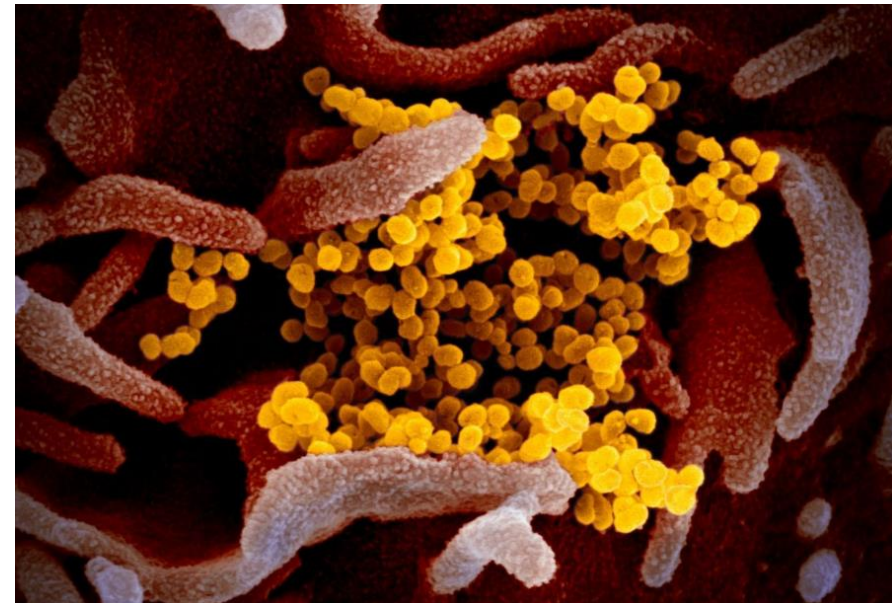


# WGS – DISCRIMINATIVE PCR in the Czech Republic

Helena Jiřincová

