NIPAH, HANTA AND BUNDIBUGYO VIRUSES – OPERATOR PREPAREDNESS AND RESPONSE FOR THE RE-EMERGING INFECTIOUS DISEASE

Prepared by
Dr Mohammad Razin Kamarulzaman
MBBCh (NUI) Master of Aviation Medicine (Otago)
Head Group Safety and Security

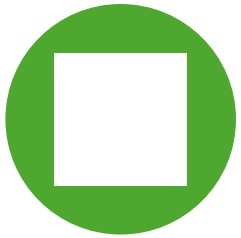
Disclosures

NOT A PUBLIC HEALTH EXPERT

NOT AN INFECTIOUS DISEASE EXPERT

NO GRANT/RESEARCH SUPPORT

EMPLOYEE OF MALAYSIA AVIATION GROUP



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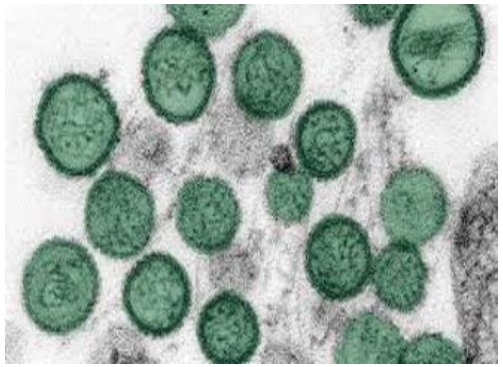
OBJECTIVE AND SCOPE



Objective

To share the three outbreaks of concern in the first half of 2026 and its relevance for airline operations

Scope

- Introduction
- Nipah – West Bengal
- Hanta – Andes
- Bundibugyo Ebola (BVD) - DRC
- Relevance to airline operations
- Conclusion

INTRODUCTION

Three outbreaks in first half of 2026

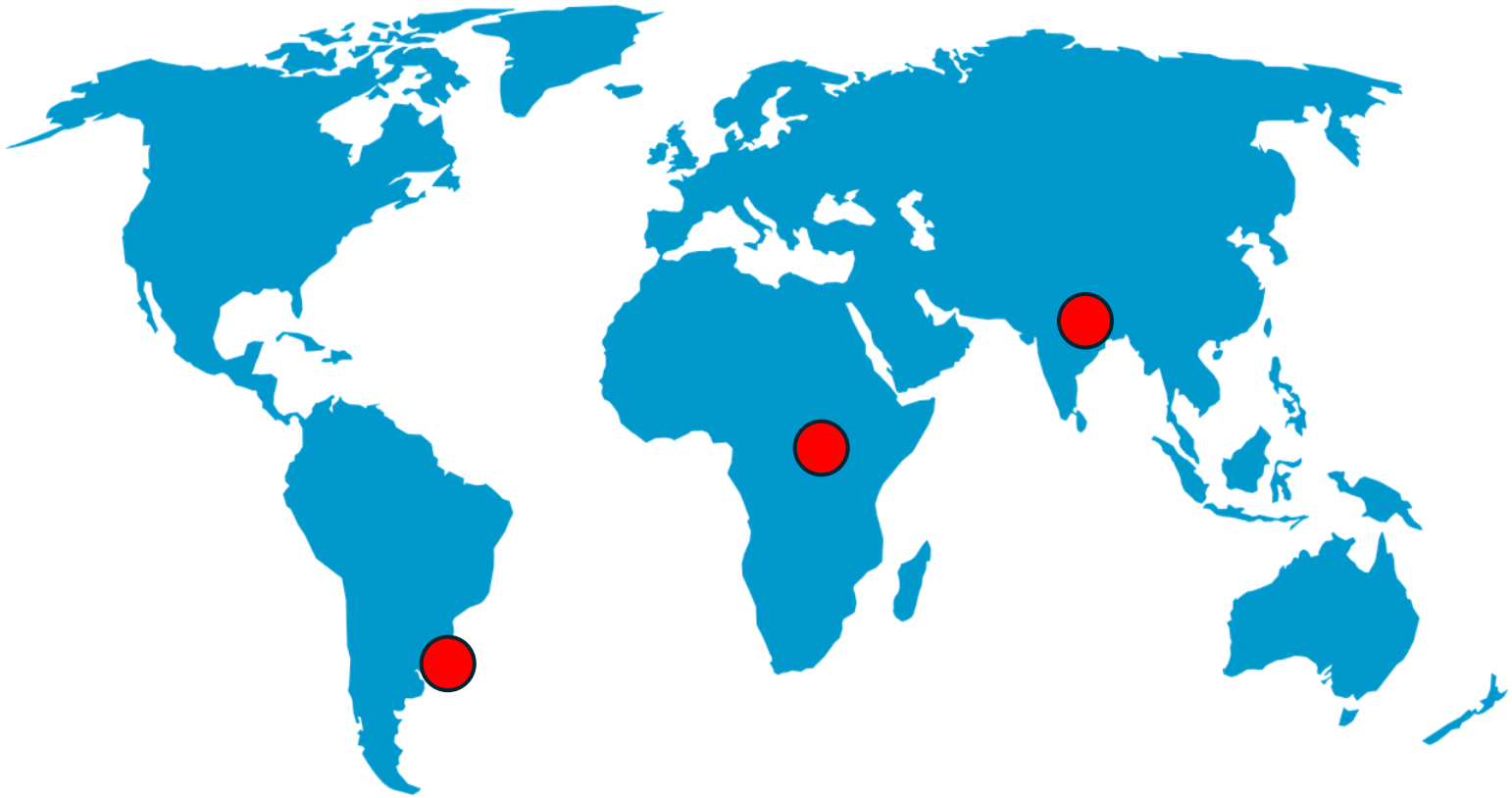
News “viraled” faster than the disease itself

