

Session 3: Genomic surveillance

Portugal - on the experience for SARS-CoV-2 and influenza

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National Reference Laboratory for Influenza and Other Respiratory Viruses
INSA

8th Joint WHO Europe & ECDC Annual European Influenza and COVID-19 Surveillance Meeting
5-7 October 2022

Genomic surveillance SARS-CoV-2 and influenza

Influenza Networks

- Sentinel GP
- Emergency/obstetrician rooms
- Hospital
- Laboratory

Influenza Sequencing

- First viruses of the season
- Weekly selection viruses
- ~ 96 virus/month

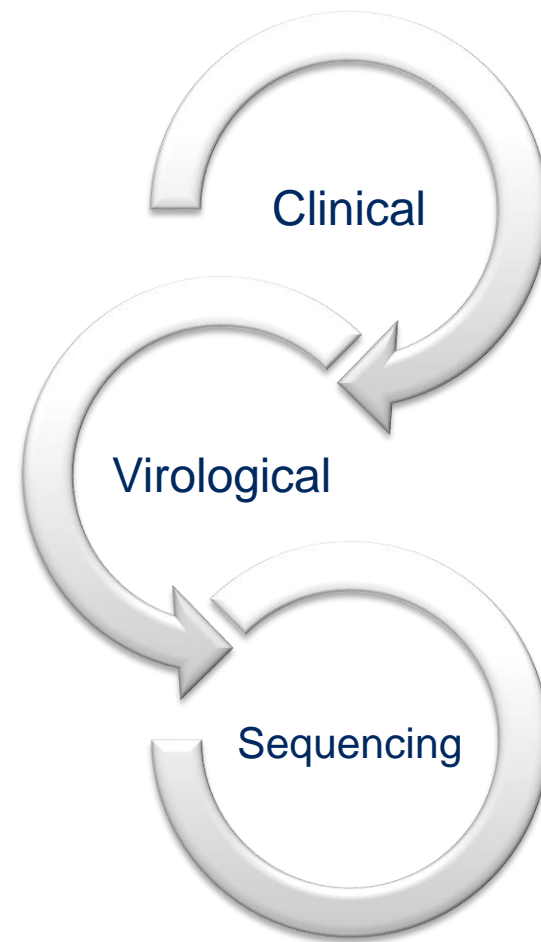
- All age groups, regions
- Vaccinated
- Severe cases
- Hospitalized
- Antiviral therapy

- Less frequent type/subtype₂

Pandemic period

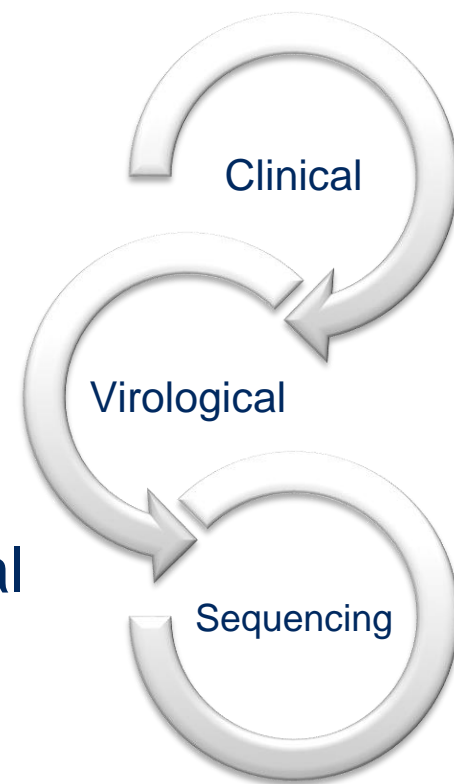
- increase global genomic sequencing capacities
- rapid sharing of sequence data and metadata

Integration of **SARS-CoV-2** testing and sequencing should occur without compromising **influenza surveillance**



COVID-19 pandemic response

- improve the geographic and demographic representativeness
- timeliness of influenza and SARS-CoV-2 genetic sequence
- data in publicly accessible databases, Global Initiative on Sharing All Influenza Data (GISAID)
- monitor trend and prevalence of existing and emerging (co-) circulating genetic variants (clades) among samples from sentinel sites.



