Methodological advancements on inter-laboratory diagnostic test evaluation

CoVetLab joint research project 2022-2023

Diagnostic test evaluation provides information that is fundamental to the use of test results to infer the presence, prevalence, or absence of a disease in a population
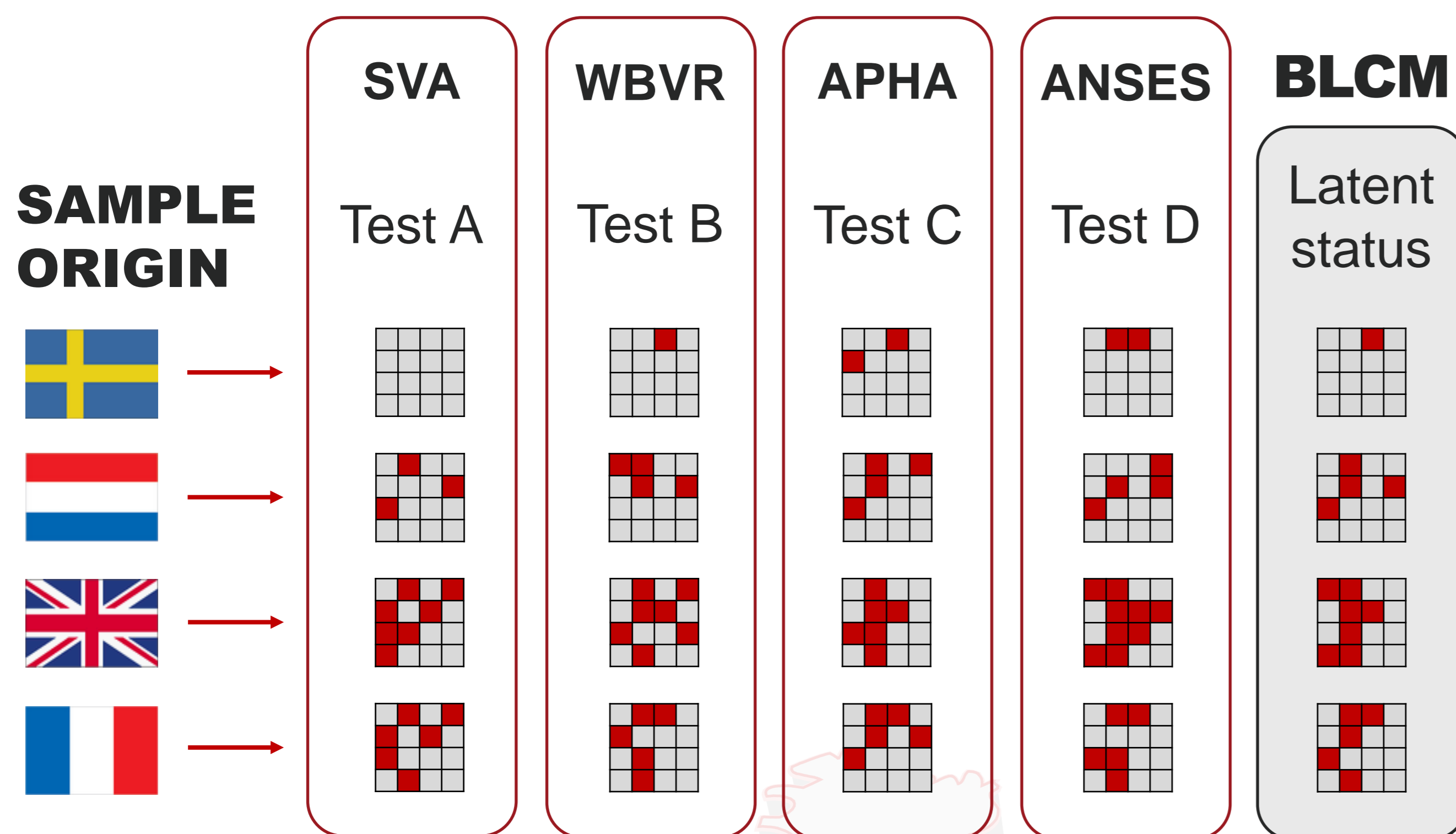
CHALLENGES

1) Lack of gold standard test →

2) Lack of positive samples →

SOLUTIONS

Bayesian latent class models

Inter-laboratory evaluation

LAB ANALYSES

SAMPLE ORIGIN

SVA	WBVR	APHA	ANSES	**BLCM**
Test A	Test B	Test C	Test D	Latent status

The Bayesian latent class model (BLCM) will combine the laboratory results for each sample population and assign an assumed true value for each sample, i.e. the *latent status*.

