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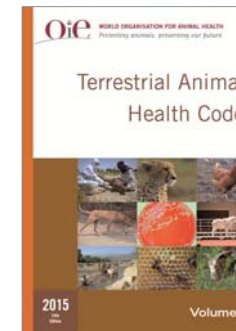
OIE Standards on validation of diagnostic tests in general and for wildlife

Regional Seminar for OIE National Focal Points for Wildlife
Nakuru (Kenya), 22 – 24 November 2016

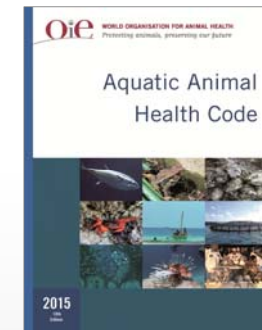


OIE standards

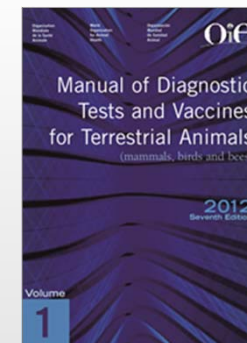
Terrestrial Animal Health Code – mammals, birds and bees



Aquatic Animal Health Code – fish, molluscs and crustaceans



Manual of Diagnostic Tests and Vaccines for Terrestrial Animals

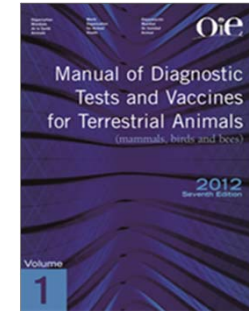


Manual of Diagnostic Tests for Aquatic Animals



Codes and Manuals available on the OIE website

Chapters 1.1.5. of the OIE *Terrestrial Manual* and 1.1.2. of the *Aquatic Manual*



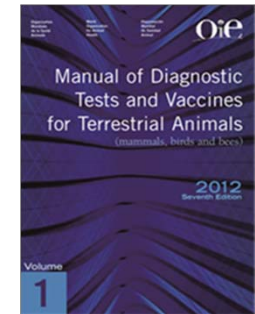
- Identical chapter in both manuals because principles and methods are same
- Title: Principles and methods of validation of diagnostic assays for infectious diseases
- Included for the first time in the *Terrestrial Manual* in 2000 and in the *Aquatic Manual* in 2003

Other chapters of the OIE *Terrestrial Manual* and the *Aquatic Manual* relevant for validation

Eight (8) Chapters have been developed in complement of this standard:

Chapter 3.6.1	Chapter 3.6.2	Chapter 3.6.3	Chapter 3.6.4	Chapter 3.6.5	Chapter 3.6.6	Chapter 3.6.7	Chapter 3.6.8
Development and optimisation of antibody detection assay	Development and optimisation of antigen detection assay	Development and optimisation of nucleic acid detection assays	Measurement uncertainty	Statistical approaches to validation	Selection and use of reference samples and panels	Principles and methods for the validation of diagnostic tests for infectious diseases applicable to wildlife	Comparability of assays after minor changes in a validated test method NEW

Chapters of the OIE *Terrestrial Manual* and of the *Aquatic Manual* relevant for validation



- chapters have been developed by OIE *ad hoc* Groups and adopted by the World Assembly of Delegates (2013 for the chapter, 2014 for the first 7 guidelines, and 2016 for the last one).
- [Available and downloadable on the OIE website](#)