Good – awareness, precautionary measures

Bad – unnecessary fear

REGULATORY COMPLIANCE

- Health regulatory compliance
  - International Health Regulations 3rd Edition 2005 updated 2024
- Civil aviation regulatory compliance
  - Chicago Convention Article 14 – **Prevention of Spread of Disease**
  - ICAO Annex 6, 9, 11, 14, 19
- Airline safety and health obligation to passengers, crew and other workforce



CAPSCA

CHICAGO CONVENTION 1944
ARTICLE 14 PREVENTION OF SPREAD OF DISEASE

Each contracting State agrees to take effective measures **to prevent the spread by means of air navigation** of cholera, typhus (epidemic), smallpox, yellow fever, plaque, and such other communicable diseases as the contracting States shall from time to time decide to designate, and to that end contracting States will **keep in close consultation with the agencies concerned with international regulations relating to sanitary measures applicable to aircraft**. Such consultation shall be without prejudice to the application of any existing international convention of this subject to which the contracting States may be parties.

- ANNEX 6
- ANNEX 9
- ANNEX 19
- ANNEX 11
- ANNEX 14

INTERNATIONAL HEALTH REGULATIONS 2005 REVISED 2024, EFFECTIVE SEP 2025

- **International Sanitary Conventions (1851–1938):** European nations convened the first International Sanitary Conference in Paris in 1851 to standardize quarantine measures, primarily targeting the spread of cholera, plague, and yellow fever. These efforts led to a series of conventions establishing uniform sanitary protocols at ports and borders.

- **International Sanitary Regulations (1951):** Following the creation of the World Health Organization (WHO), these earlier conventions were consolidated and streamlined into the International Sanitary Regulations in 1951, which governed disease control and quarantine across member states.

- **International Health Regulations (1969 & 2005):** The WHO formally adopted the modern IHR in 1969. They were initially limited to reporting six diseases, later reduced to three (cholera, plague, and yellow fever). Driven by globalization and the rapid emergence of new threats like SARS, the World Health Assembly substantially revised the regulations in 2005 to cover all public health risks (biological, chemical, and radiological).