CASE STUDIES
Serological detection of **BVD** & **IBR**
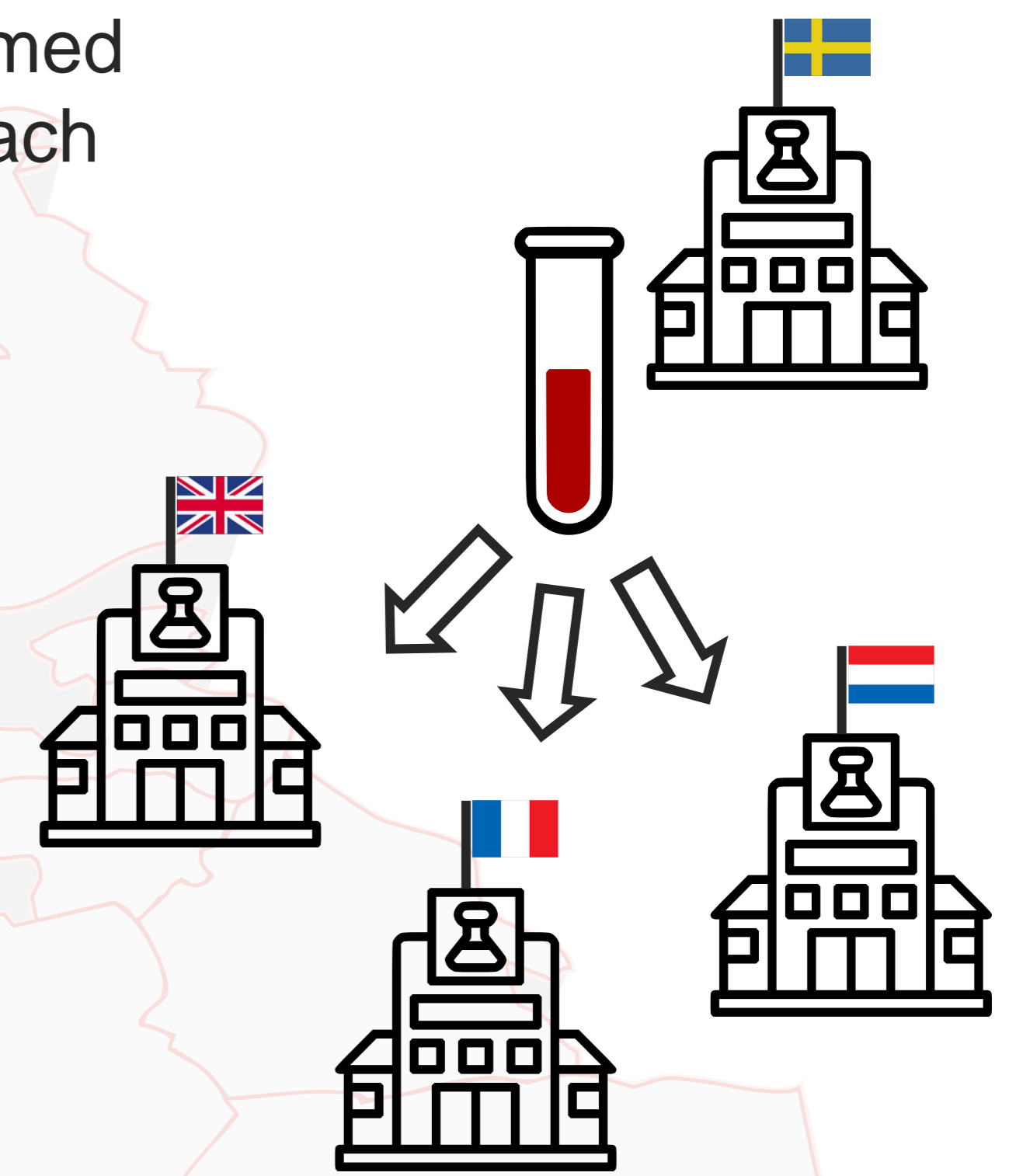
WORKFLOW

- Each lab shares a selection of serum samples with all other collaborating labs
- Every sample is analysed by each lab with their own serological tests for BVD and IBR
- All lab results are analysed together using BLCM to estimate the sensitivity and specificity of each test.

EXPECTED OUTCOMES

- Estimation of the diagnostic sensitivity and specificity of serological tests currently used for detection of BVD and IBR
- Open-source software tool for inter-laboratory diagnostic test evaluation using BLCM
- International collaborative network of laboratory experts and epidemiologists to:
  i.   exchange expertise and experience on test evaluation
  ii. facilitate future sample exchange between partner institutes
  iii. move towards a harmonization of diagnostic tools and analytical strategies for test evaluation across Europe

CONTRIBUTORS

A. Comin (SVA)
V. Ahlberg (SVA)
G. Kouokam (ANSES)
S. Valas (ANSES)
M. Denwood (KU)
M. Arnold (APHA)
H. Crooke (APHA)
A. Dastjerdi (APHA)
A. Dekker (WBVR)
M. Cunotte (WBVR)
E. de Freitas Costa (WBVR)