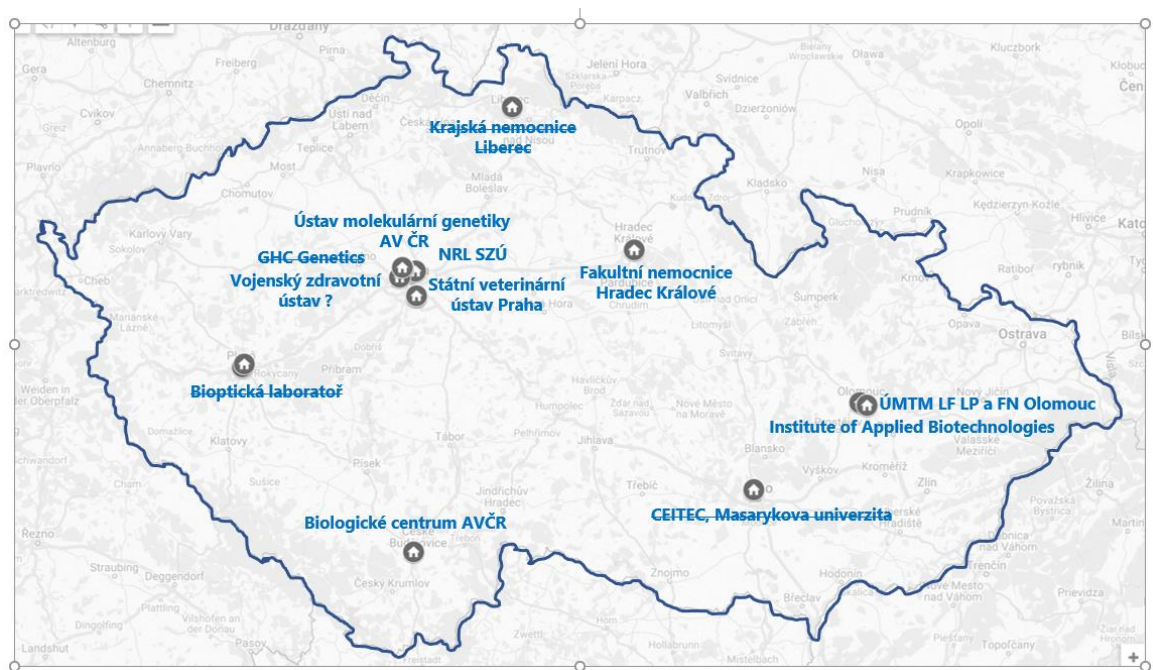
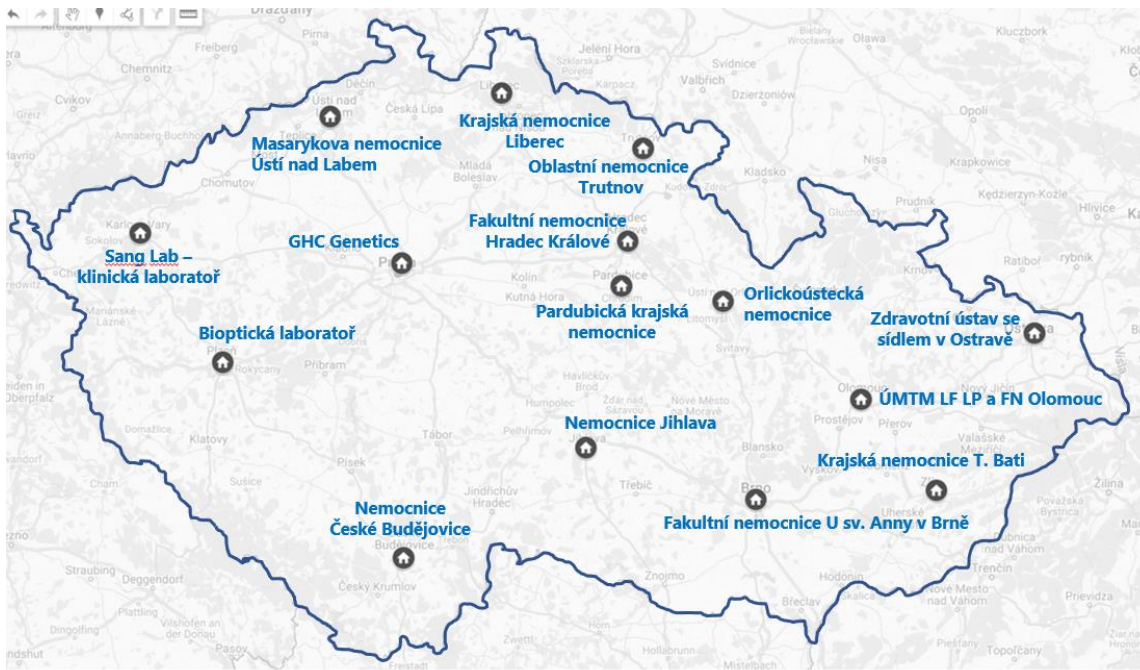
NRL FOR INFLUENZA AND RESPIRATORY VIRUSES

