    - CAT 1 - No direct contact
    - CAT 2 - Direct contact (low risk)
    - CAT 3 – Direct contact (high risk)

  - Temperature taken using tympanic thermometer. A temperature above 37.5 degrees or above was the trigger for transfer to clinical care

  - All passengers provided with a category information leaflet. CAT 2 and CAT 3 passengers were issued with a monitoring kit and requested to monitor for a 21 day period.

Health Assessment Form (P1 & 2)

3.	While in that country(ies), did you:			
3.1	Come into contact with a person known/suspected to have Ebola?	Yes ☐	No ☐	Unknown ☐
3.2	Care for anyone with a severe illness, or who has died of an unknown cause?	Yes ☐	No ☐	Unknown ☐
3.3	Attend any funerals or had any contact with any dead bodies?	Yes ☐	No ☐	Unknown ☐
3.4	Visit any traditional healers or been admitted to hospital?	Yes ☐	No ☐	Unknown ☐
3.5	Handle laboratory specimens of contaminated bodily fluids?	Yes ☐	No ☐	Unknown ☐
3.6	Have contact with contaminated bodily fluids?	Yes ☐	No ☐	Unknown ☐
4.	**Health information**			
4.1	Do you have a raised temperature/fever now?	Yes ☐	No ☐	Unknown ☐
4.2	Have you had a temperature **at any time during the past 48 hours**?	Yes ☐	No ☐	Unknown ☐
4.3	**Currently** do you have any of the following:			
4.4	Headache	Yes ☐	No ☐	Unknown ☐
4.5	Vomiting/feeling sick?	Yes ☐	No ☐	Unknown ☐
4.6	Diarrhoea	Yes ☐	No ☐	Unknown ☐
4.7	Intense fatigue or exhaustion?	Yes ☐	No ☐	Unknown ☐
4.8	Bruising	Yes ☐	No ☐	Unknown ☐
4.9	Unexplained or unusual bleeding?	Yes ☐	No ☐	Unknown ☐
4.10	Have you ever been diagnosed and treated for Ebola? If Yes, go to Q4.11, if No go to 4.14	Yes ☐	No ☐	
4.11	Date diagnosed			
4.12	Hospital treated at			
4.13	Do you have a discharge note? If yes, date of discharge:	Yes ☐	No ☐	
	Medicines			
4.14	Have you taken any 'over the counter' remedies for common illnesses such as colds, flu, headaches and back pain within the past 12 hours?	Yes ☐	No ☐	Unknown[†] ☐
4.15	Have you taken any paracetamol, aspirin, ibuprofen or other antipyretic[*] medication **within the past 12 hours?**	Yes ☐	No ☐	Unknown[†] ☐
4.16	If so, what was the medication and when did you last take it? Date (DD/MM/YYYY)……………………Time (24 hour clock)…………………………			

[*] substance to reduce fever [†] Treat UNKNOWN response as YES

I confirm, to the best of my knowledge, that the information that I have provided in this health assessment form is correct and complete.

Signature of passenger……………………………………………Date…………………………

If there are any positive answers to sections 3 or 4, this form should be reviewed by a health protection practitioner or consultant.

The following sections (5 to 9) are to be completed by PHE screening staff only

5.	Temperature on arrival in UK	
5.1	Temperature (°C)	
5.2	Date (DD/MM/YYYY)	
5.3	Time (hh:mm)	
5.4	Name of person taking temperature	
5.5	How was the temperature taken?	Tympanic thermometer ☐ Infrared thermometer ☐

6.	Outcome (please select ONE CATEGORY only)	
6.1	Not been to an Ebola-affected country in the last 21 days	Category 0 ☐
	Free to go with general information leaflet	Category 1 ☐
	At risk (active monitoring and PHE contact):	
	low risk exposure category	Category 2 ☐
	high risk exposure category	Category 3 ☐
	Referred to NHS	☐
	Name of hospital referred to:	
	Local health protection team:	Informed: ☐

