

# Adult VPI in Italy: surveillance, epidemiology and burden of disease (focus on COVID-19, Influenza, Pneumococcus, RSV, Tdap, Zoster)

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# Goals of the presentation

- **How are surveillance and control programs against infectious diseases organized in Italy?**
- **Get an overview of the epidemiology of the main adult (18+ years) vaccine preventable infections in Italy**
- **Have surveillance measures for adult infections changed in response to the COVID-19 pandemic?**

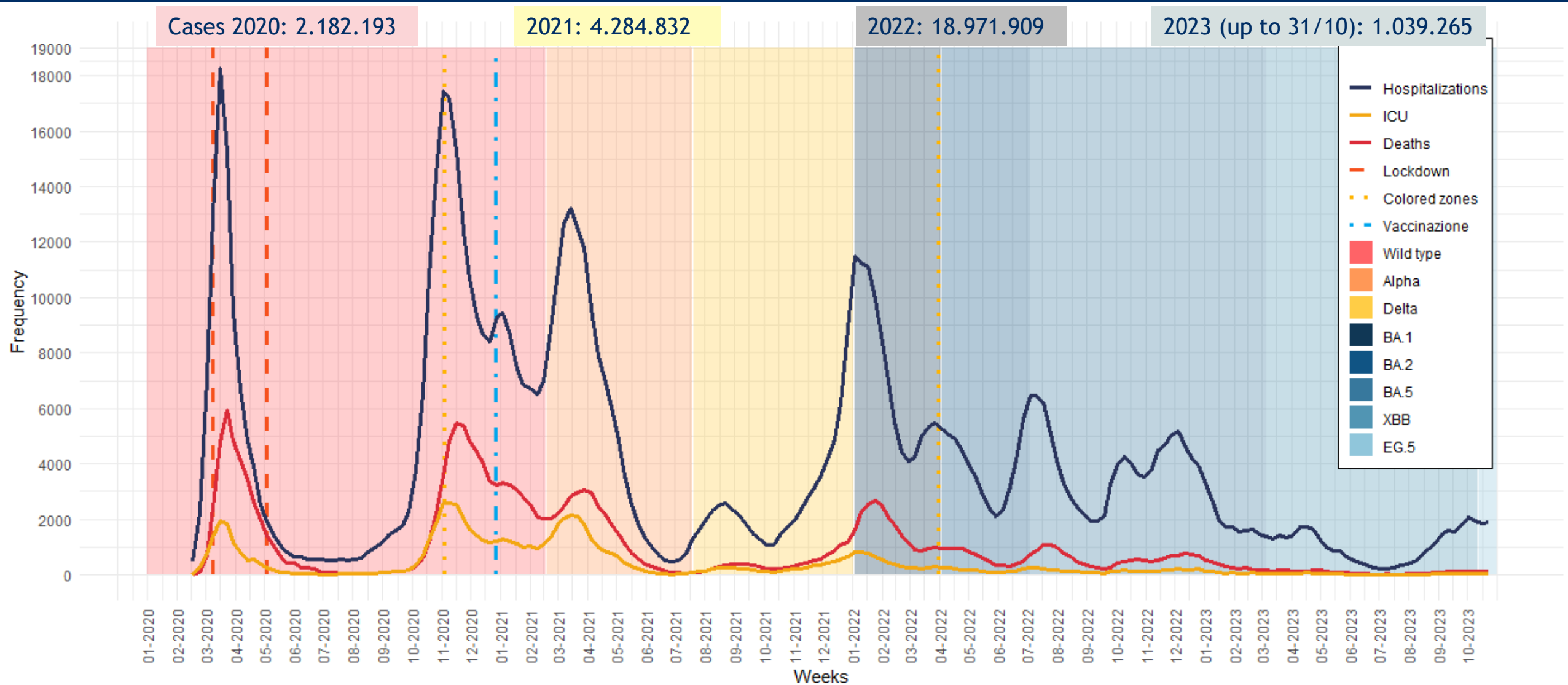
# Vaccine preventable infections/diseases (focus)

