Agenda Item	Item 4
Security Marking	**OFFICIAL - SENSITIVE**
Title of Paper	The 5th UK confirmed case of MERS-CoV, August 2018: Summary of incident
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Purpose of Paper	To summarise the details of the fifth UK confirmed case of MERS-CoV, and to highlight specific challenges in the public health management of the incident.
Action(s)	Members to understand the circumstances of the incident, and provide scientific advice that will guide the policy for future incidents.

The 5th UK confirmed case of MERS-CoV, August 2018: Summary of incident

1.0 Overview of case & initial incident response

1.1 Case History & Timeline

1.1.1 The case was an I&S year old man with an underlying health condition (diabetes) who is a resident of the Kingdom of Saudi Arabia (KSA). He did not have a history of contact with any confirmed cases of MERS-CoV prior to his onset of symptoms. According to KSA health authorities, his family in Saudi Arabia stated he had a history of contact with camels (however the case and his daughter did not confirm this when he was hospitalised).

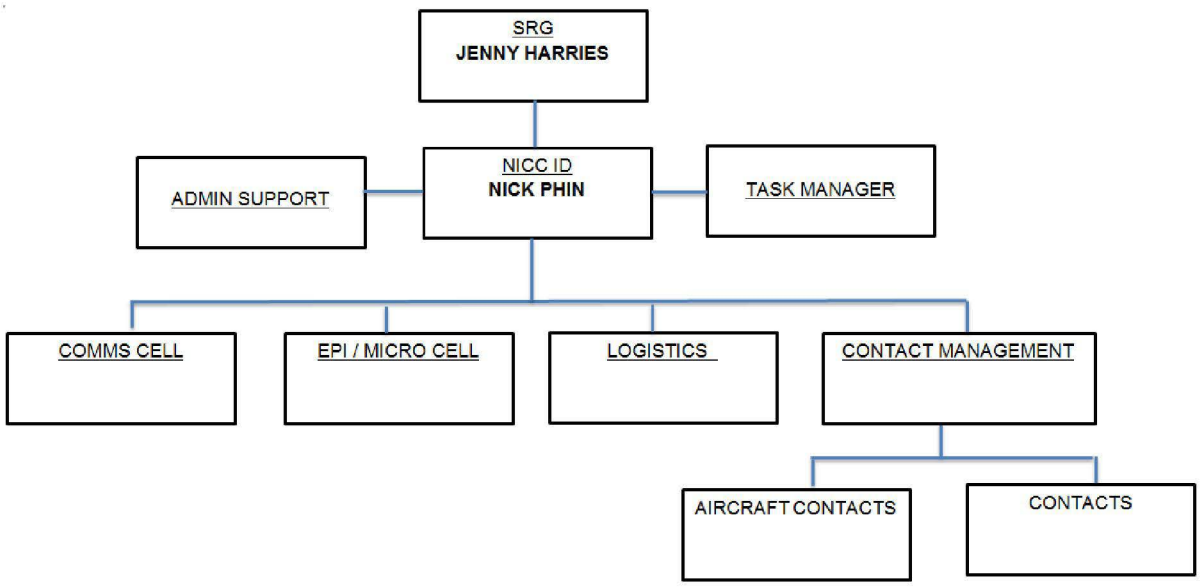
1.1.2 A summary of the case history is provided below:

Date: DD/MM	*Event summary*
14/08	Estimated onset of first symptoms
15/08	The case developed a cough, and presented to a primary care physician in Makkah, Saudi Arabia where he was prescribed antibiotics.
16/08	The case I&S arrived at Manchester Airport on Saudi Airlines flight SV123 from Jeddah. The case I&S were driven from Manchester airport to her home in Leeds by a family friend in a private car. The case was feeling unwell, and did not leave I&S home until presenting at hospital.
19/08	19:45: The case arrived at the Emergency Department (ED) at I&S hospital and is assessed as a possible case of MERS-CoV and isolated in ED.
20/08	03:00: The case is transferred to a negative pressure room in the Infections Diseases Department. Samples are taken and sent to the PHE Laboratory at Birmingham.
21/08	The case is declared presumptive positive for MERS-CoV based on test results from the Birmingham PHE Laboratory that evening. Sputum samples were positive, but initial throat swab was negative. A PHE National Enhanced Incident is declared, and the first IMT is held the same evening.
22/08	The positive result is confirmed at the Colindale Reference Laboratory.
23/08	The case is transferred by Yorkshire Ambulance Service to the Royal Liverpool University Hospital which has a commissioned Airborne High Consequence Infectious Disease (HCID) unit
24/08 - 03/09	The case's clinical condition improved but he remained positive for MERS-CoV via PCR up until 3 September when the first negative test result was confirmed.
04/09	Second negative test result received; case was considered non-infectious and not requiring HCID management.
7/09	Case is discharged from hospital.

1.2 Incident Management

1.1.2 The response was managed as a national enhanced incident. A national incident co-ordination centre (NICC) was established at Colindale (Figure 1). Four cells were established, a communications cell, logistics cell, an epi/micro cell (to provide scientific advice) and a contact management cell. The contact management cell was sub-divided into aircraft contacts, and other contacts. The FF100 for MERS-CoV was activated.

Figure 1: PHE Incident management structure



1.2.2 Throughout the incident, PHE liaised with both KSA health authorities and WHO via the International Health Regulations (IHR) Focal Point. PHE and KSA shared information to enable tracing of contacts. During the incident PHE provided regular updates to WHO.

2.0 Contact tracing and public health follow-up of contacts

2.1.1 The NICC provided criteria for the public health management and public health follow-up of contacts (See Fig. 2).

2.1.2 Each hospital took the lead for the initial contact tracing and risk assessment of their staff, and the public health follow-up. They were assisted and guided by the PHE Health Protection Team and PHE Field Services, who collated the information and submitted it to the NICC and to the national FF100 team.

Figure 2: Summary of public health follow-up and virological investigations

Description	Contact definition	Public Health Actions	Virology	Serology	Rationale	Category of follow-up
Exposed Family and Friends	Household-level contacts	Active surveillance (daily contact for 14 days after last exposure to case) Home monitoring.	Asymptomatic persons within this group should have respiratory sampling, in line with WHO recommendations. Suggest enhanced respiratory sampling at approximately 3 day intervals	Yes. Paired sera 14 days apart	WHO recommendations. Confirmation of status & onwards infection risk	Active Enhanced
Exposed Health Care Worker without MERS-appropriate PPE†	Any healthcare worker who has been within 2 metres of a confirmed case without use of MERS- CoV recommended PPE at all times	Active surveillance (daily contact for 14 days after last exposure to case) Home monitoring.	Swab if become symptomatic For asymptomatic persons within this group with elevated risks*, enhanced respiratory sampling, in line with WHO recommendations; suggested at approximately 3 day intervals	Yes for elevated risk* Paired sera 14 days apart	WHO recommendations For elevated risk, sample as per exposed family	Active Or Active Enhanced if considered at elevated risk*
Exposed Health Care Worker with MERS- appropriate PPE†	Any healthcare worker who has been using MERS-CoV recommended PPE at all times when within 2 metres of the case	Passive follow-up: - check health status initially, information letter and contact number in event of symptoms developing within 14 days Can continue to work	Swab if symptomatic as per possible case algorithm	If symptomatic	Effective use of appropriate PPE should lower risk of infection.	Passive
Other exposed persons in healthcare setting (e.g. patients, visitors)	Any person who has been within 2 metres of a confirmed case for more than 15 minutes.	Active health surveillance (daily contact for 14 days after last exposure to case) Home monitoring.	Swab if symptomatic as per possible case algorithm	If symptomatic	Reactive approach	Active
Flight	Any person who was on the flight and was sat within three rows in front or behind the case.	Passive follow-up: - check health status initially, information letter and contact number in event of symptoms developing within 14 days	Swab if symptomatic as per possible case algorithm	If symptomatic	No known transmission during commercial air travel	Passive