CEM - NIPH



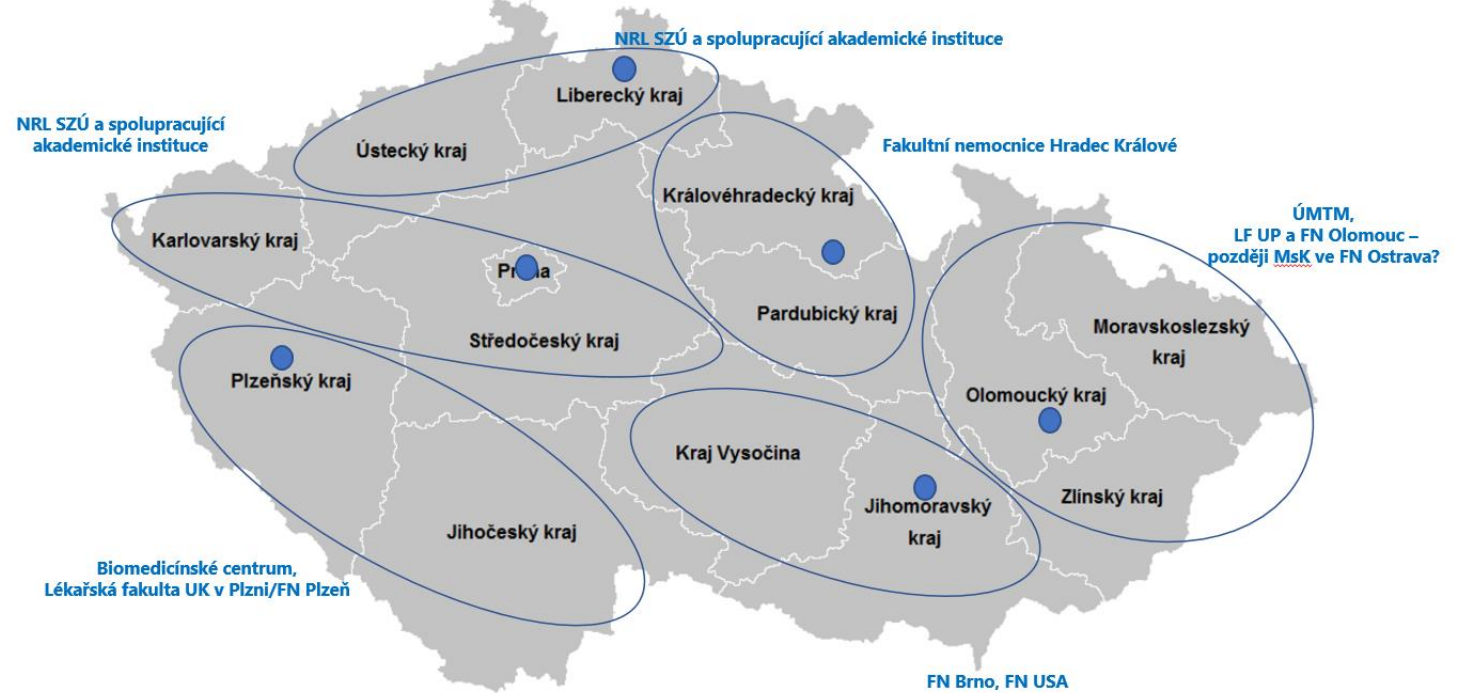
# WGS strategy - target 4 500 samples per month

- Representative – 10% of positive from the sentinel labs
- Targeted
  - Import
  - PCR discriminative
  - Outbreak
  - Atypical PCR
  - Vaccination failure
  - Hospitalisation <50 YOA
  - Atypical clinical signs



# Sentinel and SARS WGS net

# Coverage of the whole region



# Summary of the data from WGS

• Sum of WGS in GISAID	4 378
• Sum of WGS in GISAID 2021	4 096
• <b>Sum of WGS ECDC support</b>	<b>1 980</b>
• Alpha B.1.1.7	3 137
• Beta B.1.351	60
• Gamma P.1	11
• Delta B.1.617.2	96
• Zeta P.2	5
• B.1.620	3
• B.1.1.318	4
• B.1.617.1.	5
• B.525	2
• C.36	17
• C.36.3	1
• B.1.258 (+ x.10, 11, 12, 14, 15)	369