- ❑ **SARS-CoV-2/COVID-19**
- ❑ **Influenza**
- ❑ **RSV**
- ❑ **Invasive pneumococcal disease**
- ❑ **Tetanus**
- ❑ **Diphtheria**
- ❑ **Pertussis**
- ❑ **Zoster**

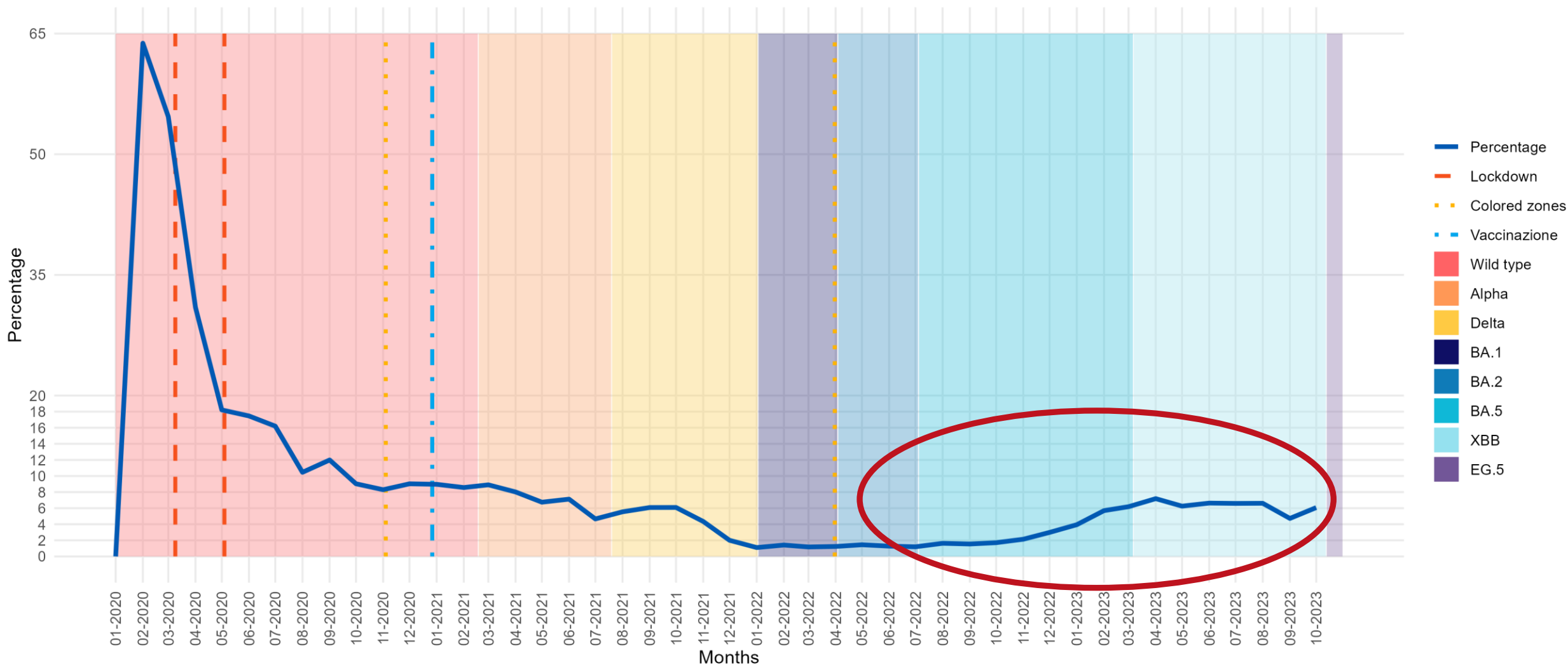
# Surveillance of infectious diseases in Italy

- Under the EU/ECDC umbrella
- More than 50 infections/(group of) diseases monitored
- Ministry of Health supervision
- Decree law March 7, 2022 – “Revisione del sistema di segnalazione delle malattie infettive (Premal)”
- Some “special” Surveillance systems managed by ISS (e.g., vaccine preventable invasive bacterial diseases, SARS-CoV-2/COVID-19, arbovirolosis, measles, etc)