Genomic surveillance SARS-CoV-2 and influenza

Influenza/SARS-CoV-2 Sequencing

- Health **Sentinel** Units for respiratory disease

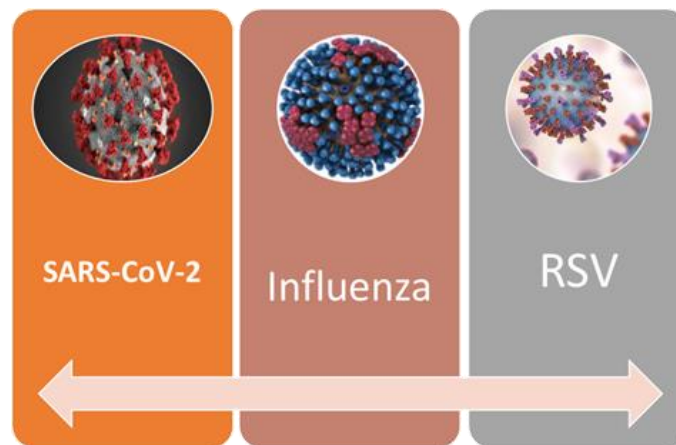


Samples tested for **SARS-CoV-2**
(laboratory network for COVID-19)



National Reference Laboratory, INSA

5-10 samples /week/each site



Sequencing

- All Influenza and SARS-CoV-2 positive rRT-PCR cycle-threshold (Ct) value of ≤ 30

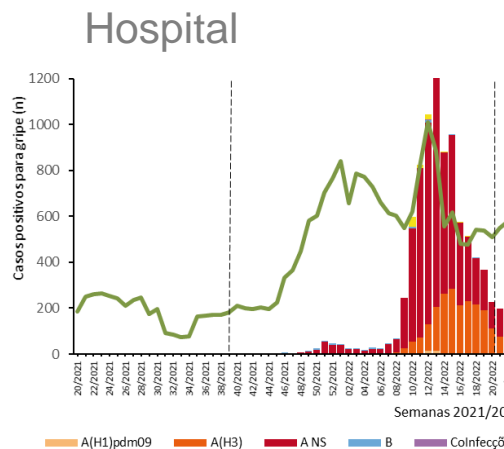
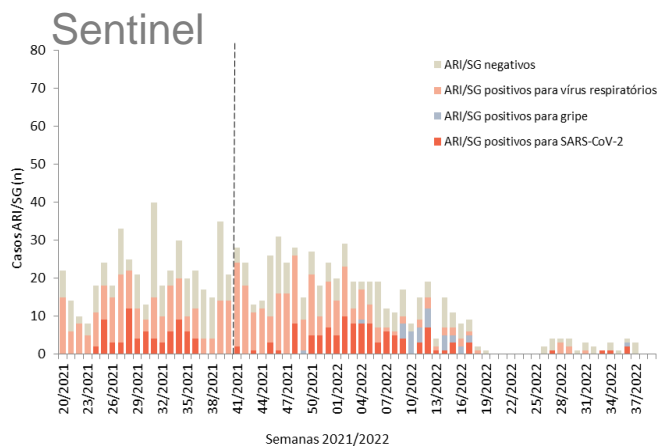


Respiratory viruses*

* hRV, PIV, EV, hMPV, RSVA/B, hBov, hCoV, AdV

Genomic surveillance SARS-CoV-2 and influenza

Influenza Sequencing, 2021/2022

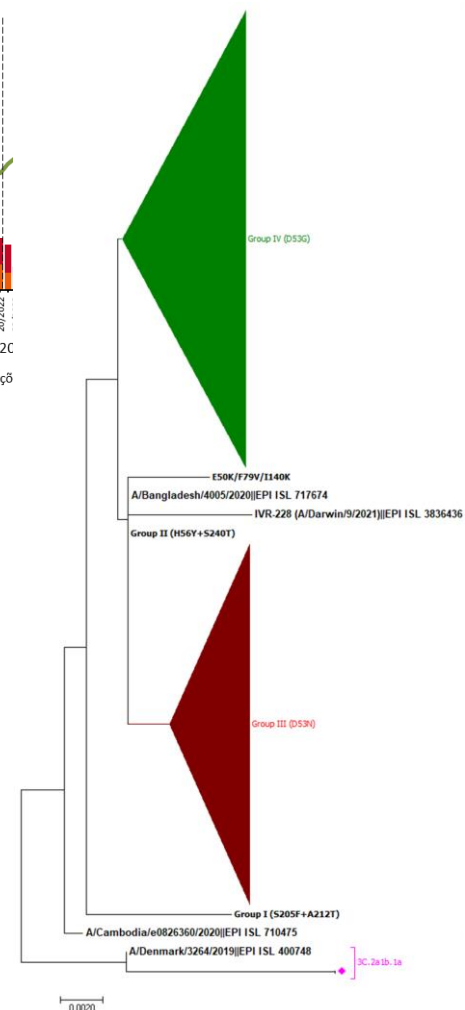


Quadro II — Caracterização genética dos vírus da gripe, detetados desde a semana 40/2021