7.	21 days since last date in affected country (ie departure date)	
7.1	Please calculate and give to passenger the date that reflects 21 days since last date in one of the affected countries (ie departure date from affected country – see 2.5) (DD/MM/YYYY)	

8.	Any other relevant information
8.1	Please record any other relevant information

Health Assessment Form (P3 & 4)

3.	While in that country(ies), did you:			
3.1	Come into contact with a person known/suspected to have Ebola?	Yes ☐	No ☐	Unknown ☐
3.2	Care for anyone with a severe illness, or who has died of an unknown cause?	Yes ☐	No ☐	Unknown ☐
3.3	Attend any funerals or had any contact with any dead bodies?	Yes ☐	No ☐	Unknown ☐
3.4	Visit any traditional healers or been admitted to hospital?	Yes ☐	No ☐	Unknown ☐
3.5	Handle laboratory specimens of contaminated bodily fluids?	Yes ☐	No ☐	Unknown ☐
3.6	Have contact with contaminated bodily fluids?	Yes ☐	No ☐	Unknown ☐
4.	Health information			
4.1	Do you have a raised temperature/fever now?	Yes ☐	No ☐	Unknown ☐
4.2	Have you had a temperature at any time during the past 48 hours?	Yes ☐	No ☐	Unknown ☐
4.3	Currently do you have any of the following:			
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4.5	Vomiting/feeling sick?	Yes ☐	No ☐	Unknown ☐
4.6	Diarrhoea	Yes ☐	No ☐	Unknown ☐
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4.8	Bruising	Yes ☐	No ☐	Unknown ☐
4.9	Unexplained or unusual bleeding?	Yes ☐	No ☐	Unknown ☐
4.10	Have you ever been diagnosed and treated for Ebola? If Yes, go to Q4.11, if No go to 4.14	Yes ☐	No ☐	
4.11	Date diagnosed			
4.12	Hospital treated at			
4.13	Do you have a discharge note? If yes, date of discharge:	Yes ☐	No ☐	
	Medicines			
4.14	Have you taken any 'over the counter' remedies for common illnesses such as colds, flu, headaches and back pain within the past 12 hours?	Yes ☐	No ☐	Unknown† ☐
4.15	Have you taken any paracetamol, aspirin, ibuprofen or other antipyretic* medication within the past 12 hours?	Yes ☐	No ☐	Unknown† ☐
4.16	If so, what was the medication and when did you last take it? Date (DD/MM/YYYY)..................... Time (24 hour clock).............................			

*substance to reduce fever †Treat UNKNOWN response as YES

I confirm, to the best of my knowledge, that the information that I have provided in this health assessment form is correct and complete.

Signature of passenger..Date............................

If there are any positive answers to sections 3 or 4, this form should be reviewed by a health protection practitioner or consultant.

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6.1	Not been to an Ebola-affected country in the last 21 days	Category 0 ☐
	Free to go with general information leaflet	Category 1 ☐
	At risk (active monitoring and PHE contact):	
	low risk exposure category	Category 2 ☐
	high risk exposure category	Category 3 ☐
	Referred to NHS	☐
	Name of hospital referred to:	
	Local health protection team:	Informed: ☐

7.	21 days since last date in affected country (ie departure date)	
7.1	Please calculate and give to passenger the date that reflects 21 days since last date in one of the affected countries (ie departure date from affected country – see 2.5) (DD/MM/YYYY)	

8.	Any other relevant information
8.1	Please record any other relevant information

Health Assessment Form (P5 & 6)

	Any other relevant information (continued)

9.				Your name (print)
9.1	All information completed?	YES/NO		
9.2	Monitoring kit issued?	YES/NO	If YES, kit number:	

Category 0 – No known contact

This person has not been to an Ebola-affected country in the last 21 days, has had no laboratory contact with Ebola and has had no contact with an Ebola case.
ACTION: None.

Category 1 – No direct contact

This person visited an Ebola affected area, but had no direct contact with an Ebola case (or body fluids) while there; nor attended a burial or any other high-risk event. OR laboratory staff in a country assured to be operating to a UK standard (See Appendix 1). For example: laboratory staff attached to Ebola treatment centres (ETCs), logistics workers, operational support workers.
ACTION: provide information leaflet, noting end of 21 day period on back.