# Weekly severe cases of Sars-CoV-2 infections diagnosed in Italy (up to 31/10)

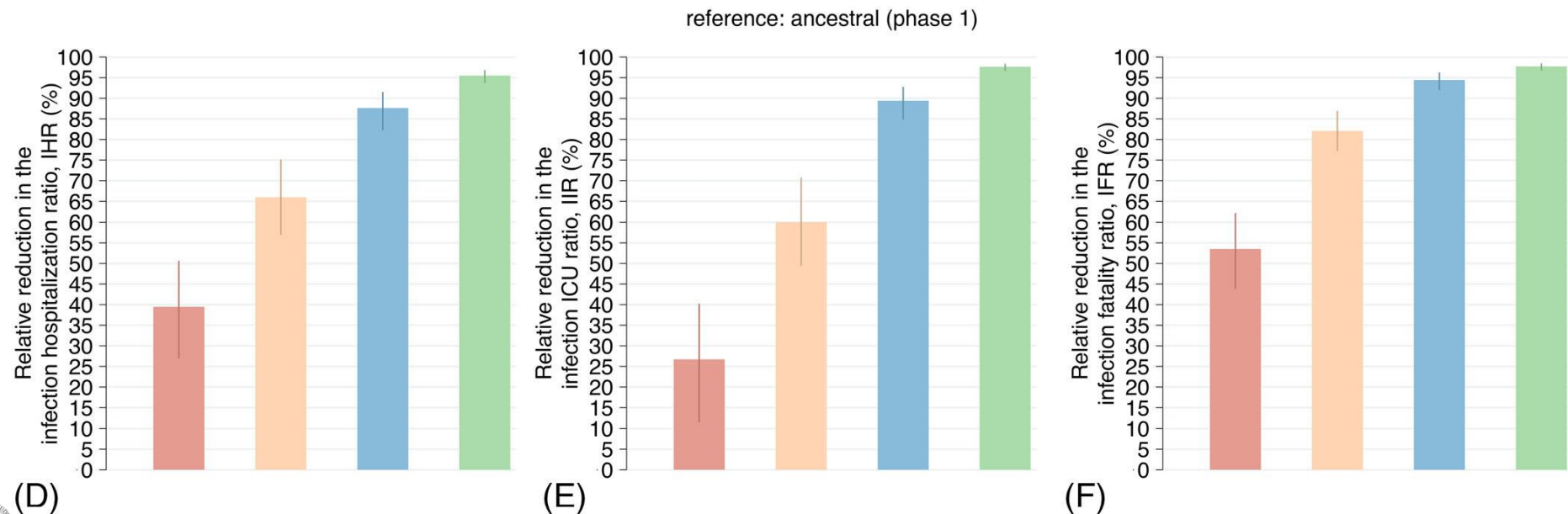
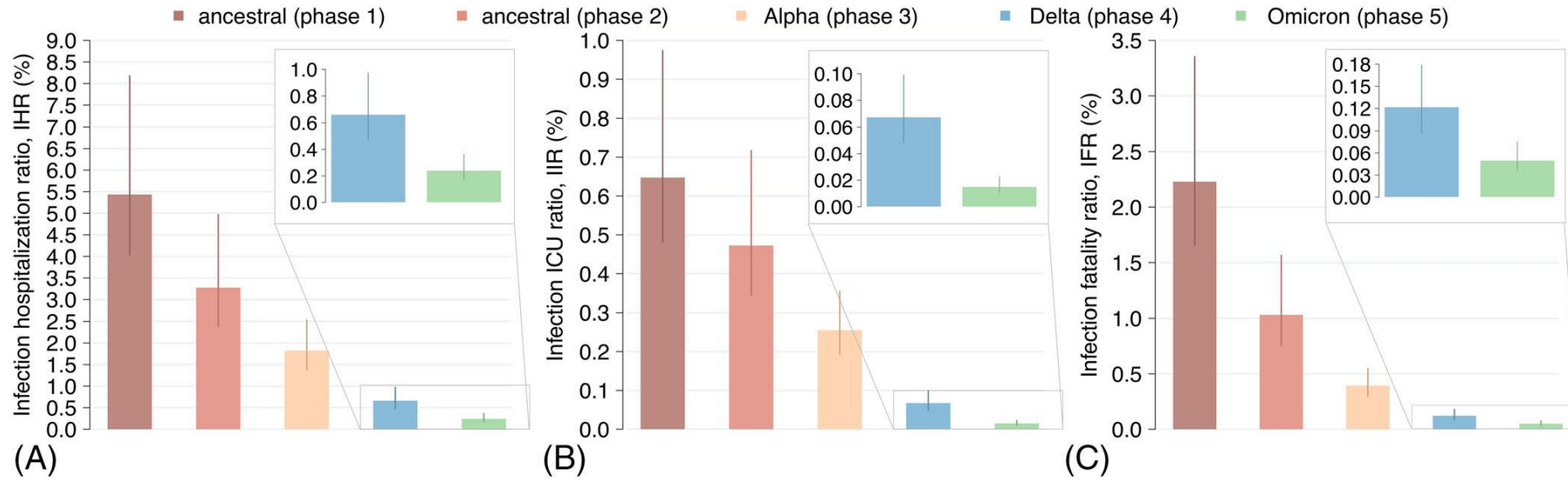


