

# Overview of diagnostic workflow and current opportunities

Virtual workshop (29/1/21) on the Formation of an Avian influenza and Newcastle disease diagnosis and surveillance subnetwork  
*(an initiative within the Central Asia Animal Health Network – CAAHN)*



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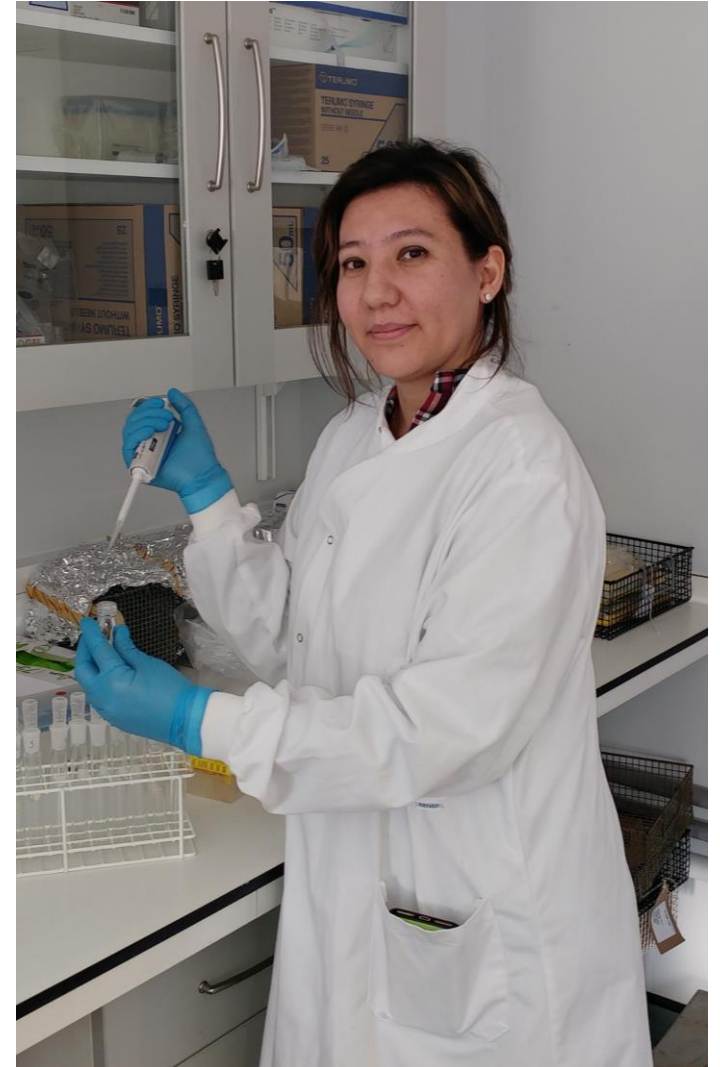
# UK International Reference Laboratory: Offer of assistance

## Benefit to UK and to region

- Early warning of disease threat; Ensuring policy aligned to developing situation
- National preparedness for incursion risk/pathways
- International outreach; Surveillance knowledge – threat detection

## UK IRL International aims

- Offer of laboratory protocols harmonisation
- Confirmatory diagnoses
- Provision of specialist reagents
- Source of expertise and advice
- Design and analyses of international surveillance data
- Maintaining international archive/biobanks
- Development of new methodology
- Provide training as necessary
- Publish the science and maintain web fora
- Collaborative research studies



# Countries APHA IRL have supported in the last 10 years (2010-2020) – *Avian Influenza/NDV*





# APHA Diagnostic disease response overview: rapid and reliable



Birds are sampled  
(OP and C swab + blood)



Samples SUBMITTED to APHA Weybridge Laboratory

Extraction of  
RNA and  
molecular  
testing

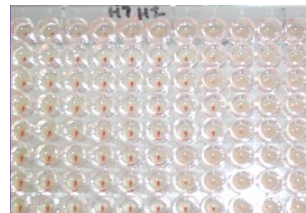
Serology  
assessed by  
HI for AI/ND  
antibodies

Swab material  
processed into  
eggs for virus  
isolation

Initial screen  
AIV- M gene (Nagy2)  
NDV- L gene (Sutton)

**Positives go to NGS:**

- Full characterisation
- Mammalian adaptation etc



Eggs candled daily:

- Positives processed and stock generated
- Isolated virus utilised in IVPI where needed