Features				
Novel				
Discovered				
Transmission				
Human to human Transmission				
Mode Transmission				
Asymptomatic transmission				
R0				
Incubation Period (days)				
Symptoms				
Vaccine				
Complications				
Case Fatality Rate				
Risk of Spread				

Features	Nipah			
Novel	No			
Discovered	1999 - Malaysia			
Transmission	Bats excreta – palm saps – human			
Human to human Transmission	Yes but limited			
Mode Transmission	Droplets close contact			
Asymptomatic transmission	No			
R0	0.5 - 1.5			
Incubation Period (days)	4 - 14			
Symptoms	Viral fever like			
Vaccine	No			
Complications	Neurological			
Case Fatality Rate	40 - 75%			
Risk of Spread	Local			

Features	Nipah	Hanta Andes		
Novel	No	No		
Discovered	1999 - Malaysia	1976 - Korea		
Transmission	Bats excreta – palm saps – human	Rat droppings – human inhalation		
Human to human Transmission	Yes but limited	Yes rare Andes variant		
Mode Transmission	Droplets close contact	Droplets close contact		
Asymptomatic transmission	No	No		
R0	0.5 - 1.5	<1.0		
Incubation Period (days)	4 - 14	7 - 42		
Symptoms	Viral fever like	Viral fever like		
Vaccine	No	No		
Complications	Neurological	Pulmonary		
Case Fatality Rate	40 - 75%	30 - 40%		
Risk of Spread	Local	Local		

Features	Nipah	Hanta Andes	Bundibugyo Ebola	Remarks
Novel	No	No	No	
Discovered	1999 - Malaysia	1976 - Korea	2007 - Uganda	
Transmission	Bats excreta – palm saps – human	Rat droppings – human inhalation	Bats excreta – fruits – meat - human	
Human to human Transmission	Yes but limited	Yes rare Andes variant	Yes in outbreaks	
Mode Transmission	Droplets close contact	Droplets close contact	Droplets close contact body fluids	
Asymptomatic transmission	No	No	No	
R0	0.5 - 1.5	<1.0	1.3 - 2.7	2 - 8 (COVID-19) 12 - 18 (Measles)
Incubation Period (days)	4 - 14	7 - 42	2 – 21	
Symptoms	Viral fever like	Viral fever like	Viral fever and gastro	
Vaccine	No	No	No for BVD	
Complications	Neurological	Pulmonary	Hemorrhagic multi-organ	
Case Fatality Rate	40 - 75%	30 - 40%	30 - 50%	0.9% (COVID-19) 0.1% (Measles)
Risk of Spread	Local	Local	Regional	

GUIDANCE FROM AUTHORITIES

World Health Organization
African Region

BUNDIBUGYO VIRUS DISEASE OUTBREAK
Democratic Republic of the Congo | Uganda
Weekly External Situation Report 05, Data as of 31 May 2026

Summary

	321	48	-	-	321	48	15.0%
	11	1	1	1	12	2	16.7%

Event description

As of 31 May 2026, a total of 131 laboratory-confirmed cases, including 48 confirmed deaths, have been reported across the three affected provinces of Ituri, North Kivu and South Kivu in the Democratic Republic of the Congo. Of the 2277 previous suspected cases, including 266 suspected deaths reported to date, those testing positive have been reclassified as confirmed cases, while those with negative laboratory results have been discarded and removed from the case count. A total of 218 suspected cases remain under investigation and are not yet reflected in the reported cases. The outbreak remains largely concentrated in Ituri province, which accounts for 294 confirmed cases (95.4%), followed by North Kivu (10 confirmed cases), and South Kivu (three confirmed cases), whilst Kinshasa, the most affected Health zones are Bunia, Rwampara, Mongbwalu, and Nyankunde.

A total of 1,008 contacts had been identified for follow-up across the most affected provinces as of 29 May, of whom 991 (98.3%) were reported seen within the previous 24 hours. Contact tracing performance remained particularly

CAPSCA
Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation

Does the current Hantavirus outbreak pose a risk to aviation?
9 May 2026

Reports of a hantavirus outbreak on a cruise ship has raised fears of another global public health outbreak. As of 8 May, WHO has recorded a total of eight (five confirmed and three suspected) cases, including three deaths.

Hantavirus infections are relatively uncommon globally. The virus is primarily transmitted through direct contact with the urine, faeces, or saliva of infected rodents. Limited human to human transmission, specific to the Andes species, has been reported previously in community settings involving close and prolonged contact.

WHO and the relevant State public health authorities are managing the outbreak through a coordinated response including further in-depth investigations, case management and the implementation of risk-based, evidence-informed public health measures.