Subtipo/Linhagem	Grupo Filogenético	Nº de vírus
A (H1)pdm09	A/Victoria/2570/2019 (H1N1)pdm09-like virus ⁽¹⁾	0
	A/Guangdong-Maonan/SWL1536/2019 (H1N1)pdm09-like virus ⁽²⁾	10
A(H3)	A/Cambodja/e0826360/2020 (H3N2)-like virus ⁽¹⁾	0
	A/Bangladesh/4005/2020 (H3N2)-like virus ⁽²⁾	496
	A/Denmark/3264/2019 (H3N2)-like virus ⁽²⁾	2
B/Victoria	B/Washington/02/2019 (B/Victoria lineage)-like virus ⁽¹⁾	0
	B/Austria/1359417/2021 (B/Victoria lineage)-like virus ⁽²⁾	6
B/Yamagata	B/Phuket/3073/2013 (B/Yamagata lineage)-like virus ⁽¹⁾	0
TOTAL:		514

(1) - grupo que inclui vírus geneticamente semelhantes ao contemplado na vacina do Hemisfério Norte para a época 2021/2022

(2) - grupo que inclui vírus geneticamente diferentes ao contemplado na vacina do Hemisfério Norte para a época 2021/2022



3C.2a.tb.2a.2

3C.2a.tb.1a

Influenza/SARS-CoV-2 Sequencing

COVID-19 lab. network

43 Public + 96 private + 34 academy



Selection of positive Swabs



National Reference Laboratory
INSA

- Influenza
5 samples/week/each lab
- SARS-CoV-2
~520 samples/week

WGS Sequencing

All positive rRT-PCR cycle-threshold (Ct)
value of ≤ 30

SNP PCR (SARS-CoV-2)

Monitoring new VOC spread



Genomic surveillance SARS-CoV-2 and influenza

2022/2023 Influenza/SARS-CoV-2 Sequencing

- GP sentinel network (~55)
- Sentinel Health Units (~55)
- Hospital laboratory network (42)



10% resident population
All regions (mainland, Islands)
ARI case def.
Vaccination flu/Covid-19
HCW
medical appointments/statins
smoking habits
RAT COVID-19

Sequencing

- All positive rRT-PCR cycle-threshold (Ct) value of ≤ 30
- Influenza ~96 virus /month
- SARS-CoV-2 ~520 virus/week
- *RSV WGS sequencing

Virus characterization,
vaccine viruses, new clades/variants

Boletim de Vigilância Epidemiológica da Gripe e outros Vírus Respiratórios
Época 2021/2022
Semana 37 | 12 a 18 set

Resumo

Atividade gripal esporádica*

*De acordo com dados da Rede Portuguesa de Laboratórios para o Diagnóstico da Gripe

Vigilância clínica

- A taxa de incidência de síndrome gripal (SG) foi de 11,2 por 100.000 habitantes.
- A taxa de incidência de infeção respiratória aguda (IRA) foi de 16,8 por 100.000 habitantes.

Estes indicadores devem ser interpretados tendo em conta a reorganização dos serviços de saúde, na que se refere ao atendimento do doente respiratório.

Vigilância laboratorial

- Na semana 37/2022, não foram detetados casos de gripe nas redes sentinelas.
- A Rede Portuguesa de Laboratórios para o Diagnóstico da Gripe (Hospitais), na semana 37/2022, detetou 45 casos positivos para o vírus da gripe, dos quais 43 do tipo A e 2 do tipo B. Em 3 dos casos foi identificado o subtipo A(H1) e em 1 o subtipo A(H3).
- Até ao momento, foram detetados 292 casos de co-infeção pelo vírus da gripe e SARS-CoV-2.

2022/2023 SARS-CoV-2 Sequencing

Hospital laboratory network
Public + Private + Academia

Variants monitoring
Complement sentinel surveillance
Geographical coverage

Sequencing

- All positive rRT-PCR cycle-threshold (Ct) value of ≤ 30
- SARS-CoV-2 ~520 virus/week



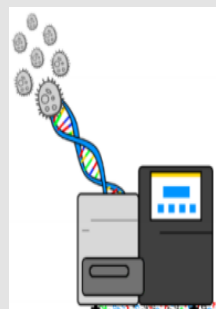
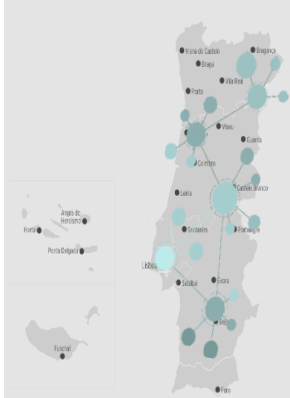
Genomic surveillance of SARS-CoV-2 in Portugal