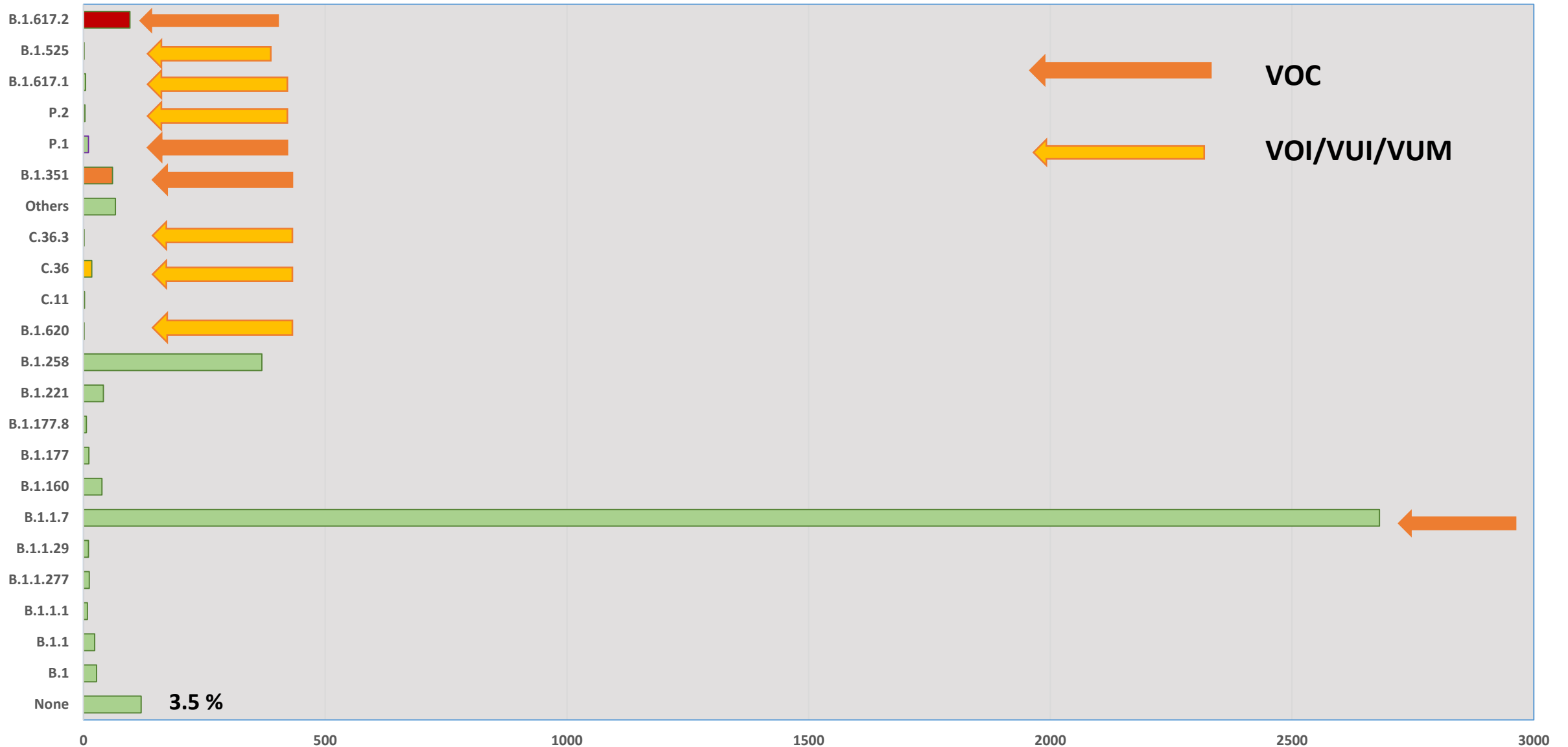
VOC – variant of concern

VUI – variant under investigation