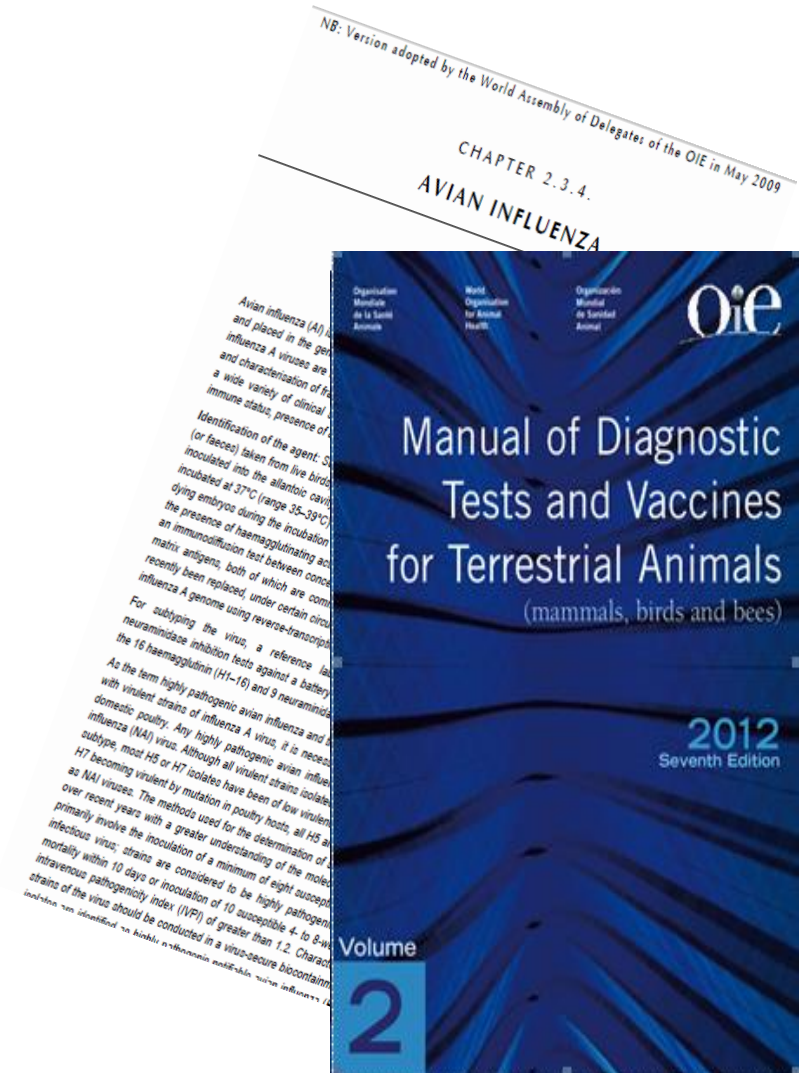


**All tests UKAS  
accredited ISO17025  
International  
standards**

# Key Laboratory requirements: ISO17025

Disease template : prepared bespoke to each disease of local relevance

- Tests to used for confirmatory diagnosis, Level of Preparedness, Ability to ramp up, Pinch points (limiting steps), quality assurance to ISO17025
- Resources: **trained and 'health cleared'** staff, facilities, reagents & consumables
- Disease scenarios tested
- Lead/turnaround times for test results
- Reporting (how/who communicates results)
- **International proficiency tests** via APHA
- Importance of undertaking recommended tests



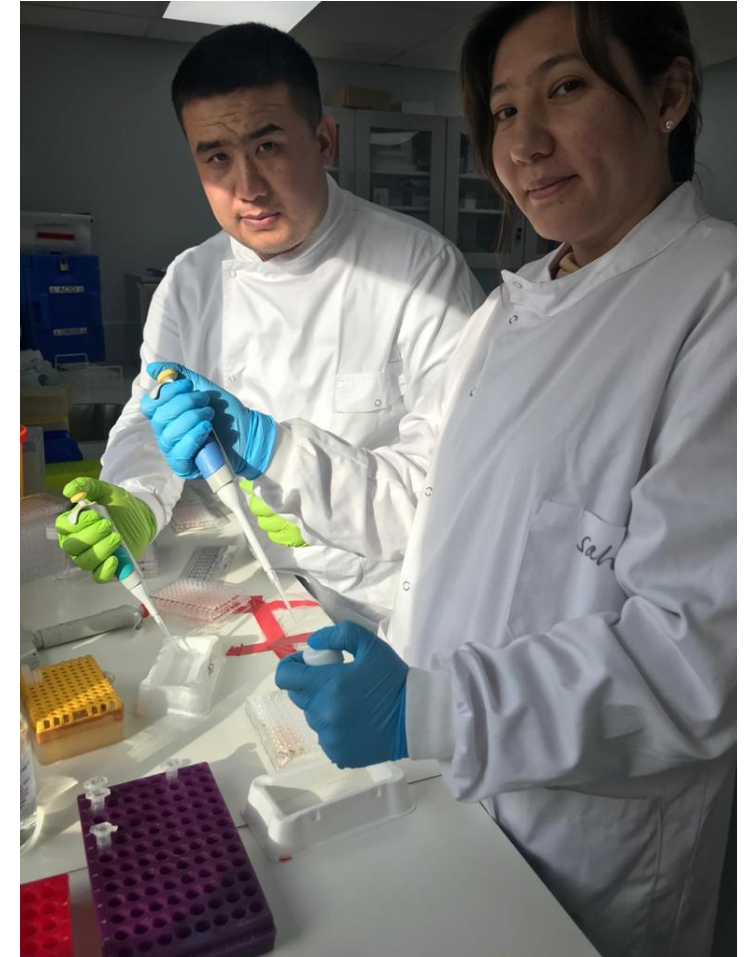
# Sharing of panels for molecular testing