# Percentage by month of severe Sars-CoV-2 infections among diagnosed and reported cases

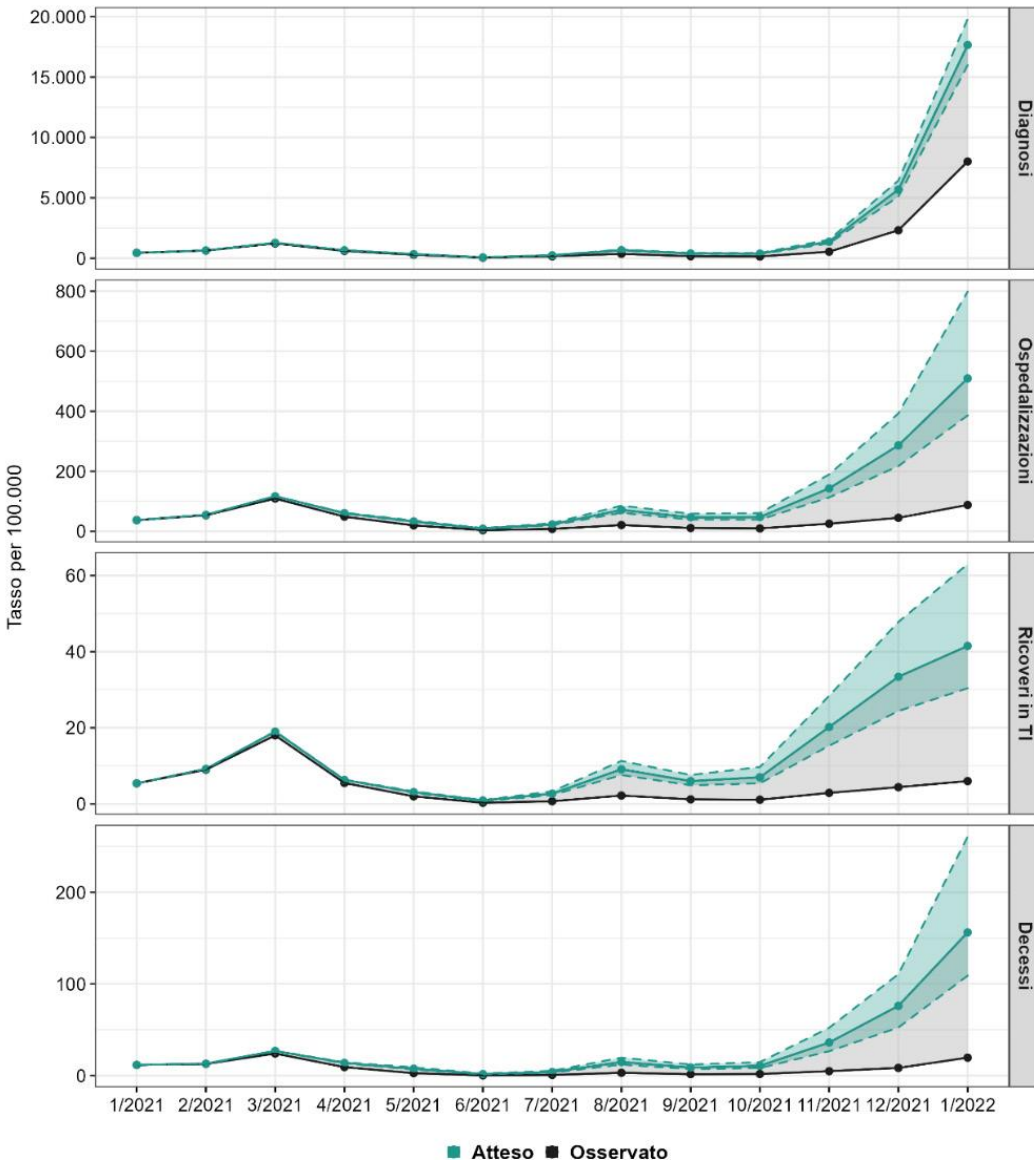


Since summer 2022, ascertained and reported cases are likely between 1/10 and 1/20