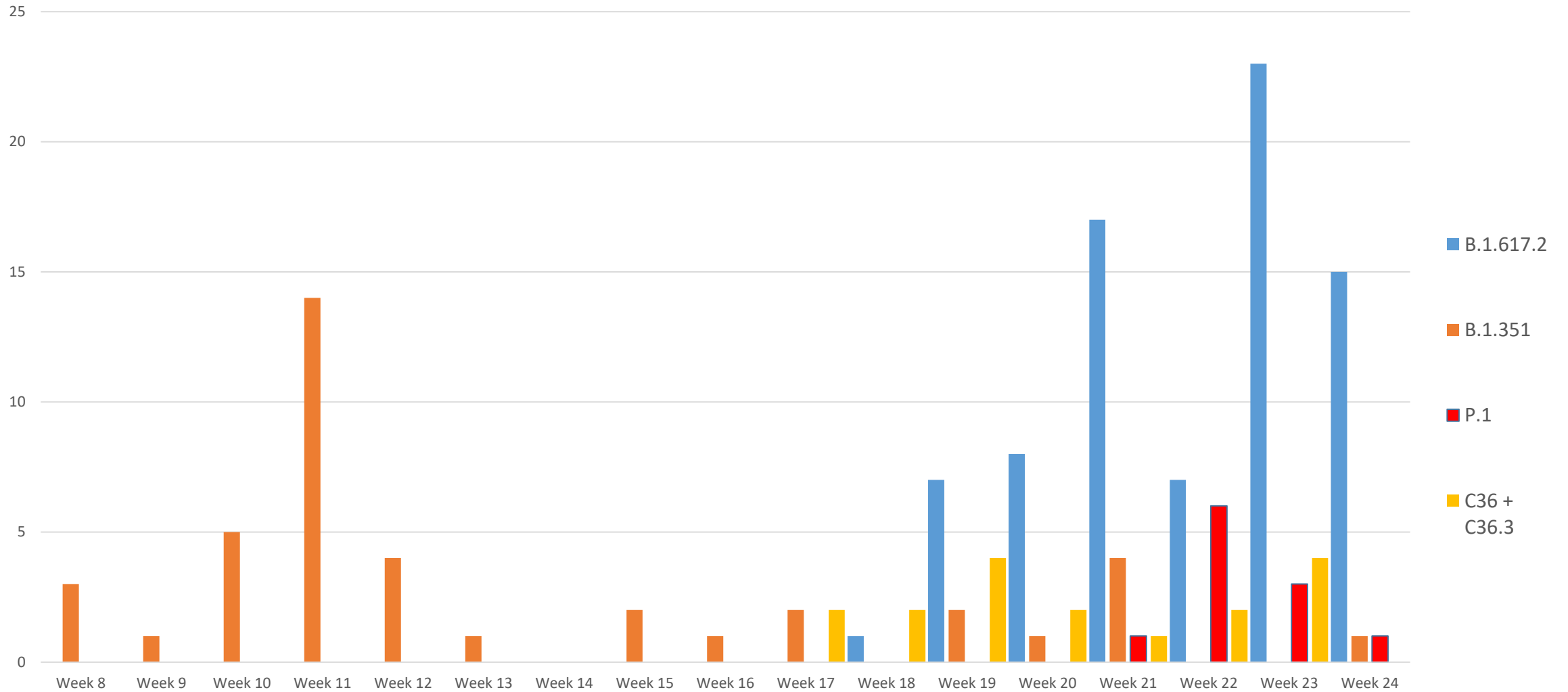
VOI – variant of interest (CDC/WHO terminologie)