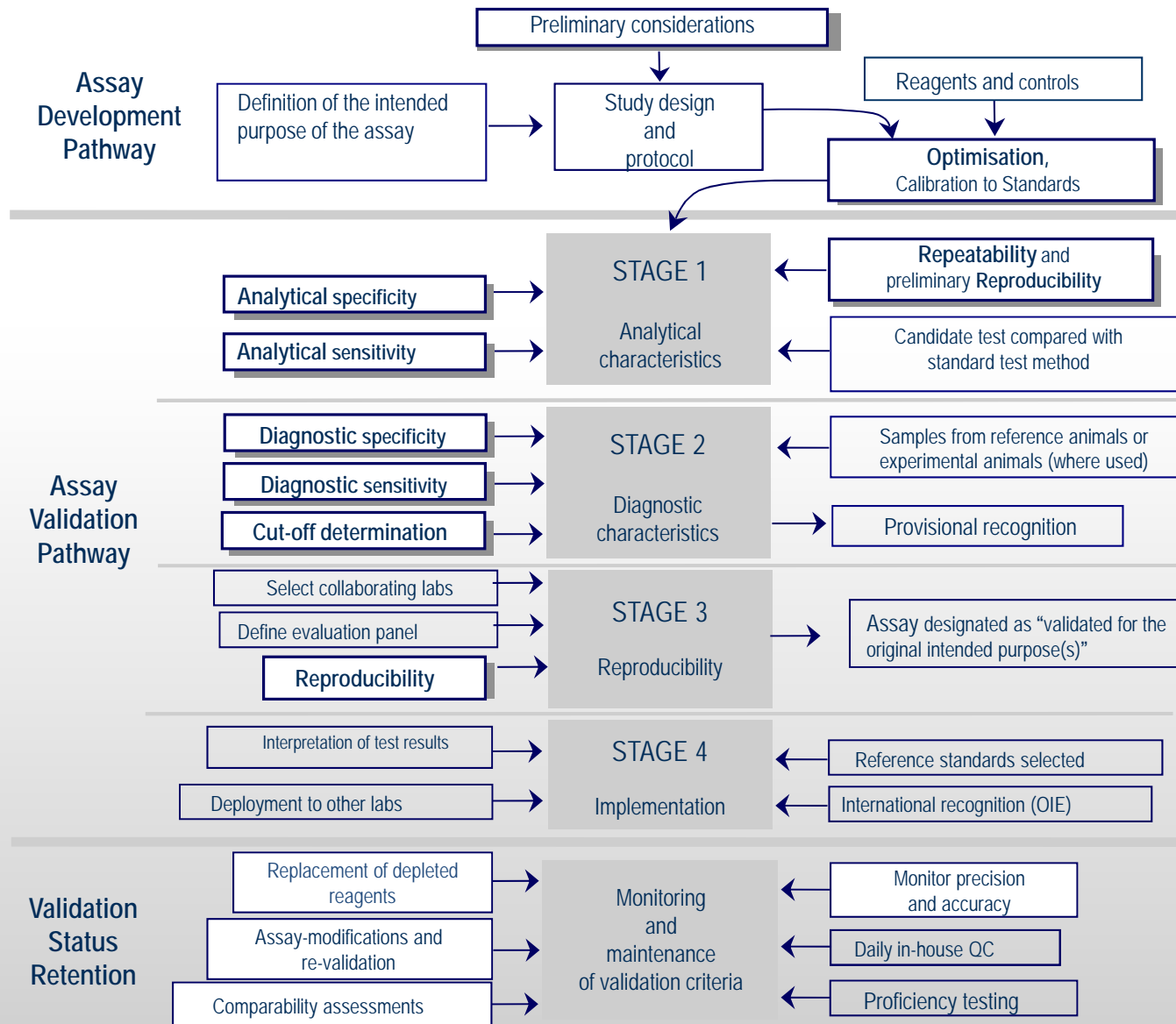
What is test validation?

- **Process** that determines the **fitness of an assay for (an) intended purpose(s) and for specific specimen(s) and specie(s)**
- Process that determines the **assay's analytical and diagnostic characteristics**
- It is an ongoing process.

Why test validation?

- Confidence in test results obtained
- Ensure quality of the test results
- Repeatability in a same laboratory and
Reproducibility in other laboratories

OIE development and validation pathway



Intended Purpose(s) for assay



Study Design
and
Protocol

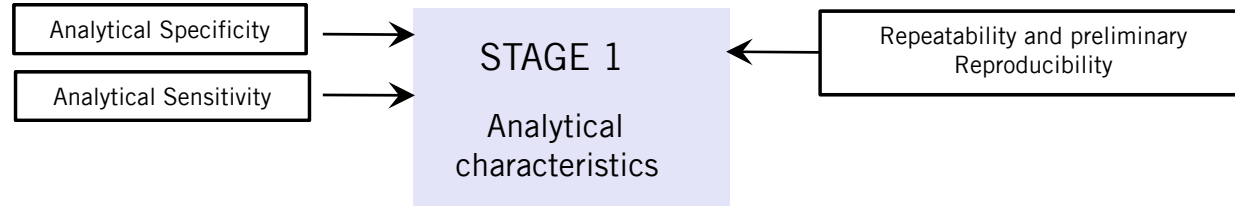
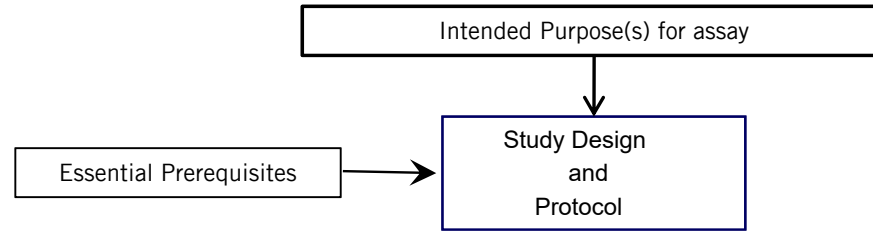
Essential Prerequisites