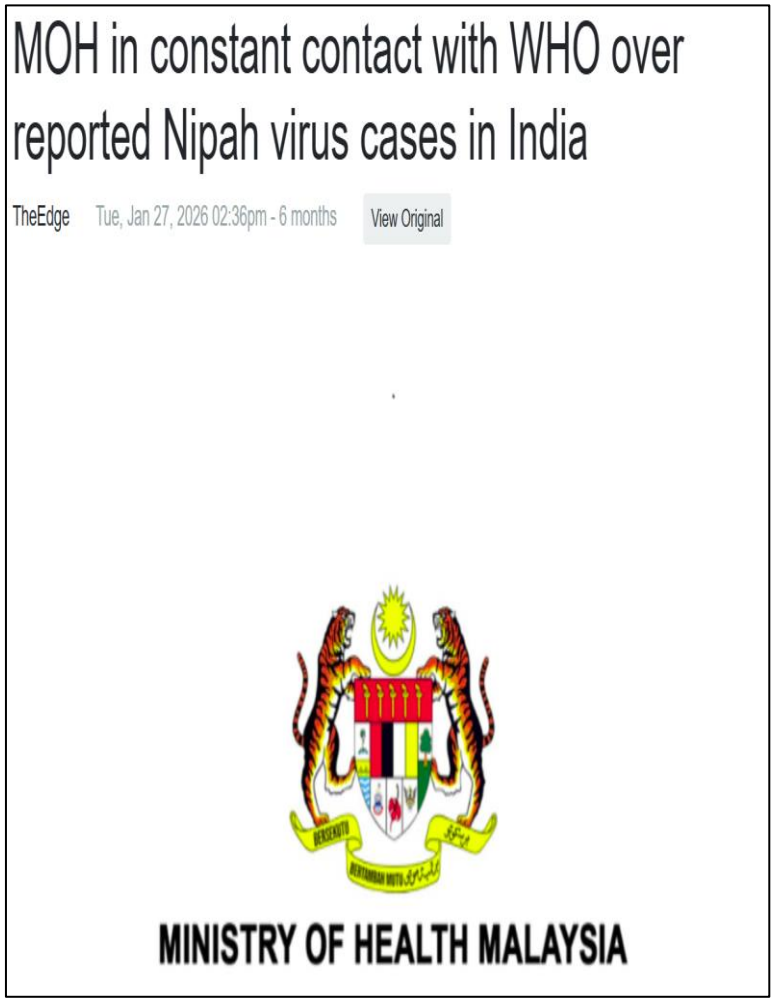
WHO has issued guidance for the management of hantavirus on board ships, in healthcare environments and for Individuals engaging in outdoor activities where endemic transmission is known.

A cruise ship passenger that travelled by air from Saint Helena to Johannesburg, died after arrival in South Africa, who has confirmed the diagnosis. South Africa has immediately implemented contact tracing of the passengers on the flight in accordance with public health guidelines and in collaboration with the airline. Other countries have implemented similar measures for travellers that might have been exposed during flights.

WHO currently assesses the risk to the global population as low and advises against the application of any travel or trade restrictions based on the current information available on this event.

ICAO considers the risk to aviation to be low in view of the WHO risk assessment, requests states and aviation stakeholders to adhere to WHO guidance and to assist the public health authorities with contact tracing in aviation. ICAO will continue to monitor the situation with WHO and our partners through the ICAO-WHO Memorandum of Understanding and will issue additional aviation-specific guidance should it be necessary.