VUM – variant under monitoring (ECDC terminologie)

# Overview of variants detected in the Czech republic in 2021



# VOC detection in CW 8 to CW 24 2021 (data from NRL)

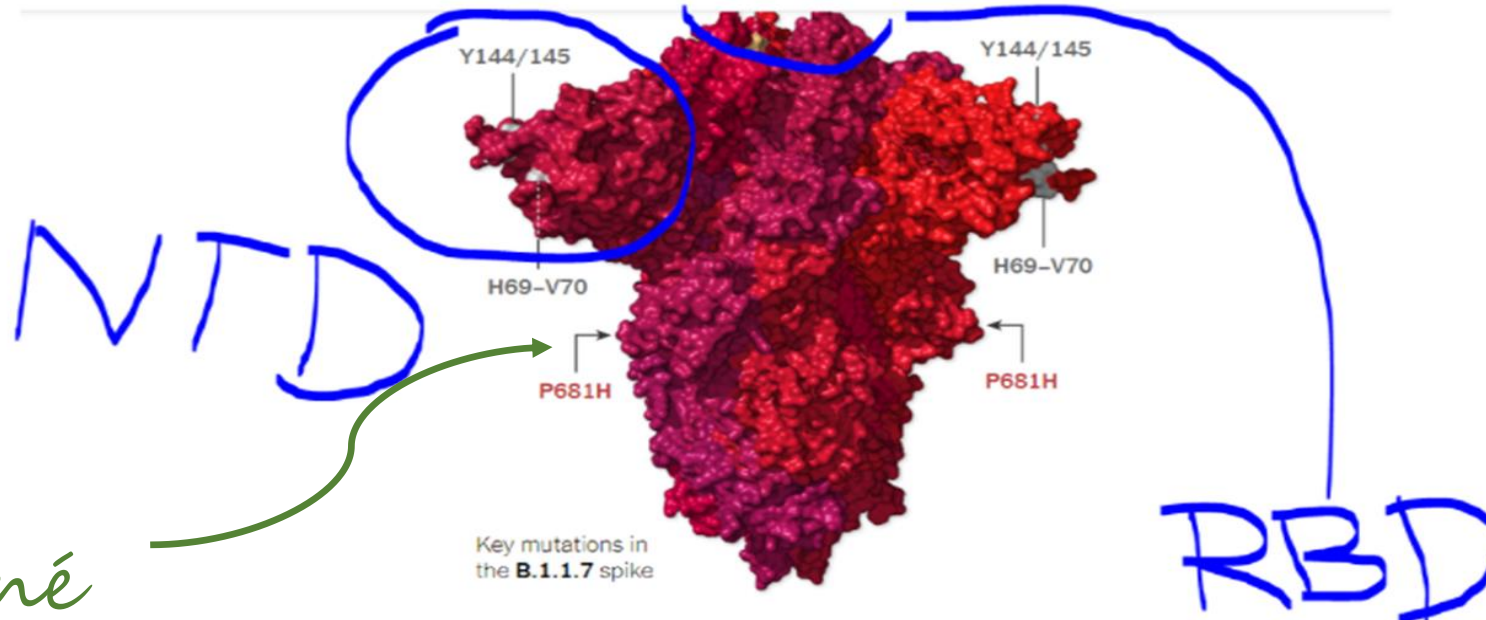


PCR

*Furinové štěpné místo*

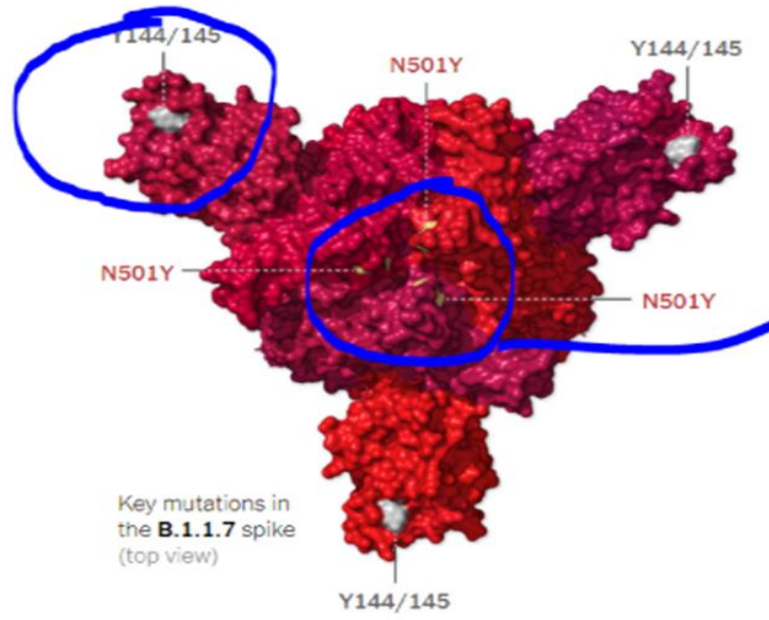
NTD

RBD



Key mutations in the B.1.1.7 spike

It takes three spike proteins to form one spike, so each mutation appears in three places:



Key mutations in the B.1.1.7 spike (top view)

## NRL recommendation concerning PCR

The goal is not to identify a variant, but to find a hot spot mutation

1st priority: **E484K L452R**

Escape, resistant against bamlanivimab (BAMLAN - Eli Lilly)  
EG **C.36 / B.617.2** B.1.1.7, P.1, P.2, B.1.351/B.1.1.318

2nd priority: **N501Y, K417N, P681 H**

Or: K417N/T, P681H/R, E484K/Q, del69-70.

**.? T478K** B.1.617/2, B.1.1.519 **T478R** (Tanzanie, Uganda A.VO.1)

- Import
- Outbreak
- Atypical PCR
- Vaccination failure
- Hospitalisation <50 YOA
- Atypical clinical signs