Assay
Development
Pathway

Assay
Validation
Pathway

Assay Development Pathway

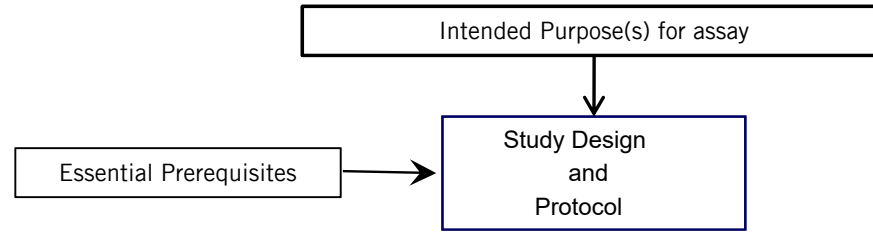


Assay Validation Pathway

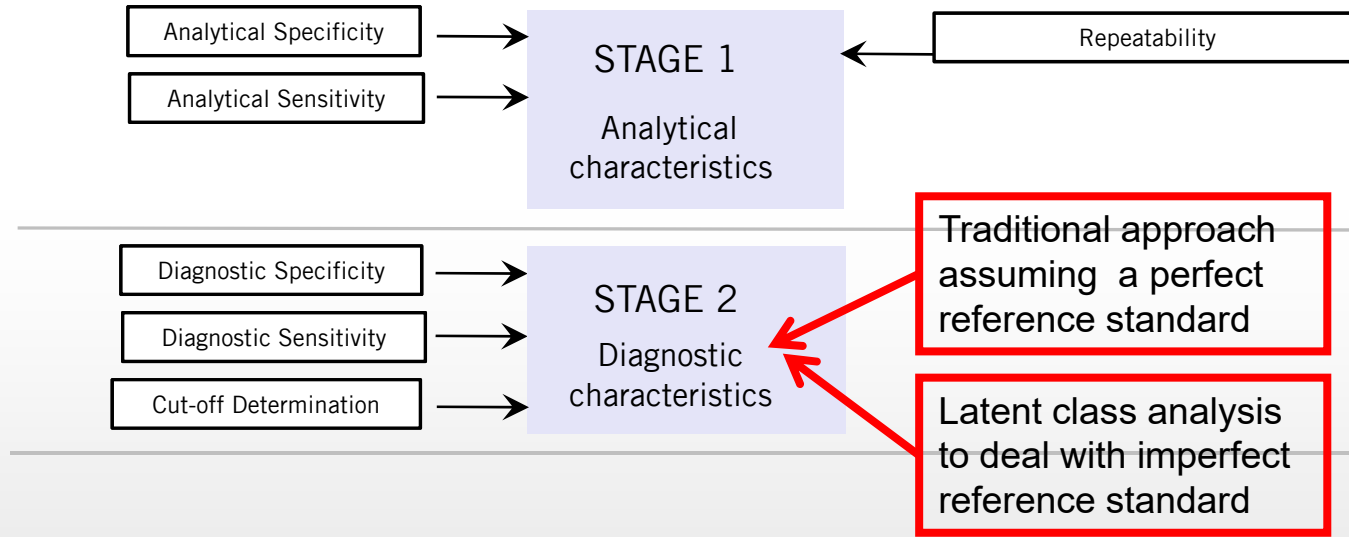
STAGE 1: ANALYTICAL CHARACTERISTICS

- **Analytical sensitivity:** smallest detectable amount of analyte that can be measured with a defined certainty
- **Analytical specificity:** Degree to which the assay distinguishes between the target analyte and other components in the sample matrix
- **Repeatability:** Level of agreement between replicates of a sample both within and between runs of the same test method in a given laboratory