Hantavirus cluster linked to cruise ship travel, Multi-country



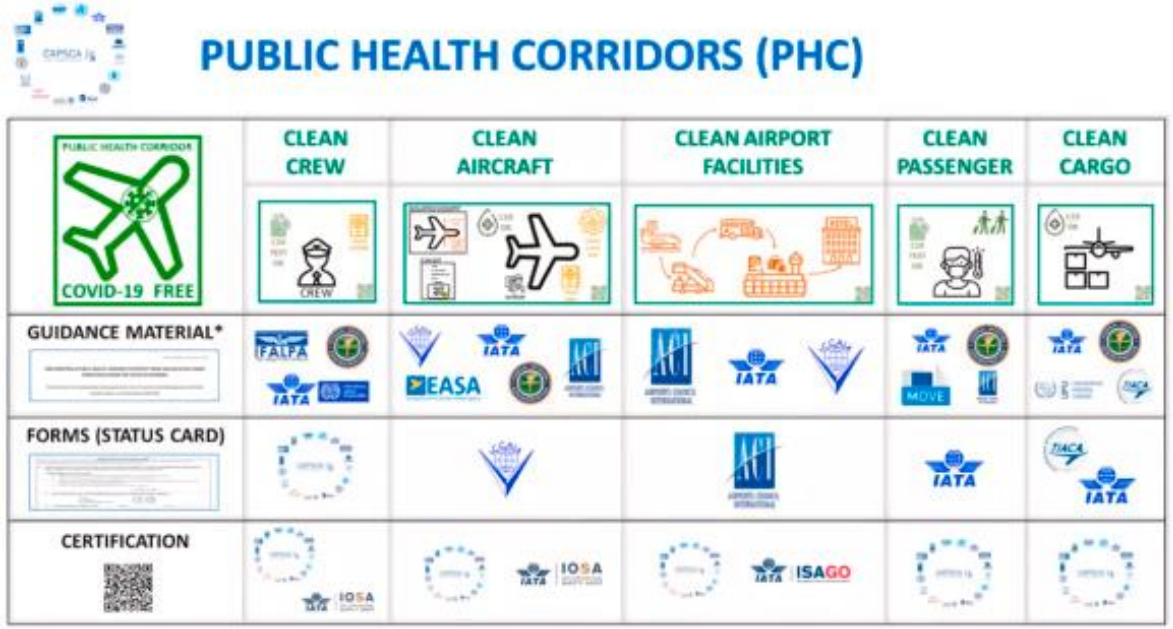
MOH in constant contact with WHO over reported Nipah virus cases in India