Other contacts in non- healthcare settings (who are not included in above categories)	Any person with unprotected face-to-face contact for more than 15 minutes	Active health surveillance (daily contact for 14 days after last exposure to case) Home monitoring.	Swab if symptomatic as per possible case algorithm	If symptomatic	Reactive approach	Active

Figure 2: Notes

*Examples of elevated risk activities include medical examination of patient, manual handling, personal care, vital signs measurements/observations, clinical sample taking (including phlebotomy), cleaning of the patient's room, direct contact with the patient or equipment (such as an x-ray cassette) during radiography.

† MERS-appropriate PPE refers to personal protective equipment as described in PHE's infection prevention and control guidance for MERS; this is the minimum standard for MERS-appropriate PPE. Note that 'exposed healthcare worker without MERS-appropriate PPE' includes PPE breaches i.e. improper use or failure/compromise of MERS- appropriate PPE.

Enhanced respiratory sampling includes: Nasopharyngeal or combined nose and throat swabs x2 from the upper respiratory tract taken into virus transport media, and sputum if possible, though if asymptomatic this is unlikely to be produced. If an asymptomatic person becomes symptomatic, then need to get an upper and a lower respiratory tract sample. Serum sample should be collected in a 5ml clotted blood plain tube, aiming to separate 2ml serum. Centrifuge locally as soon as possible (following standard BBV precautions), subject to local risk assessment. Contact VRD Colindale for further advice if local centrifugation is problematic.

3.1 Household and community contact tracing

3.1.1 Three household/community contacts were identified

- I&S
-
-

3.1.2 All household/community contacts were classified as requiring active enhanced surveillance (see Fig 2), with active public health follow-up for 14 days, and enhanced sampling (respiratory swabs and serology).

3.1.3 Household and community contacts were recommended for home monitoring during the 14-day follow-up period. This means they were advised to remain at home where possible, but could go out for essential trips but should avoid travelling a significant distance from home. They were also recommended to avoid long journeys on public transport and that they should not travel internationally.

3.1.4 I&S returned to KSA before the end of the 14-day follow-up period. Although this was against PHE advice, there was no legislative power to preven I&S eaving the country. I&S did agree that I&S would postpone travel if I&S respiratory sample was positive or if I& became unwell. I&S espiratory sample was negative for MERS-CoV and I&S was met at the airport prior to departure by PHE staff to confirm I&S was still well I&S details were passed to KSA health authorities to continue his follow-up.

3.1.5 None of the household or community contacts developed symptoms of MERS-CoV during the follow-up period, and the respiratory swabs taken as part of the enhanced surveillance were all negative for MERS-CoV.

3.2 Aircraft contact tracing

3.2.1 The case travelled on Saudi Arabian airlines, the national carrier of KSA, and therefore KSA authorities were able to quickly obtain copies of the passenger manifest. Guidance for contact tracing for MERS-CoV is to contact all passengers sat within three rows from the case. As the case had been sat in the business class cabin, the relevant contacts included all passengers sat within the business class cabin.

3.2.2 Aircraft contacts sat in business class were classified as passive contacts. They were contacted by PHE, had an initial symptom check and provided

with health information, and a number to call if they became symptomatic in the 14-days post exposure. They were not subject to home monitoring, but were advised against international travel. Two contacts had returned to KSA, and were subsequently followed-up by KSA health authorities.

3.2.3 All 18 aircraft passenger contacts were successfully contacted and followed-up for 14-days post exposure. No aircraft passengers reported symptoms that met the case definition for MERS-CoV testing within the 14-day period. KSA health authorities undertook all contact tracing related to the flight crew and they are not included in this total.