# Estimated changes in COVID-19 severity and fatality in Italy (2/2020-2/2022)



# Impact of anti COVID-19 vaccination in Italy (January 2020- January 2021)



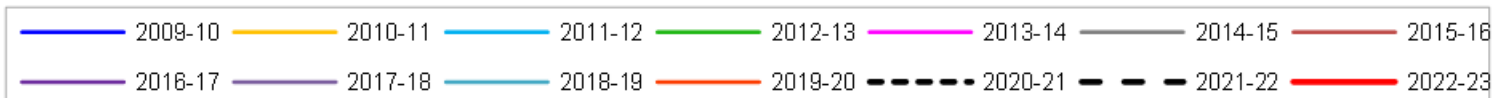
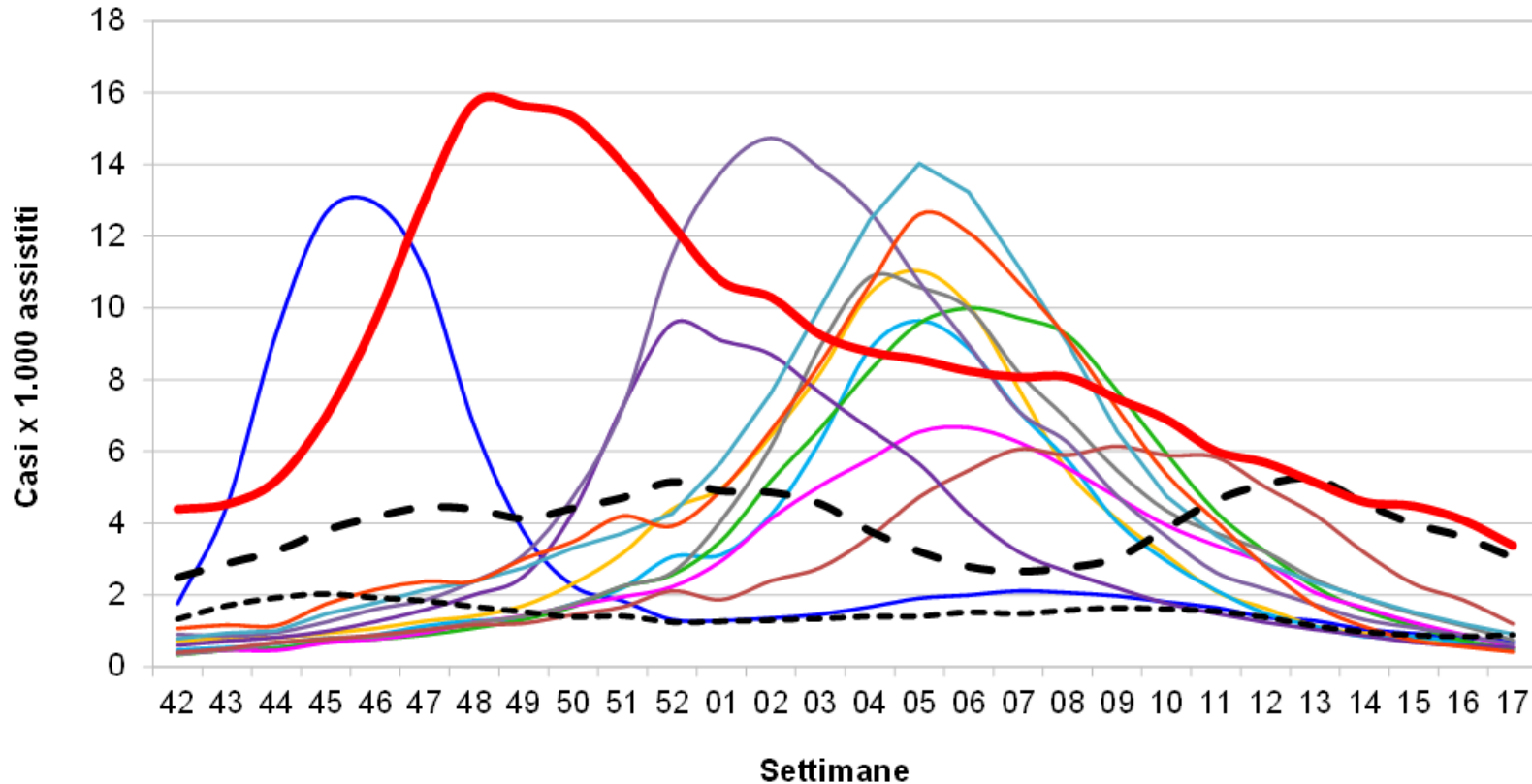
Fascia di età	Area geografica	N. osservato	N. evitati		Tasso di mortalità osservato per 100.000	Tasso di mortalità atteso per 100.000	
			Stima	Range (VE ± 5%)		Stima	Range (VE ± 5%)
<60	Nord	976	1.471	(1.165-1.878)	6	15	(13-17)
	Centro	570	729	(576-936)	8	19	(16-22)
	Sud	1.498	1.618	(1.335-1.972)	12	25	(23-28)
	<b>Italia</b>	<b>3.044</b>	<b>3.817</b>	<b>(3.077-4.786)</b>	<b>9</b>	<b>19</b>	<b>(17-22)</b>
60-69	Nord	2.285	4.095	(3.068-5.755)	66	184	(154-231)
	Centro	1.070	2.232	(1.583-3.441)	72	223	(179-304)
	Sud	2.716	4.496	(3.414-6.255)	106	281	(238-349)
	<b>Italia</b>	<b>6.071</b>	<b>10.822</b>	<b>(8.064-15.450)</b>	<b>81</b>	<b>224</b>	<b>(188-286)</b>