Assay Development Pathway



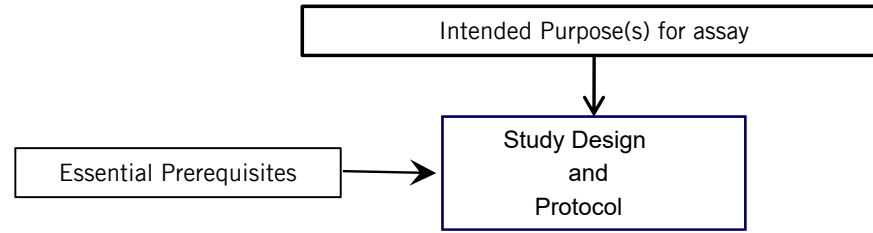
Assay Validation Pathway



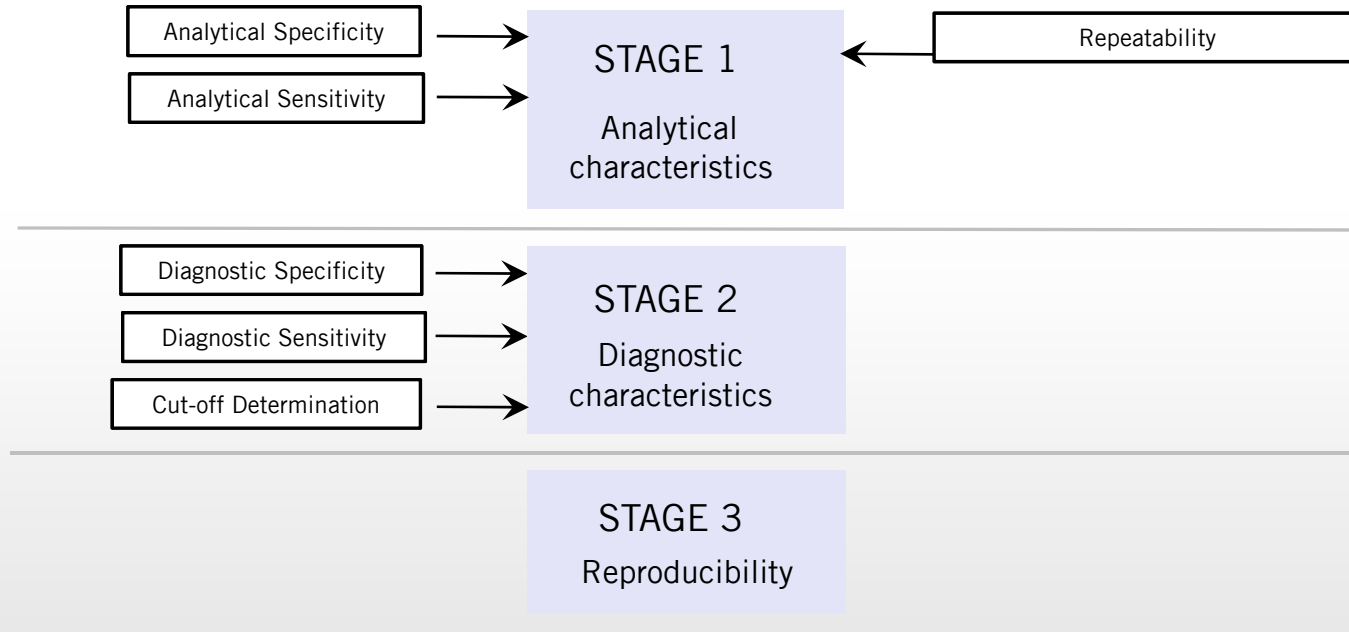
STAGE 2: DIAGNOSTIC CHARACTERISTICS

- Selection of reference animals
- **Diagnostic specificity** : Proportion of known uninfected reference animals that test negative in the assay
- **Diagnostic sensitivity** : Proportion of known infected reference animals that test positive in the assay
- Comparison with existing diagnostic test –
Final Threshold determination

Assay Development Pathway



Assay Validation Pathway



STAGE 3: REPRODUCIBILITY

- **Definition:** ability of a test method to provide consistent results when applied to aliquots of the same samples tested at different laboratories
- Provides additional data for the estimation of the repeatability
- Provides additional data on the robustness if the test method has been developed as a diagnostic kit.