TheEdge Tue, Jan 27, 2026 02:36pm - 6 months View Original

MINISTRY OF HEALTH MALAYSIA

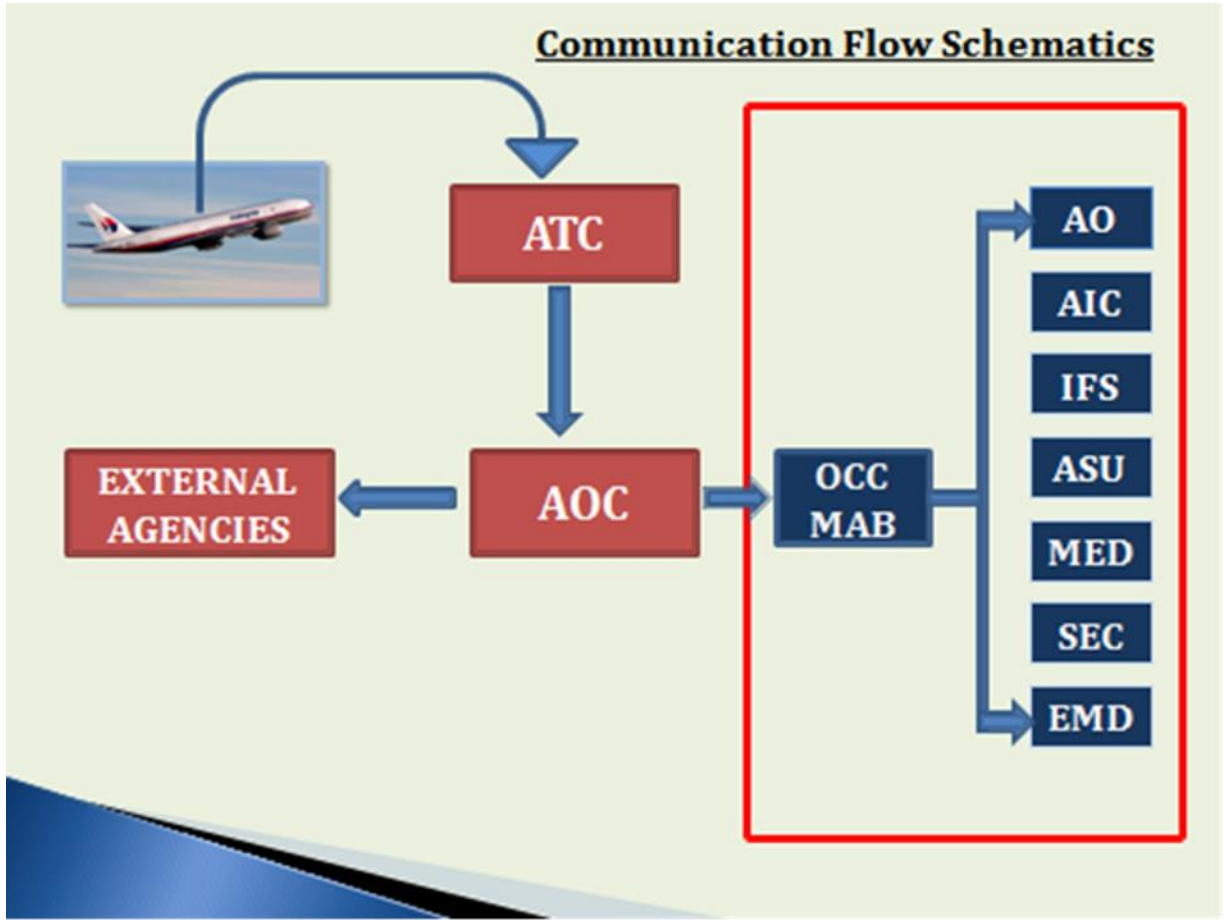
REVISIT COVID-19 EXPERIENCE

Revisit COVID-19 Public Health Corridors and Layered Biosecurity Approach



AIRLINES ROLE

- Pre-flight handling procedures
- In-flight handling procedures
- Management of suspected victims
- Management of aircraft
- Handling of crewmembers
- General health at workplace



RISK ASSESSMENT NIPAH VIRUS

Crew Health Risks
Malaysia Airlines
Nipah (India/Bangladesh)

- Stop and review
- Proceed with caution and review
- Safe to proceed and review

Risk probability	Risk severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5				5D	5E
Occasional 4			4C	4D	4E
Remote 3		3B	3C	3D	
Improbable 2	2A	2B	2C		
Extremely improbable 1	1A				

Hazard	Risk	Mitigation	Severity	Likelihood	Risk Rating	Added Mitigation	Severity	Likelihood	Residual Risk	Note
Microorganisms (During Layover)	Infection	• Hand washing • Minimum layover	Major	Improbable	2C	• Avoid crowded areas • Avoid healthcare facilities visits • Avoid fruit farms	Major	Extremely Improbable	1C	• Nearest location of operations – CCU/DAC
Microorganisms (Inbound)	Infection	• Pax are screened by Ground Services • Minimum contact with inbound pax • Hand washing	Major	Improbable	2C	• Use of UPK when attending to ill pax	Major	Extremely Improbable	1C	• Nearest location of operations – CCU/DAC

RISK ASSESSMENT HANTAVIRUS

Crew Health Risks
Malaysia Airlines
Hanta (Andes) - Connecting

- Stop and review
- Proceed with caution and review
- Safe to proceed and review

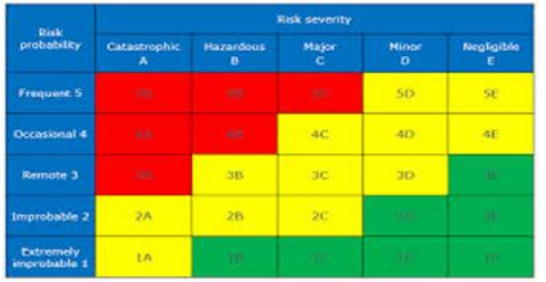
Risk probability	Risk severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5				5D	5E
Occasional 4			4C	4D	4E
Remote 3		3B	3C	3D	
Improbable 2	2A	2B	2C		
Extremely improbable 1	1A				

Hazard	Risk	Mitigation	Severity	Likelihood	Risk Rating	Added Mitigation	Severity	Likelihood	Residual Risk	Note
Microorganisms (During Layover)	Infection	• Hand washing • Minimum layover	Major	Extremely improbable	1C	• Avoid crowded areas • Avoid healthcare facilities visits • Avoid fruit farms	Minor	Extremely Improbable	1E	• Nearest location of operations – LHR/CDG
Microorganisms (Inbound)	Infection	• Pax are screened by Ground Services • Minimum contact with inbound pax • Hand washing	Major	Extremely improbable	1C	• Connecting passengers screened by Ground Services • Use of UPK when attending to ill pax	Minor	Extremely Improbable	1E	• Nearest location of operations – LHR/CDG

RISK ASSESSMENT EBOLA BUNDIBUGYO VIRUS DISEASE (BVD)