70-79	Nord	6.593	13.440	(9.788-19.833)	229	697	(570-919)
	Centro	2.416	5.173	(3.629-8.207)	199	626	(499-877)
	Sud	5.155	9.621	(7.070-14.329)	267	766	(634-1010)
	<b>Italia</b>	<b>14.164</b>	<b>28.234</b>	<b>(20.487-42.369)</b>	<b>235</b>	<b>705</b>	<b>(576-940)</b>
80+	Nord	17.427	66.470	(42.787-111.148)	769	3.701	(2.656-5.672)
	Centro	5.715	22.922	(14.196-42.525)	588	2.945	(2.048-4.961)
	Sud	8.239	19.266	(14.176-27.659)	606	2.023	(1.649-2.640)
	<b>Italia</b>	<b>31.381</b>	<b>108.658</b>	<b>(71.160-181.332)</b>	<b>682</b>	<b>3.045</b>	<b>(2.230-4.625)</b>
<b>Totale</b>	Nord	27.281	85.475	(56.809-138.613)	108	448	(334-659)
	Centro	9.771	31.056	(19.983-55.110)	92	382	(279-608)
	Sud	17.608	35.000	(25.995-50.214)	97	290	(240-373)
	<b>Italia</b>	<b>54.660</b>	<b>151.532</b>	<b>(102.787-243.937)</b>	<b>101</b>	<b>382</b>	<b>(292-553)</b>

