

Monitoring of SARS-CoV-2 infection from nasopharyngeal swab, saliva, feces and urine by a quantitative rapid antigen test

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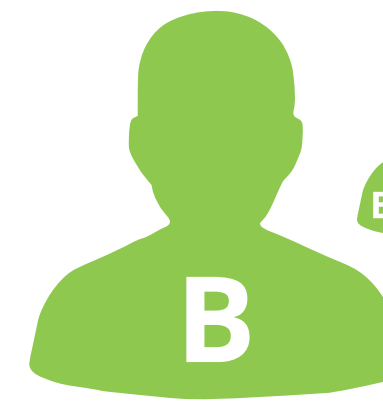
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Introduction

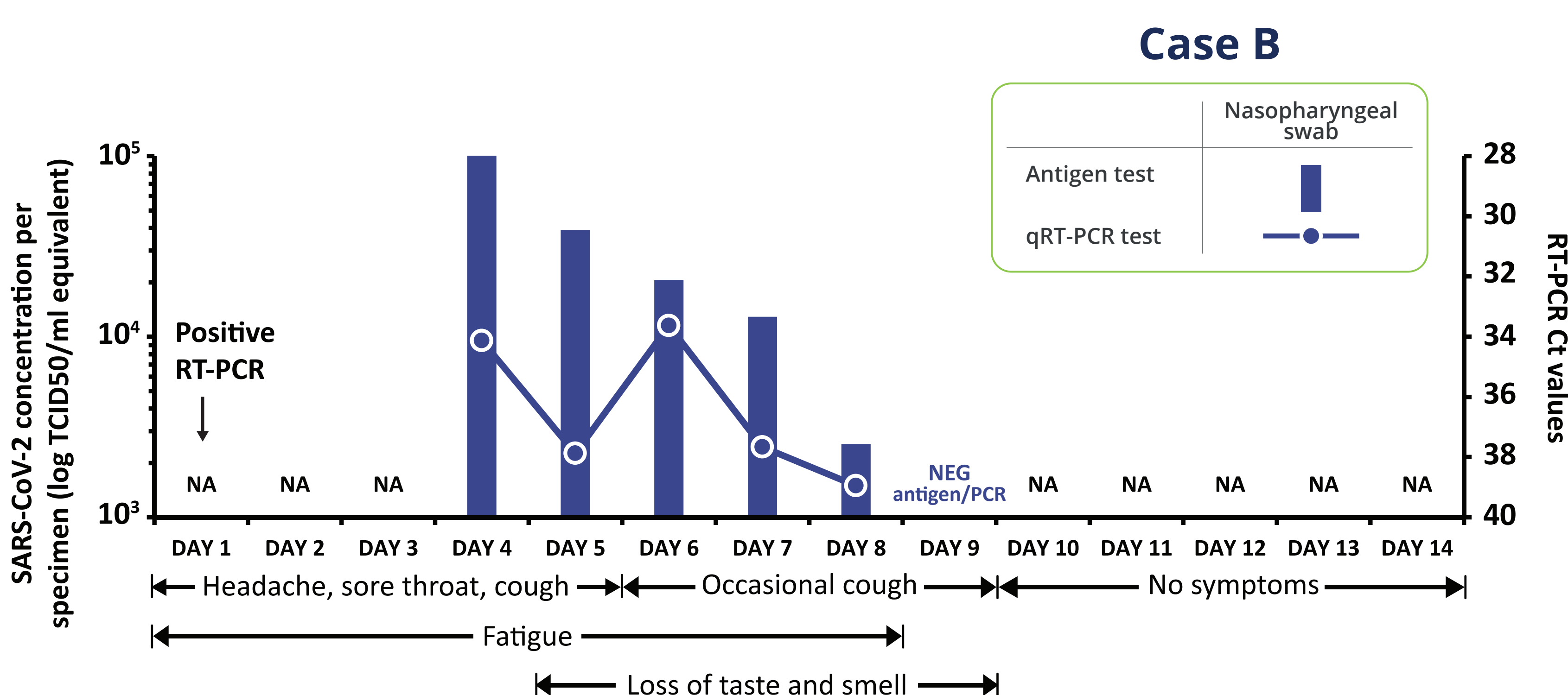
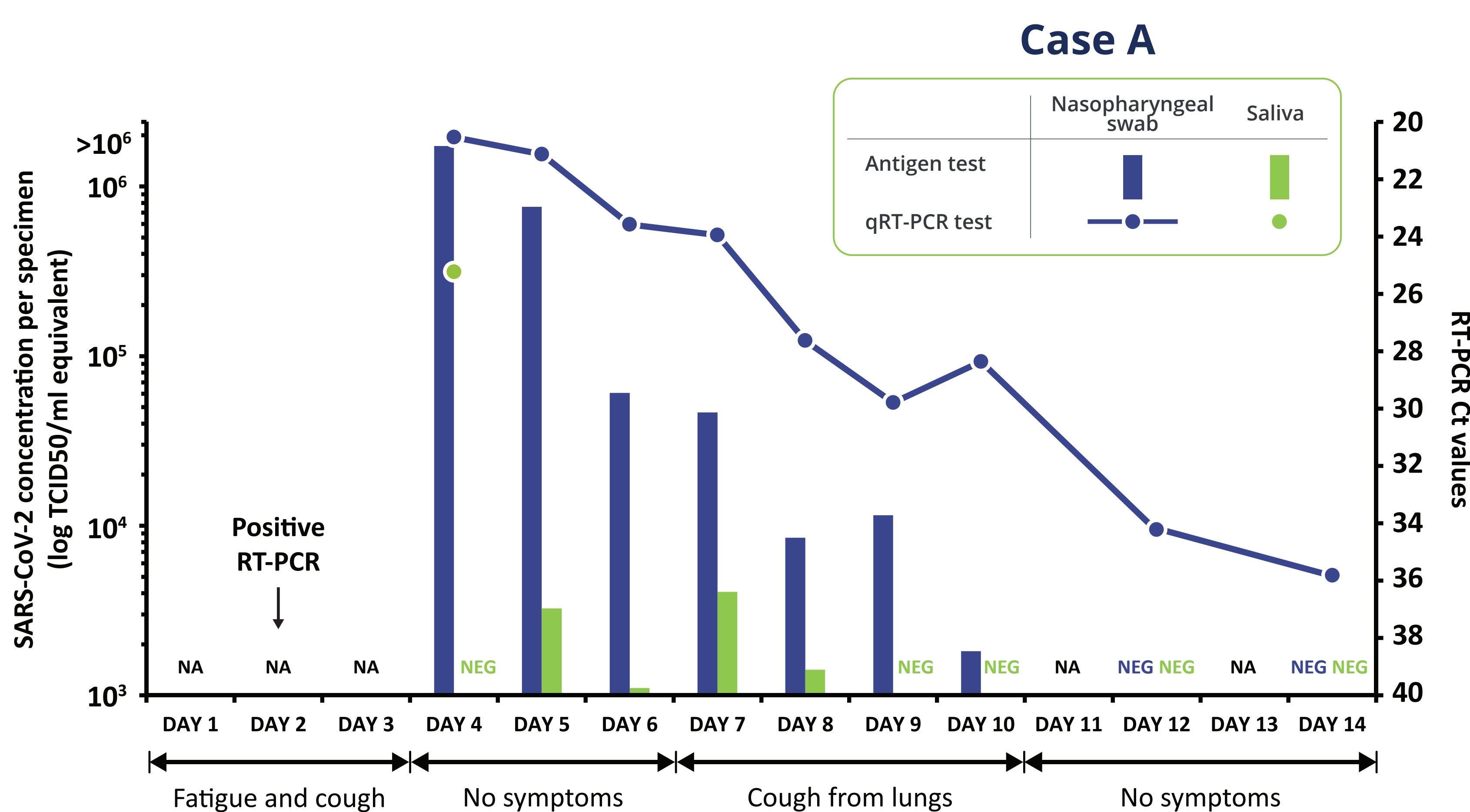
Antigen tests for respiratory infections have been described to work best for the first five days from symptom onset. Besides nasopharyngeal swab, other sample types have been proposed for testing of SARS-CoV-2. We describe, for the first time, the use of a quantitative antigen test for monitoring the viral load in nasopharyngeal swabs, saliva, urine, and stool.