<https://insaflu.insa.pt/covid19/>

Nationwide Lab Network

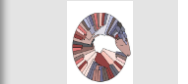
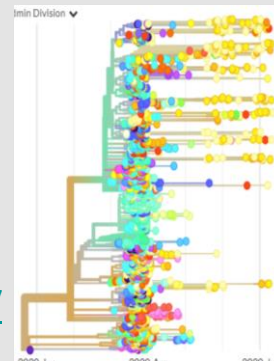
RT-PCR / NGS

BIOINFORMATICS



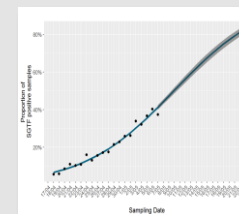
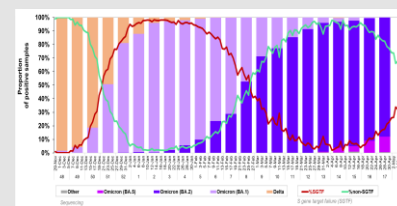
<https://insaflu.insa.pt/>

SARS-CoV-2, influenza, etc



<https://github.com/insapathogenomics/ReporTree>

Borges et al,
2018
Genome
Medicine 10: 46



WGS

Nationwide weekly surveys

- Positive samples (all Regions) are sent to the National Institute of Health (INSA) for sequencing
- Since, June 2021: ~520 sequences / week, covering ~140 municipalities per week

SGTF

- Monitoring based on TaqPath data provided by large laboratories dispersed across the country, when needed

<https://insaflu.insa.pt/covid19/>

(Release on 8 April 2020)

shared by Vitor Borges





Genomic surveillance of SARS-CoV-2 in Portugal

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Open data sharing and reporting



en | pt

PT / EN

Weekly reports every Tuesdays

Genetic diversity of the novel coronavirus SARS-CoV-2 (COVID-19) in Portugal

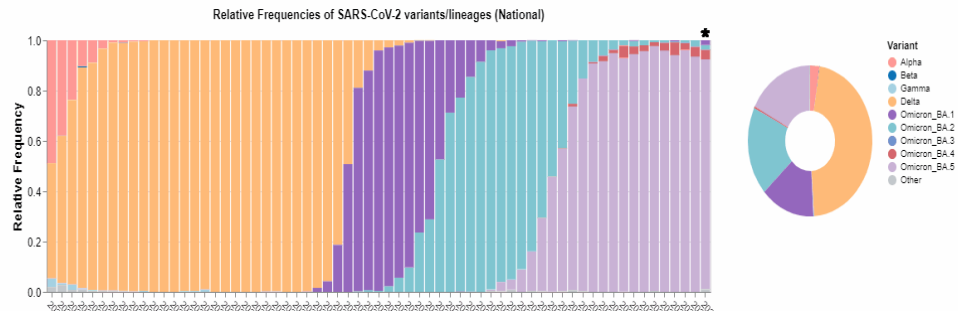
[Download - Latest situation report](#)

The Portuguese National Institute of Health [Instituto Nacional de Saude Doutor Ricardo Jorge (INSA)] is coordinating a national project to monitor the spread of the pandemic novel coronavirus SARS-CoV-2 in Portugal using whole-genome sequencing (WGS) data, in collaboration with a nationwide network of hospitals/labs.

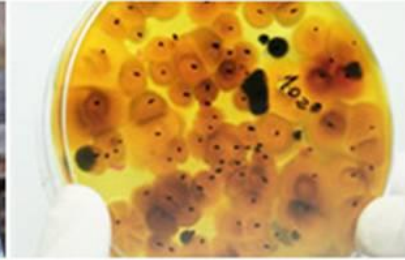
SARS-CoV-2 genome sequence data was obtained through next-generation sequencing (NGS) and bioinformatics analyses using the INSAFLU platform. Up to the current date, INSA analysed 41147 SARS-CoV-2 genome sequences.

[More details about the study \(click here\)](#)

The interactive graphs show the evolution of the weekly relative frequency of the SARS-CoV-2 variants/lineages at national and regional levels.



shared by Vitor Borges



Thank you Q&A

Raquel Guiomar

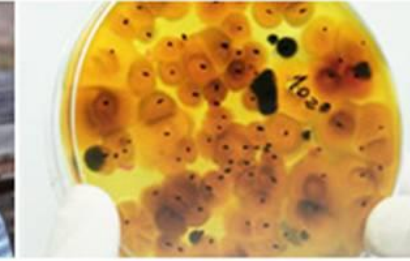
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