3.3 Healthcare contacts

3.3.1 59 healthcare worker contacts were identified at Leeds Hospital Trust, Yorkshire Ambulance Service (YAS) and Royal Liverpool Hospital Trust. No patients or visitors were considered to be close contacts of the case.

3.3.2 Healthcare workers were assessed using the criteria in Figure 2 (above). Those placed under active or active enhanced follow-up were excluded from work and home monitoring was recommended. Healthcare workers under passive surveillance were allowed to work. Any healthcare worker on passive surveillance who developed symptoms was excluded from work until a MERS-CoV negative test result was confirmed.

Figure 3: Healthcare contacts

	Type of follow-up	Number of Contacts	Symptomatic
Leeds Hospital Trust & Yorkshire Ambulance Service	Active Enhanced	14	3
	Active	10	1
	Passive	16	1
Royal Liverpool Hospital Trust	Active	1	0
	Passive	18	0

3.3.3 One staff member at Liverpool required active surveillance due to a PPE breach.

3.3.4 Five healthcare workers developed respiratory symptoms during the follow-up period (three who were on active enhanced follow-up, one who was on active,

and one who was on passive). All five symptomatic contacts tested negative for MERS-CoV. Two symptomatic contacts tested positive for rhinovirus.

3.4 Active enhanced sampling

3.4.1 A subset of the contacts on active public health follow-up were assessed as having an elevated risk and were allocated to active enhanced follow-up. (see Figure 2 for definition). This included three household/community contacts and 14 healthcare workers.

3.4.2 It was recommended that contacts under active enhanced follow-up were sampled every three days (as far as operationally possible). All specimens provided by asymptomatic contacts were upper respiratory samples. All 17 contacts swabbed were negative for MERS-CoV.

4.0 Serology

4.1 Serological sampling

4.1.1 Serological samples were requested from the index case, all contacts on active enhanced surveillance, plus any symptomatic contacts.

4.1.2 18 contacts were serologically investigated, this included:

- 3 community/household contacts
- 13 healthcare workers who were under active enhanced surveillance (including 4 symptomatic contacts)
- 2 healthcare workers under active surveillance, one of whom was symptomatic

4.1.3 Serology could not be completed for one healthcare contact who was on active enhanced surveillance due to late recognition by the responsible hospital . However, this contact was asymptomatic.

4.2 Serology results: Index case

4.2.1 MERS antibodies were detected in all samples taken from the case, including the earliest serum available at approximately 9 days post illness onset. This confirms the molecular diagnosis, in the absence of any other virological information.

4.3 Serology results: Contacts

4.3.1 Of the 18 contacts serologically investigated, 14 were considered to have had an adequate serological investigation (Figure 4). The serological results for these 14 contacts were all negative. This included 4 of the 5 symptomatic contacts.

4.3.2 4 contacts were considered not to have had an adequate serological investigation. In most cases this was due to the timings of the samples with either the baseline or sequential samples being taken too close to the last exposure. For two of these, the contacts refused to co-operate with further testing.

4.3.3 Of the 4 contacts who had an inadequate investigation, 3 were asymptomatic. One contact did experience symptoms and tested negative for MERS-CoV by PCR from an upper respiratory sample, but positive for Rhinovirus. All of the serum samples that were received from these contacts were negative.

5.0 Conclusions

5.1 This incident involved confirmation of the fifth UK case of MERS-CoV. From boarding the flight in Jeddah to the point where he was considered non-infectious, the case was confirmed as having close contact with 80 people.

5.2 Although the case was isolated promptly following his attendance at hospital, there were some early breaches in adequate infection control that resulted in a number of healthcare worker exposures at Leeds Hospital Trust.

5.3 Public health follow-up of and virological investigation of all contacts did not identify any evidence of onward transmission from the case. Additional serological investigations did not reveal any evidence of onward transmission from the case based on available samples for testing.