

# How the health crisis changed our approach to decentralized laboratory testing.

D. Lacourt<sup>1</sup>, C. Boutin<sup>1</sup>, C. Marlas<sup>1</sup>, N. Peixoto Mokhtar<sup>2</sup>, ML. Vabre<sup>3</sup>, C. Coulon<sup>1</sup>, AS Bargnoux<sup>1</sup>, JP Cristol<sup>1</sup>

1 Department of Biochemistry and Hormonology, Montpellier CHU (*Centre hospitalier universitaire* [University Hospital]), University of Montpellier, 2 Gynecological and obstetric emergency department, Montpellier CHU, University of Montpellier, 3 Neurology-Neurovascular Emergencies and Intensive Care Department, Montpellier CHU, University of Montpellier,

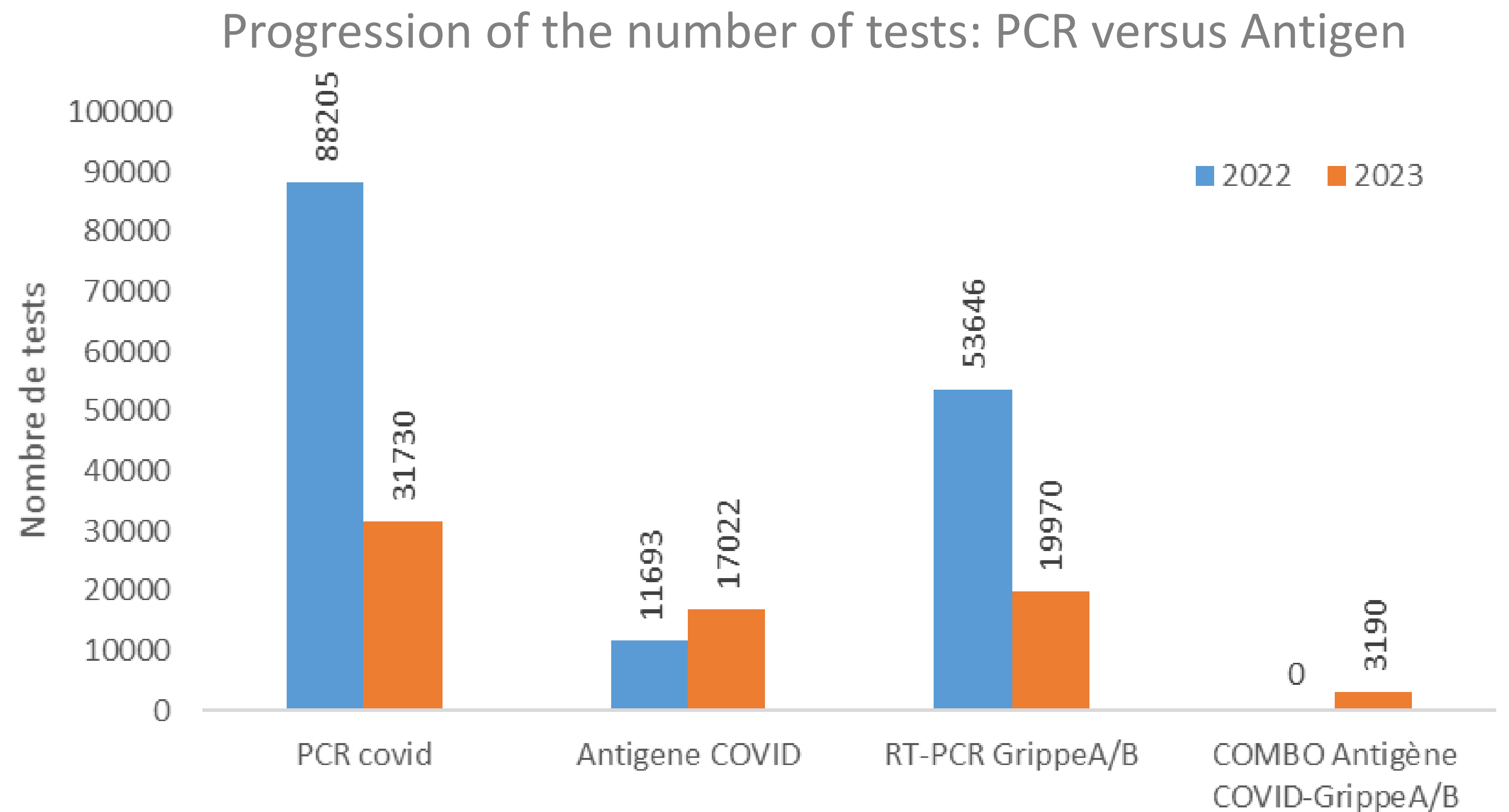
## INTRODUCTION - OBJECTIVE

The global SARS-COV2 pandemic has profoundly changed the organization of healthcare services and regional hospital groups. Delocalized laboratory testing has quickly adapted to three challenges. It was first necessary to respond to the growing demand for ABG testing for "ephemeral resuscitation" and the management of respiratory distress. Then came the time for mass viral detection. Unlike the Rapid Diagnostic Test (RDT), decentralized laboratory testing could offer reliable, rapid tests in under 5 minutes, that were traceable and that met the quality criteria (Rapid and Connectable Point-of-Care COVID-19 Coulon et al. *Diagnostics* 2023,13,3508). Finally, the resurgence of COVID epidemic waves with influenza or RSV epidemics required the development of combined antigen tests.

## THE CRISIS WAS AN "EVOLUTION BOOSTER" AND ACCELERATED TECHNOLOGICAL DEVELOPMENTS

Decentralized laboratory testing could offer rapid, traceable solutions in under 5 minutes, with quality monitoring for antigen tests. This reduction in testing time was crucial to improve the efficacy of mass screenings and facilitate acceptance of the test by healthcare teams, thus improving organization in emergency departments.

Given the resurgence of epidemic waves, sometimes at the same time as seasonal virus epidemics (flu, RSV, etc.). The implementation of combined influenza A and B/COVID-19 antigen tests in emergency rooms and in outpatient departments has made it possible to meet this challenge. The decrease in PCR tests (-64%) and the rise in antigen tests (+46%) demonstrate the synergy of organizations between centralized laboratory and decentralized laboratory testing. The reduction in COVID PCR tests has enabled a reorganization of human resources in virology laboratories.



Decentralized laboratory testing provides access to a wide range of analyses bringing together several biological disciplines (clinical chemistry, microbiology, hemostasis and cytology). "Decentralized benches" can be set up in emergency rooms, in OB-GYN departments and for monitoring extracorporeal circuits such as citrate dialysis or "ExtraCorporeal Membrane Oxygenation". Rapid adjustments in the management of staff authorization, adoption of innovative methods, such as e-learning, the use of tablets and quizzes, have helped to meet the challenges linked to continuing education.

## INTEGRATION INTO THE CARE PATHWAY

The multidisciplinary dimension is particularly crucial for the management of decentralized laboratory testing as part of a GHT (*Groupements hospitaliers de territoires* [regional hospital groups]) or rural management or even in a "medical desert". To be fully effective, the decentralized laboratory testing must be integrated into a clinical-biological dialogue between primary care and the expert centers, the laboratory results must be integrated into the clinical context, the imaging or ECG data all potentially transmitted remotely. It is in this sense that the decentralized laboratory testing of tomorrow must be integrated into telemedicine care pathways.