Category 2 – Direct contact[1] – low risk exposure

This person had direct (close) contact with Ebola cases or their body fluids (**but did not** provide direct physical contact as part of clinical care), trained and wore appropriate protective equipment/clothing (PPE) with no known breaches. For example: water, sanitation and hygiene staff, epidemiologists (especially in community), health advisors especially in ETCs or community, contact tracers in community.
ACTION: provide information leaflet and if not provided at port, advise monitoring kit to be sent the next working day.

Category 3 – Direct contact – high risk exposure

This person had direct contact with a symptomatic case with potential exposure to bodily fluids, includes vomit, faeces, kissing and/or sexual contact OR unprotected sexual contact with a recovering EVD case within three months of their symptom onset OR had direct physical contact as part of clinical care, or contact with bodily fluids **with or without** appropriate protective equipment/clothing (PPE), including those handling burials, and irrespective of known breaches OR had direct exposure of skin or mucous membranes to potentially infectious blood or body fluids, including on clothing and bedding. OR worked in a laboratory with human samples not assured to be working at UK standard. For example, healthcare workers providing patient care, burial teams.
ACTION: provide information leaflet and if not provided at port, advise monitoring kit to be sent the next working day.

Referred to NHS

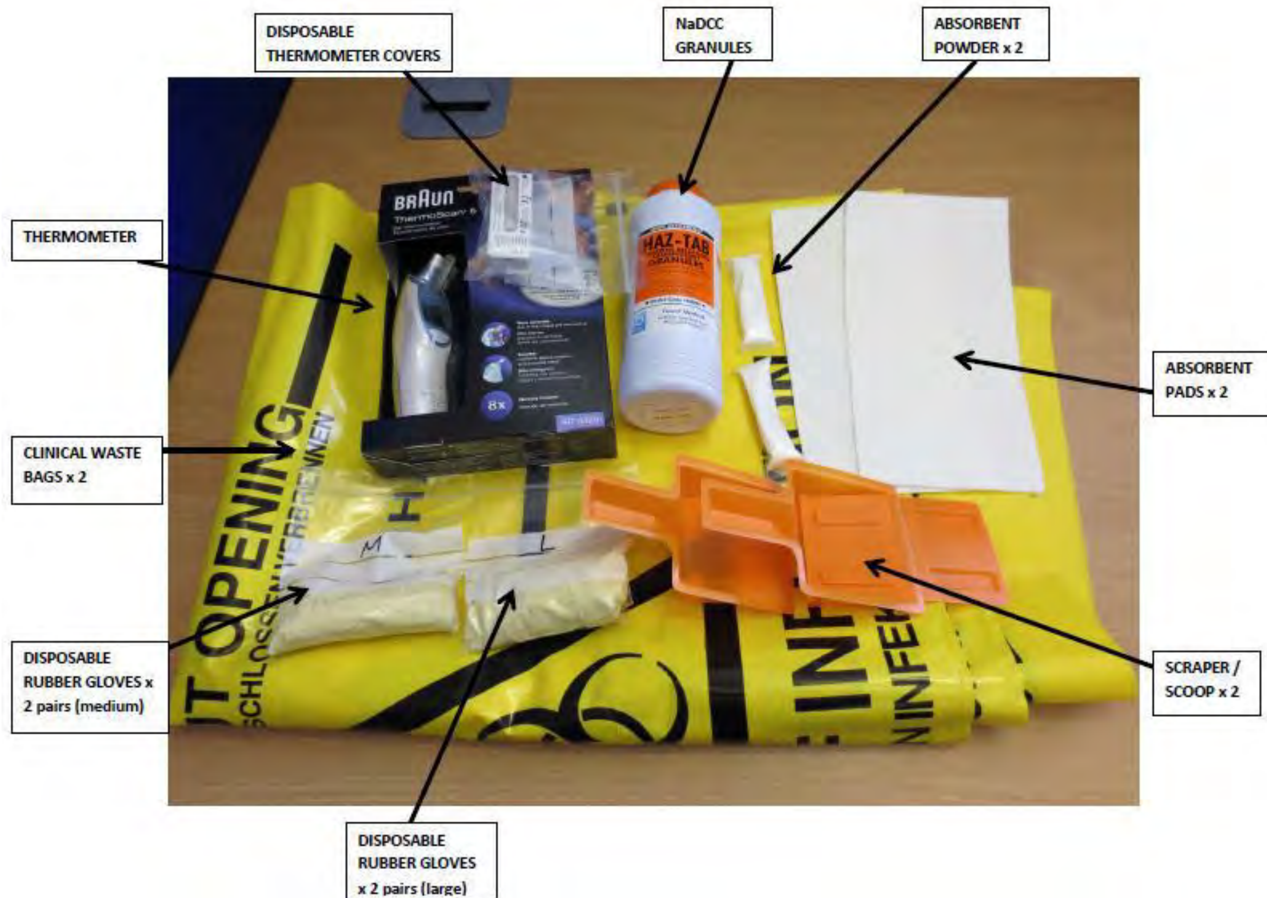
This person has visited an Ebola-affected area and is currently symptomatic.
ACTION: Arrange hospital transfer. Inform local health protection team.