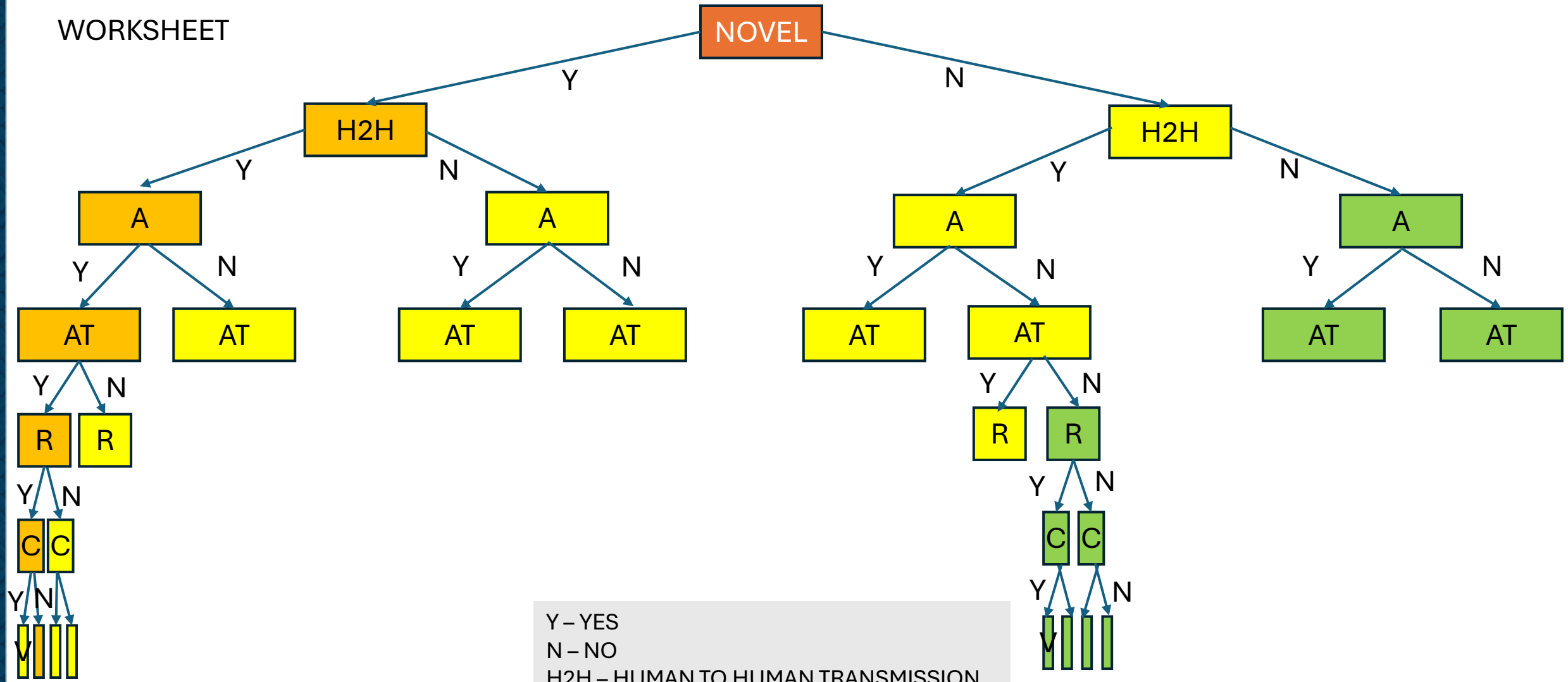
Crew Health Risks
Malaysia Airlines
BVD (DRC) - Connecting

- Stop and review
- Proceed with caution and review
- Safe to proceed and review



Hazard	Risk	Mitigation	Severity	Likelihood	Risk Rating	Added Mitigation	Severity	Likelihood	Residual Risk	Note
Microorganisms (During Layover)	Infection	• Hand washing • Minimum layover	Major	Extremely improbable	1C	• Avoid crowded areas • Avoid healthcare facilities visits • Avoid fruit farms	Minor	Extremely Improbable	1E	Connecting flights LHR/CDG JED
Microorganisms (Inbound)	Infection	• Pax are screened by Ground Services • Minimum contact with inbound pax • Hand washing	Major	Extremely improbable	1C	• Connecting passengers screened by Ground Services • Use of UPK when attending to ill pax	Minor	Extremely Improbable	1E	Connecting flights LHR/CDG JED