## Supply:

- 10 blind samples requiring RNA extraction
- All samples shipped in Primestore® preservative-  
NON-INFECTIOUS

## Questions:

- 1) Is the sample AIV or not?
  - 2) Can the lab test for NDV?
  - 3) If yes, is it H5 or H7?
  - 4) Can the lab also determine N type?
    - Emphasis on pathotype interpretation by the labs
    - NA type detection RRT-PCR detection where possible in context of H5N8, H5N5 and H5N6
- Offer to further type samples where assays not available



# PCR: Current sample panel for molecular testing

- Optimised each year to ensure relevance of strains being tested with those circulating
- Samples sent in Primestore as NON-INFECTIOUS aliquots
- Samples require full extraction and PCR to assess
- We will work with you to interpret results

	<b>Strain</b>	<b>Strain Name</b>	<b>Year</b>
1	H5N8 HPAI	A/Ck/Slovakia/14/20 (AV105/20)	2020
2	H7N9 HPAI	A/Guangdong/17SF003/17 (Av1238-17)	2017
3	H9N2	A/Ck/Bangladesh/8222/17 (AV267/18)	2016
4	H7N7 LPAI	A/mall/Belgium/11242_3/16 (Av1239/17)	2016
5	Negative	Negative	NA
6	NDV	P/ck/Romania/10397/17 (Av600-17)	2017
7	H5N6 HPAI	A/Mute swan/Eng/001986/18 (AV19/18)	2018
8	NDV	P/ck/Bulgaria/1/17 (Av166-17)	2017
9	NDV	P/Ck/Romania/11183/16 (AV379/16)	2016
10	H5N8 HPAI	A/Tky/Israel/238/19 (AV644/19)	2019

# Serology: Current sample panel for serological testing

- Optimised each year to ensure relevance of antigen/sera being tested
- Samples sent ready for HI testing
- Again we can work with you to interpret results

	Strain	Antigen	Year/ ref
<b>1</b>	H5N2	A/Mallard/ Denmark/ 11887-1P3/16 AV953/16	<b>2016</b>
<b>2</b>	NDV	P/Ck/Romania/11183/16 AV379/16	<b>2016</b>
<b>3</b>	H7N1	A/Afr.Star/Eng/983/79	<b>B3/18</b>
<b>4</b>	H9N2	A/Ck/Bangladesh/8222/17 AV297/18	<b>2016</b>
<b>5</b>	H5N3	A/Teal/ Eng/7394-2805/06	<b>B2/18</b>
<b>Control Ag A</b>	H5N2	A/Ost/Den/72420/96	<b>B3/08</b>
<b>Control Ag B</b>	H7N5 LPAI	A/mall/Belgium/467-H191864/17 (Av1239/17)	<b>2016</b>

	Strain	Serum
<b>1</b>	H5N1 LPAI	A/ Chicken/Scotland/559/16 AV23/16
<b>2</b>	SPF	NA
<b>3</b>	H5N2	A/Ost/Den/72420/96
<b>4</b>	H7N1	A/Afr.Star/Eng/983/79
<b>5</b>	H5N3	A/Teal/Eng/7394-2805/06
<b>Control As A</b>	H5N2	A/Ost/Den/72420/96
<b>Control As B</b>	H7N1	A/Afr.Star/Eng/983/79



# International linkages: Sharing of panels



Country	Molecular	Serology
• Croatia	Y	Y
• Germany	Y	Y
• Sweden	Y	Y
• Spain	Y	Y
• Israel (PHL)	Y	Y
• S. Africa (Centurion)	Y	Y
• S. Africa (Stellenbosch)	Y	N
• S. Africa (Oudtshoon)	Y	Y
• Botswana	Y	Y
• S. Korea	Y	Y
• Belarus	Y	Y
• Singapore	Y	Y
• Ukraine (Kiev)	Y	Y
• S. Africa (Onderstepoort)	Y	Y
• Turkey (Bornova)	Y	Y
• Egypt	Y	Y
• Ukraine (Kharkiv)	Y	Y
• Georgia (Batumi)	Y	N
• Georgia (Tea)	Y	Y
• Georgia (Ilia Univ.)	Y	N
• Afghanistan	Y	N
• Bangladesh (BLRI)	Y	N
• Kazakhstan	Y	Y
• Spain (INIA-CISA)	Y	N
• Morocco	Y	N
• Israel (Kimron)	Y	N
• N. Ireland	Y	Y
• N. Ireland	Y	Y
• Vietnam	Y	N
• Ghana	Y	N



**FluGlobalNet**

Enhancing global Animal Influenza networks

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