Person has previously been diagnosed and treated for Ebola

Screen and categorise as per current algorithm. For further detail see guidance 'Management of people diagnosed with Ebola overseas'.
ACTION: Advise they will be contacted by a member of their local health protection team to arrange a face to face review with infection specialist. Screening team to ensure Essex HPT are aware and will forward information to local HPT.

[1] Definition of direct contact: Direct contact means that body fluids (blood, saliva, mucus, vomit, urine, or faeces) from an infected person (alive or dead) have touched someone's eyes, nose, or mouth or an open cut, wound, or abrasion. This includes sexual contact. Direct contact could also be with fomites contaminated with body fluids so would include unprotected handling of contaminated medical instruments.

Monitoring Kit Content (Cat 2 & 3 only)



Returning Workers Scheme

- PHE operated its first Returning Worker Scheme (RWS) during the 2014/15 West Africa Ebola Outbreak
- Aim of RWS: support returnees, support organisations, and protect public health
- Organisations involved in the outbreak and where employees were likely to come into direct contact with Ebola were asked to pre-register with the RWS. (This included humanitarian, and healthcare organisations, as well as media organisations)
- Components of RWS:
  1. Pre-registration Scheme (completion of registration and traveller form)
  2. First contact on arrival in UK assessment to determine confirmation of category
  3. Monitoring and follow-up for 21 day period
  4. Point of contact for returnees who become asymptomatic

Further information on the PHE Ebola returning workers scheme:

https://www.gov.uk/guidance/ebola-returning-workers-scheme

Ebola Data *(14t October 2014 – 4 December 2015)*

PORT	TOTAL SCREENED	CAT 0	CAT 1	CAT 2	CAT 3	REFERRED TO CLINICAL CARE
Heathrow Airport	11,801	34	11,205	120	410	32
Gatwick Airport	1,458	10	1,362	25	56	5
St Pancras Station	349	1	332	11	4	1
Birmingham Airport	262	1	257	2	1	1
Manchester	444	2	424	7	8	3
Other Locations	101	4	95	1	1	0
TOTAL	**14,415**	**52**	**13,675**	**166**	**480**	**42**

Lessons Learnt

- Importance of preparedness in 3 dimensions:
  - Intelligence – Advanced passenger information (API), identification of targeted flights allowed the ability to flex the resources effectively
  - Logistics – facilities, equipment,
  - Interventions – Isolation, transfer to clinical care
- Airport Screening toolkit
- RING Card – early identification of infectious disease
- UK Government response to the House of Commons Science and Technology Committee report, 'Science in Emergencies: UK lessons from Ebola'

https://www.gov.uk/government/publications/uk-lessons-from-ebola-outbreak