<b>Detekovaná-mutace</b> varianty (červeně- pozitivní- detekce, černě- neprokázána- přítomnost- mutace)	<b>Suspektní-varianta*</b> červeně- <b>VOC-(alertní-varianta)</b> černě- <b>VOI-(varianta-zájmu)</b> černě- <b>VUM-(sledovaná-varianta)</b>	¤
<b>N501Y, K417N, L452R, E484K, E484Q, P681R</b>	<b>Suspektní-alfa-(B.-1.1.7)</b>	¤
<b>N501Y, E484K, K417N, L452R, E484Q, P681R</b>	<b>Suspektní-alfa-(B.-1.1.7)-+E484K</b> <b>Suspektní-gama-P.1</b> <b>Suspektní-theta-P.3</b> <u>Suspektní-B.1.621</u>	¤
<b>N501Y, E484K, K417N, L452R, E484Q, P681R</b>	<b>Suspektní-beta-(B.1.351)</b>	¤
<b>N501Y, L452R, K417N, E484K, E484Q, P681R</b>	<b>Suspektní-alfa-(B.-1.1.7)-+L452R</b> <u>Suspektní-A.27</u>	¤
<b>E484K, K417N, L452R, E484Q, N501Y, P681R</b>	<b>Suspektní-zeta-P2,</b> <b>Suspektní-iota-B.1.526</b> <u>Suspektní-B.1.525,</u> <u>Suspektní-B.1.620,</u> <u>Suspektní-A.28,</u> <u>Suspektní-AT.1,</u> <u>Suspektní-B.1.1.318,</u> <u>Suspektní-AV.1</u>	¤
<b>L452R, K417N, E484K, E484Q, N501Y, P681R</b>	<u>C.16,</u> <u>C.36-+L452R,</u> <u>C.36.3</u> <u>C.37,</u> <u>-B.1.526.1</u>	¤
<b>L452R, P681R, K417N, E484K, E484Q, N501Y, P681R</b>	<b>Suspektní-delta-B.617.2</b>	¤
<b>L452R, E484Q, P681R, K417N, E484K, N501Y, P681R</b>	<b>Suspektní-kapa-B.1.617.1</b> <u>Suspektní-B.1.617.3</u> <u>Suspektní-B.1.617</u>	¤

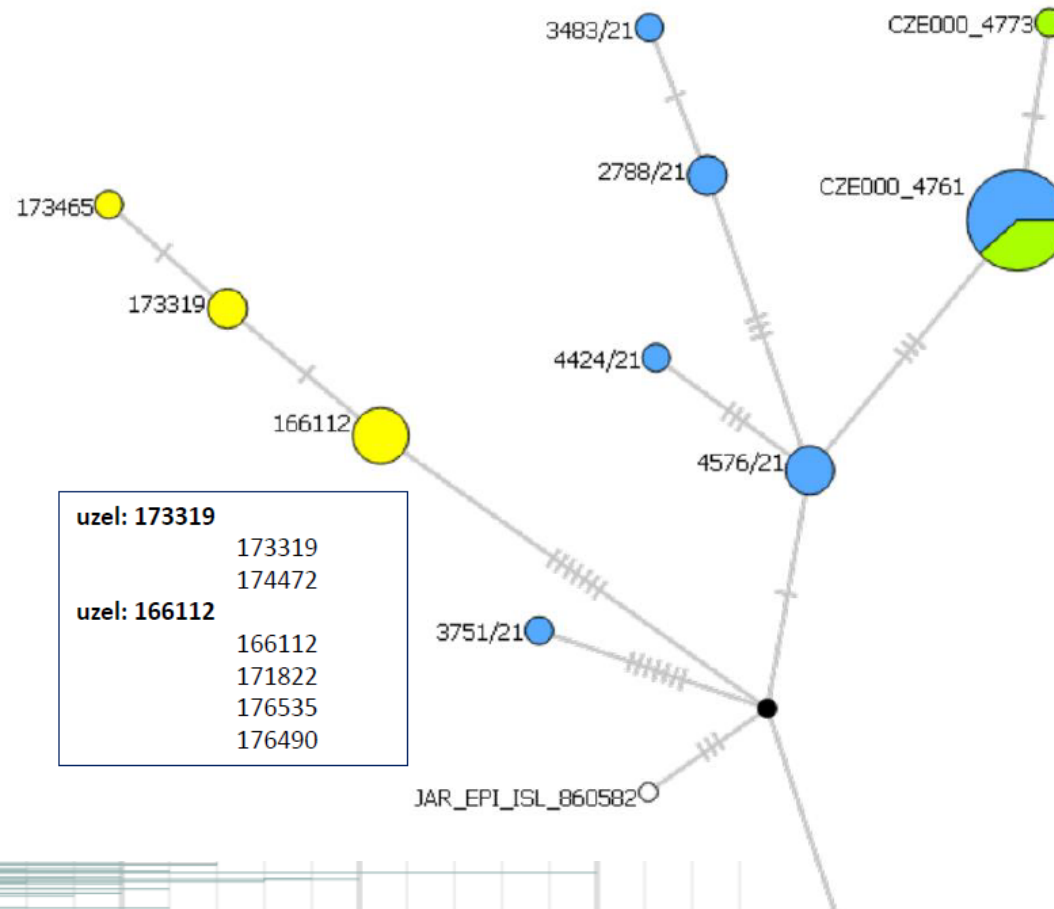
Pozn. Není-li uvedeno řecké písmeno, nebylo ještě přiřazeno WHO

