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27th ESCV EUROPEAN SOCIETY FOR CLINICAL VIROLOGY

17-20 September 2025 THESSALONIKI CONCERT HALL THESSALONIKI GREECE

Organized by ESCV

Real-Time Monitoring of Antiviral Efficacy Insights from the VIRvOLT Network

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INTRODUCTION

The COVID-19 pandemic underscored the critical need for rapid, standardized assessment of antiviral efficacy. Most clinical trials assess antiviral efficacy by tracking Ct values from RT-PCR detection on nasopharyngeal samples collected over time. However, variations in viral load due to sample quality and differences in extraction platforms introduce inconsistencies, emphasizing the need for standardized measurements. To overcome these limitations, the **VIRvOLT network** was set up to ensure that viral load results are **comparable across Europe, regardless of the laboratory**.

THE VIRvOLT NETWORK

VIRology Operational Laboratories for drug Testing

Created during the DisCoVeRy trial and within the EU-RESPONSE project our network enables real-time, **standardized nasopharyngeal viral load** measurements.

Our process normalizes **sample quality** and **extraction efficiency** regardless of the molecular biology platforms used.

VIRvOLT

Belgium : HUB-ULB Laboratoire Hospitalier Universitaire de Bruxelles

Luxembourg : Laboratoire National de Santé (LNS) Microbiology Department

Switzerland : University Hospital Basel - FAMH Medical Microbiology

France : Coordination Hospices Civils de Lyon - Hôpital de la Croix Rousse National Reference Center (CNR) for respiratory viruses

Spain : Hospital La Paz Madrid - Microbiology Department

Portugal : INSA Lisboa - National Reference Laboratory for Influenza and Other Respiratory Viruses

Poland : Central Clinical Hospital, Medical University of Łódź - Respiratory Virus Laboratory Medical Laboratory of Genetics

Czechia : University Hospital Brno Department of Clinical Microbiology and Immunology

Slovakia : Pavol Jozef Šafárik University, Faculty of Medicine, Department of Epidemiology / Department of clinical biochemistry - Košice

Hungary : University of Pécs Clinical Center /Dpt of laboratory medicine

Greece : Evangelismos Hospital Athens Department of Clinical Microbiology

VIRvOLT partners

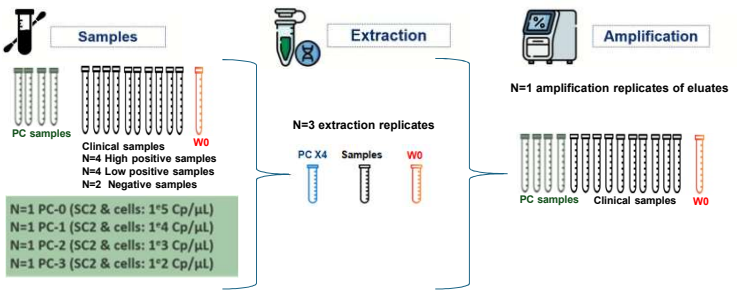
Targeted countries

EQA PROGRAMS

Protocols

Each lab quantified 10 SARS-CoV-2 (SC2) external samples (prepared by CNR-Lyon), using the COVID-19 R-GENE® kit and a standardized process.

❖**Method :** Range of RNA controls for SC2 & DNA for cellular control following the entire process (extraction and amplification) called PC-0, PC-1, PC-2, PC-3

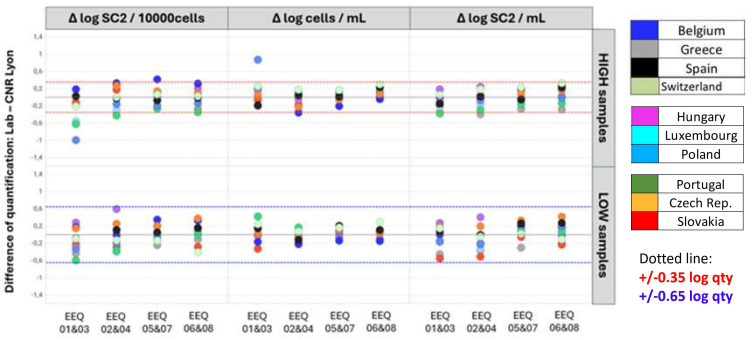


The viral loads from each lab were compared to those from CNR – Lyon lab., and expressed as SC2 cp/10,000 cells or SC2 cp/ml. Acceptance criteria (inter-lab consensus) are :

- 0.35 $\log_{10}$ for sample with Ct < 30
- 0.65 $\log_{10}$ for lower viral load with Ct > 30.

Results

Delta log SC2/10000 cells – cells/mL – SC2/mL per sample (Lab X – CNR-Lyon results)



Log SC2/10000cells quantification :

- Mean difference ≈ -0. 06 log
- % sample within acceptance = **91,8%**

Log SC2 / mL quantification:

- Mean difference ≈ -0. 03 log
- % sample within acceptance = **95.8%**

Without standardization, only 64% of samples show comparable quantification, as **RNA and DNA yields are differently affected by extraction efficiency**. With our process, consistency improves to **>90%,** ensuring reliable viral quantification.

CONCLUSION

VIRvOLT addresses key challenges in establishing a **sustainable transnational virology lab network in Europe**. Designed for continuous readiness, it enables **rapid activation and cross-border monitoring of antiviral effectiveness** during clinical trials.