WORKSHEET

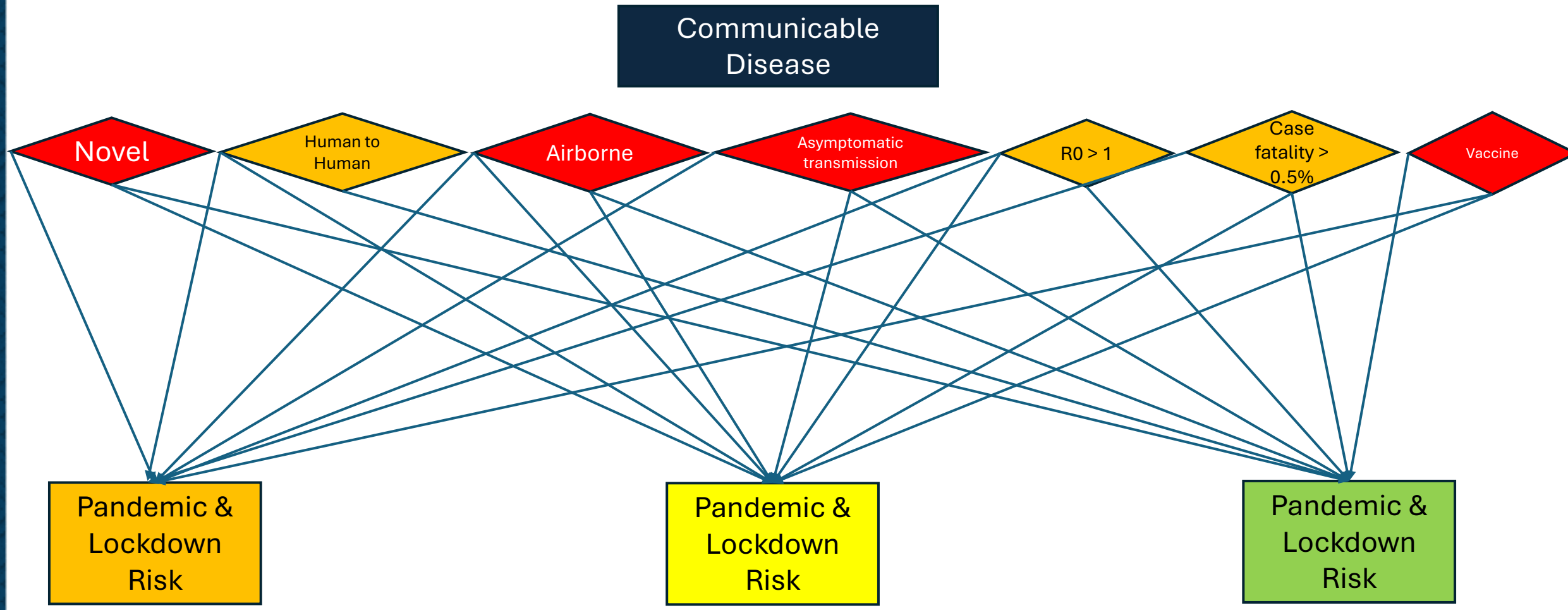


Y – YES
N – NO
H2H – HUMAN TO HUMAN TRANSMISSION
A – AIRBORNE TRANSMISSION
AT – ASYMPTOMATIC TRANSMISSION
R0 – R NOUGHT > 1
C – CASE FATALITY
V – VACCINE AVAILABLE

CONCLUSION

- Three outbreaks in H1’2026 discussed (two declared PHEIC) (with measles in the background)
- Airlines are subjected to local Health Authority requirement guided by WHO International Health Regulations and ICAO Chicago Convention Article 14 requirements
- Understanding the features of the disease is important in risk managing airline operations
- Airlines risk is dependent on its network and connectivity

ALGORITHM


Communicable Disease
Novel
Human to Human
Airborne
Asymptomatic transmission
R0 > 1
Case fatality > 0.5%
Vaccine
Pandemic & Lockdown Risk
Pandemic & Lockdown Risk
Pandemic & Lockdown Risk