\*-VOC—variant-of-concern, -VOI—variant-of-interest, -VUM—variant-under-monitoring-(dle-ECDC)



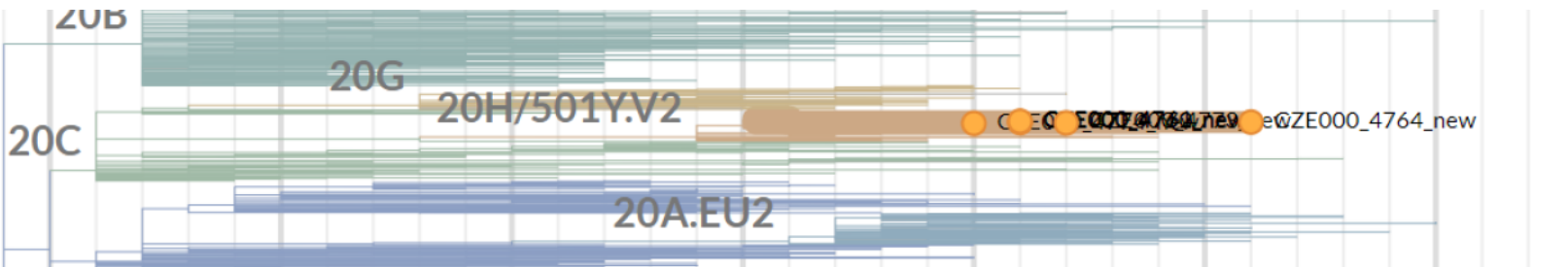
# B.1.351 - ČR Example of the tracing

Vzorky 3751, 2788, 3483 představují návaznost na import ze Zanzibaru. Vzorky detekované v Olomouci (žlutě označené) naznačují jedno ohnisko ze společného zdroje, který se liší od ostatních detekovaných variant, kde lze rovněž usuzovat do „společný“ zdroj infekce.



<b>uzel: 173319</b>	173319
	174472
<b>uzel: 166112</b>	166112
	171822
	176535
	176490

<b>uzel: CZE000_4761</b>		
	CZE000_4761	Ústí n L
	CZE000_4762	Ústí n L
	CZE000_4764	Liberec
	CZE000_4770	Liberec
	CZE000_4774	Liberec
	4421/21	Liberec
	4765-21	Liberec
	4767-21	Liberec
	4771/21	Liberec
	4772/21	Liberec
	4775/21	Liberec
	4776/21	Liberec
	4777-21	Liberec
<b>uzel: 2788/21</b>	2788/21	Hradec
	Králové	
	3244/21	Brno
	3483/21	Hradec
	Králové	
	4224/21	Brno
	3246/21	nezařazeno Praha
	(ECDC)	
	3751/21	Mělník
	(pitva)	
	4589/21	nezařazeno Praha
<b>Uzel: 4576/21</b>	4576/21	Praha
	4692/21	Praha
	4744/21	Liberec
	4773/21	Liberec

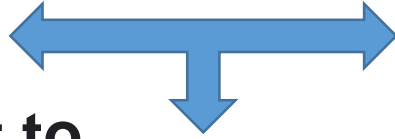


# Other NRL activities:

- Local EHK (SARS-CoV-2, respiratory panel : influenza A/B, RSV, ADV)
- Webinars for the labs and epidemiologist
- Variant virus strain isolation – distribution of:
  - B.1.258
  - B.1.1.318
  - P.1.1.248
  - B.1.351
  - B.1.1.7
  - B.1.617.1
  - B.1.617.2
  - P.1
  - Standards for PCR – to labs nad local manufacturers
  - Standards for VNT
  - Standards for the research

# Summary - PCR or WGS?

- PCR  
**not to identify a variant, but to find a hot spot mutation**



- WGS – PANGO LINEages
- Variants (VOC- VOI - VUI – VUM)

- **Import**
- **Outbreaks**
- **Atypical PCR**
- **Vaccination failure**
- **Hospitalisation <50 YOA**
- **Atypical clinical signs**

10% / 4 500 per months

**Representative - pool**



Namasté