Case description

We serially tested two individuals (A, B) with primary SARS-CoV-2 infection and one healthy individual living with case B. Samples were self-collected on a daily basis until the symptoms disappeared. Nasopharyngeal swabs, saliva, urine and stool samples were collected. All samples were analysed with mariPOC antigen test and qRT-PCR test.

	 COVID-19 infected	 COVID-19 infected
Collection of samples Days from symptom onset	Day 4 → Day 14	Day 4 → Day 9
Sample types	Nasopharyngeal swab Saliva Urine Stool	Nasopharyngeal swab <small>B's partner</small> Healthy
Diagnostic tests	mariPOC antigen test qRT-PCR test	mariPOC antigen test qRT-PCR test

Results



Viral load in different specimens and evolution along the infection course

In case A, SARS-CoV-2 antigen was found in very high, high, and detectable concentrations from nasopharyngeal swabs up to day five, seven, and ten from symptom onset, respectively. Nasopharyngeal swabs were positive in qRT-PCR in cases A and B.

SARS-CoV-2 was detectable from saliva on days five, six, seven and eight from symptom onset but at two-log lower concentrations. RT-PCR test was also positive from saliva, although with higher Ct values than from nasopharyngeal swab.

SARS-CoV-2 couldn't be detected from urine and stool, even though viral RNA was detected by RT-PCR from stool.

	Case A	Antigen test	qRT-PCR
Urine		—	—
Stool		—	+

Evolution of the symptoms

The first symptoms were headache, fatigue and cough and they correlated with viral load peak in case B. However, very high concentrations of SARS-CoV-2 were observed at day four and five (above 10^6 TCID50/ml equivalent) in case A, while no symptoms were reported. In case B, symptoms decreased after day five, accompanied by a decrease in the viral load. During the next days, a cough coming from the lungs occurred in individual A, and a loss of taste and smell occurred in individual B.

The partner of individual B neither developed symptoms nor became SARS-CoV-2 positive.

Conclusions

Highly sensitive **antigen tests** can detect SARS-CoV-2 infection **up to 10 days** from symptom onset, with highest viral load until days 4-5.

SARS-CoV-2 may be detectable from **saliva** but at **low levels**.

Urine and **stool** samples are **not clinically relevant** for rapid diagnostics because of the absence of antigen (live replicating virus).