Assay Development Pathway

Intended Purpose(s) for assay

Essential Prerequisites

Study Design and Protocol

Assay Validation Pathway

Analytical Specificity

Analytical Sensitivity

STAGE 1
Analytical characteristics

Repeatability

Diagnostic Specificity

Diagnostic Sensitivity

Cut-off Determination

STAGE 2
Diagnostic characteristics

STAGE 3
Reproducibility

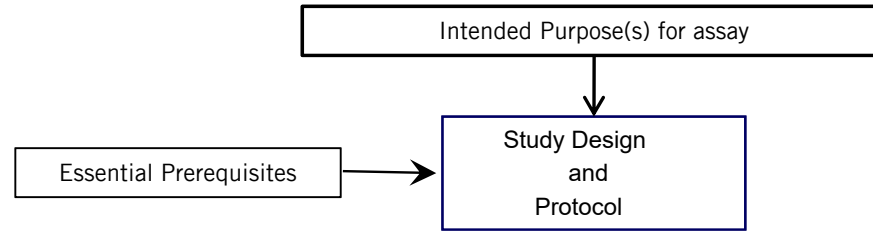
Deployment to other Labs

STAGE 4
Implementation

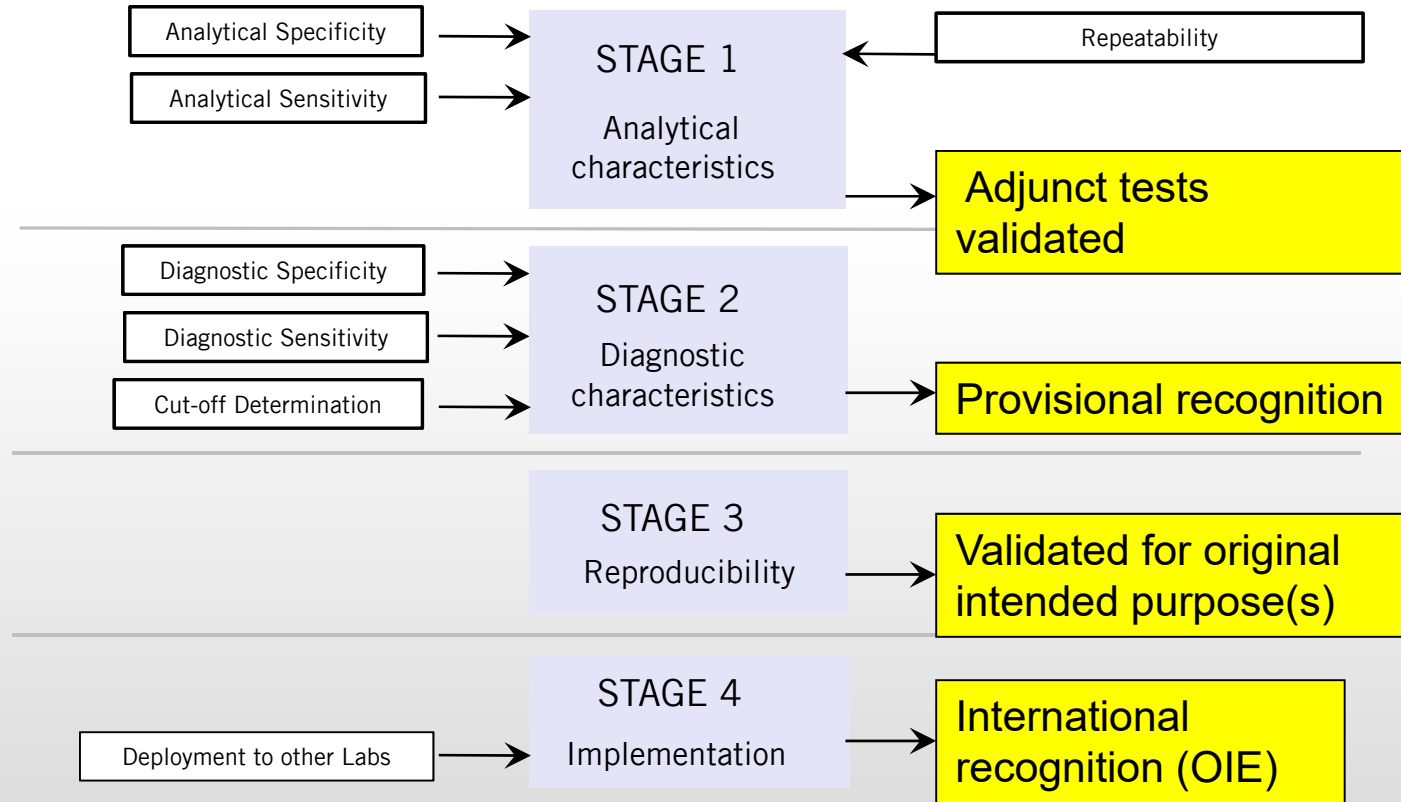
STAGE 4: PROGRAMME IMPLEMENTATION

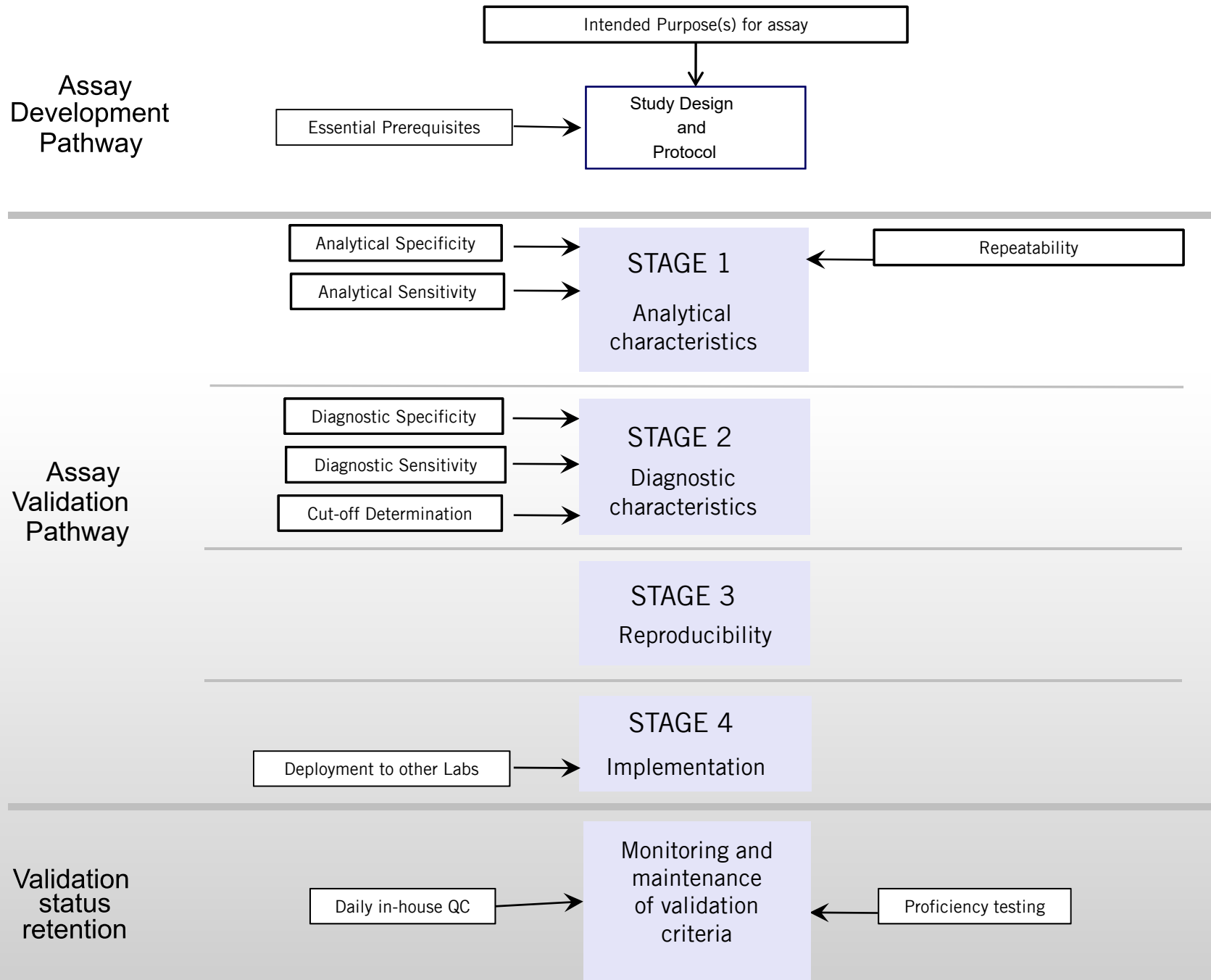
- Extensive application of the test method in different laboratories,
- Interpretation of tests results, and
- International recognition

Assay Development Pathway



Assay Validation Pathway

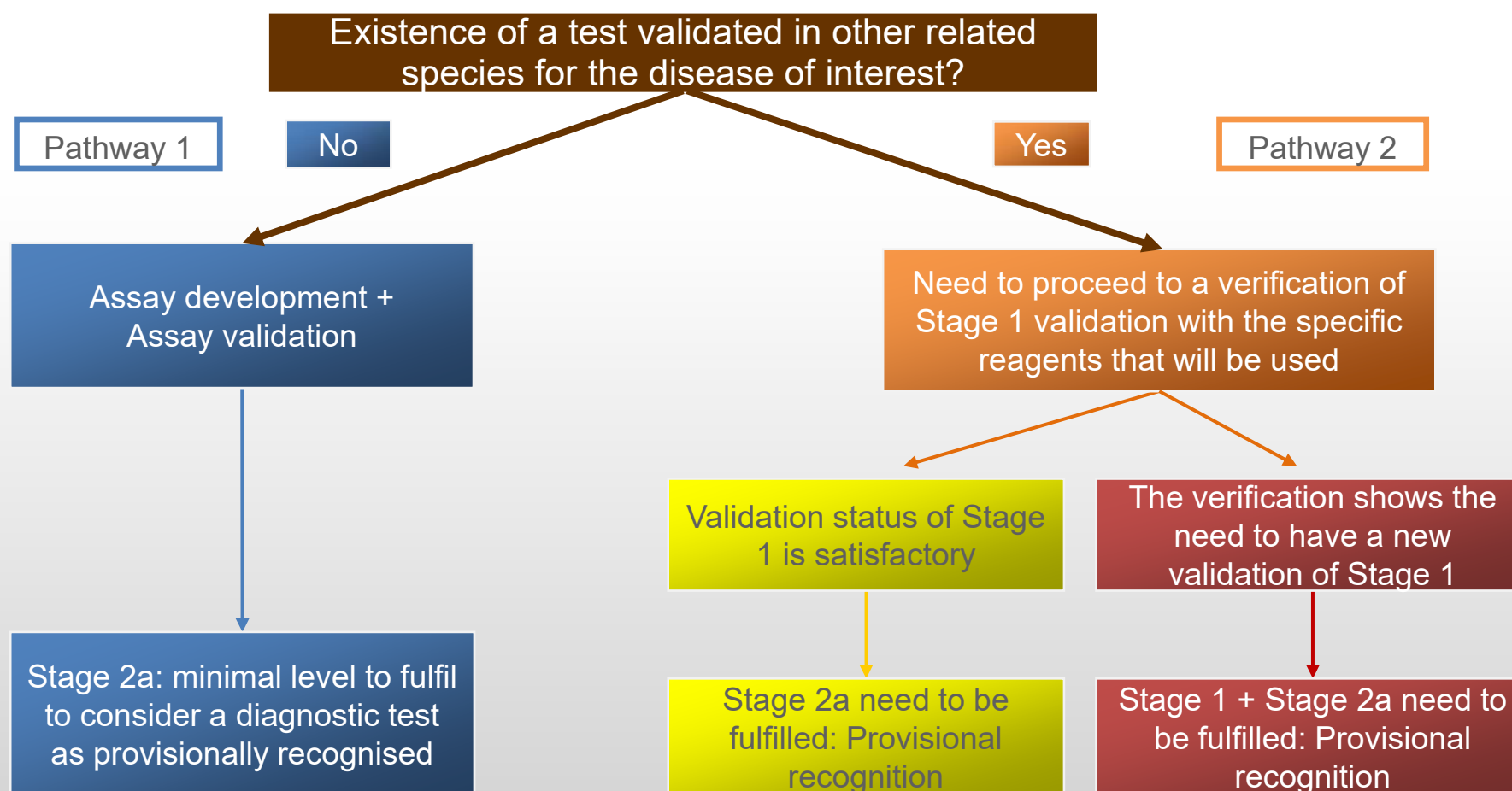




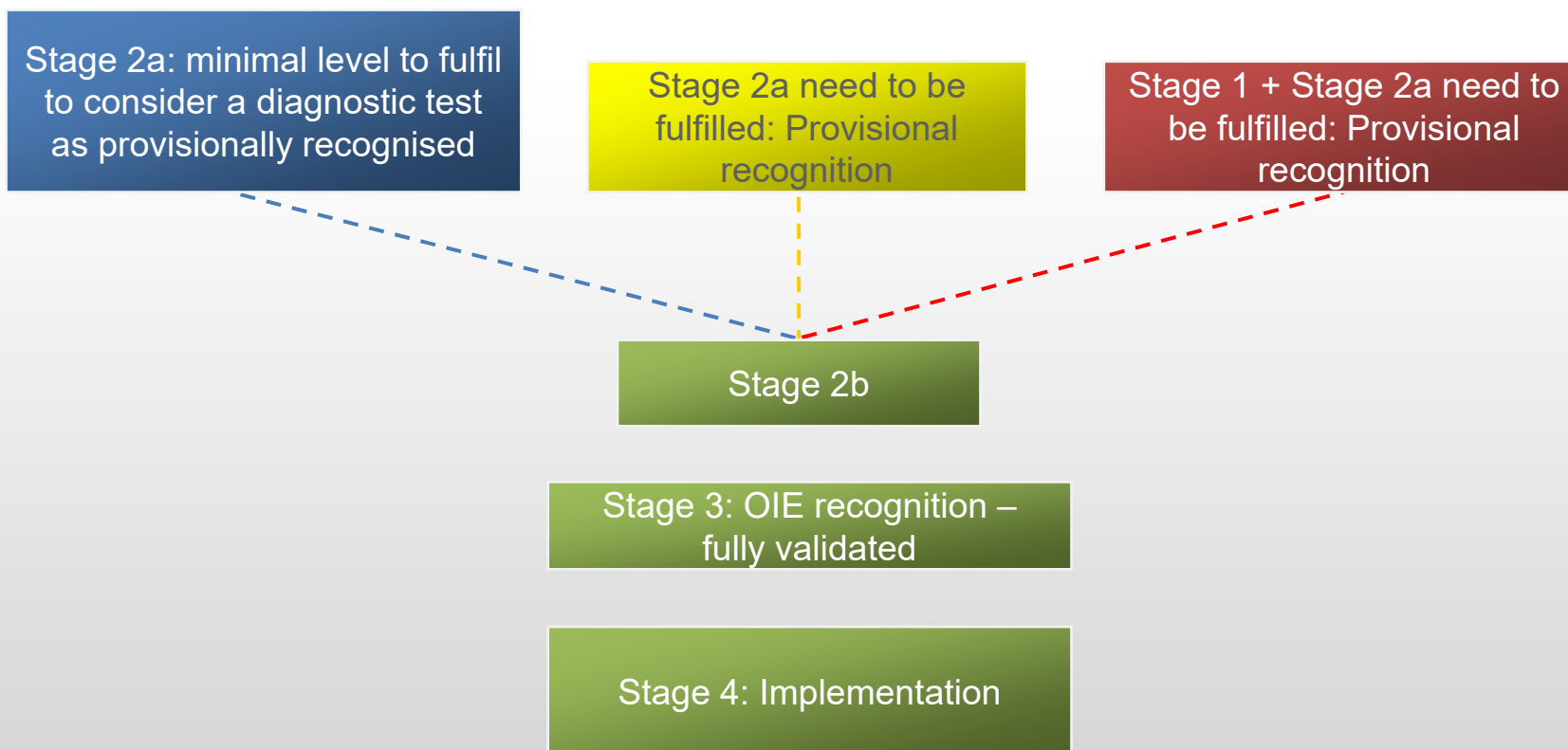
Validation of diagnostic tests for wildlife diseases - Challenges

- Stage 2: difficulty in obtaining sufficient samples for estimation of DSe and DSp
- Regulations limiting or prohibiting possession and international shipment of samples
- Poor sample quality
- Experimental infections may be only source of reference samples
- Limited knowledge of pathogenesis/epidemiology of many diseases

Validation of diagnostic tests for wildlife diseases – the proposed way forward



Validation of diagnostic tests for wildlife diseases – the proposed way forward



Validation of diagnostic tests for wildlife diseases – the proposed way forward

<i>Validation pathway: OIE Validation Standard</i>	<i>Pathway 1: No validated test in related species</i>	<i>Pathway 2: Validated test in related species</i>
Stage 1	Stage-1 verified in new target species	Stage-1 verified in new target species
Analytical specificity	Yes	Yes
Analytical sensitivity	Yes	Yes
Repeatability	Yes	No
Reproducibility (preliminary)	Yes	No
Stage 2	Stage 2a (Provisional recognition)	Stage 2a (Provisional recognition)
Diagnostic sensitivity	Yes (minimum of 30 positive reference samples)	Yes (minimum of 10 positive ref. samples)
Diagnostic specificity	Yes (minimum of 30 negative reference samples)	Yes (minimum of 10 negative ref. samples)
Cut-off determination	Yes (total of 60 samples)	Yes (total of 20 samples)
Reference sample description	Yes	Yes
	Stage 2b	Stage 2b
Diagnostic sensitivity	Yes	Yes
Diagnostic specificity	Yes	Yes
Cut-off determination	Yes	Yes
Reference sample description	Yes	Yes
Stage 3	Stage 3	Stage 3
Reproducibility	Yes	Yes
Repeatability	Yes	Yes
Stage 4	Stage 4	Stage 4
Predictive values (populations)	Yes	Yes

Thank you for your attention



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WORLD ORGANISATION FOR ANIMAL HEALTH

Protecting animals, preserving our future

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