**Averted >8 millions of infections, ~260,000 hospital admissions, >31,000 ICU, >150,000 deaths**



# Surveillance of flu-like syndromes in Italy (GPs and virological data)

**Incidenza delle sindromi influenzali (ILI) in Italia.  
Stagioni 2009/10 - 2022/23**



**Around 14 million cases estimated in 2022/23**

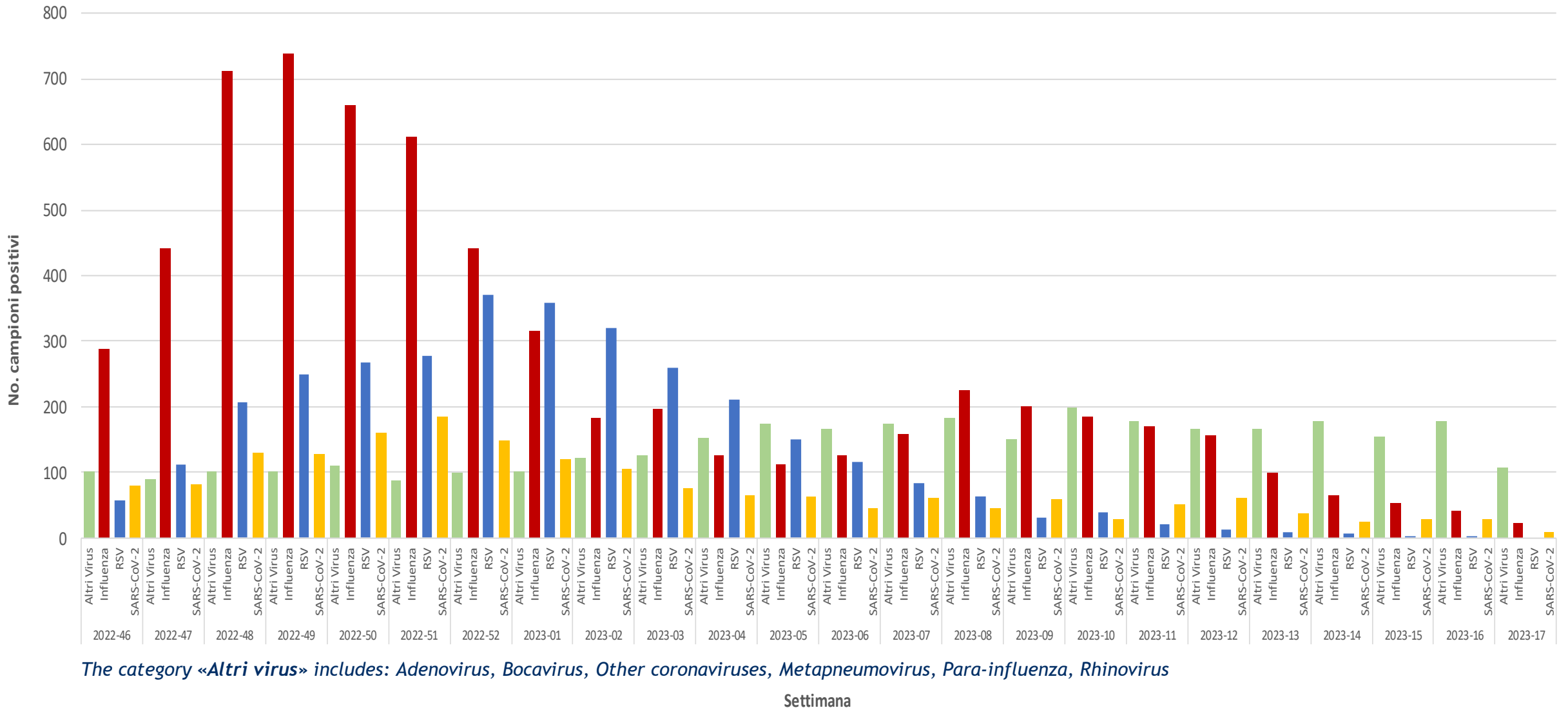
**Upsurge likely due to relaxation of Covid restriction measures**

**22% of swab (30,000) positives to Influenza**

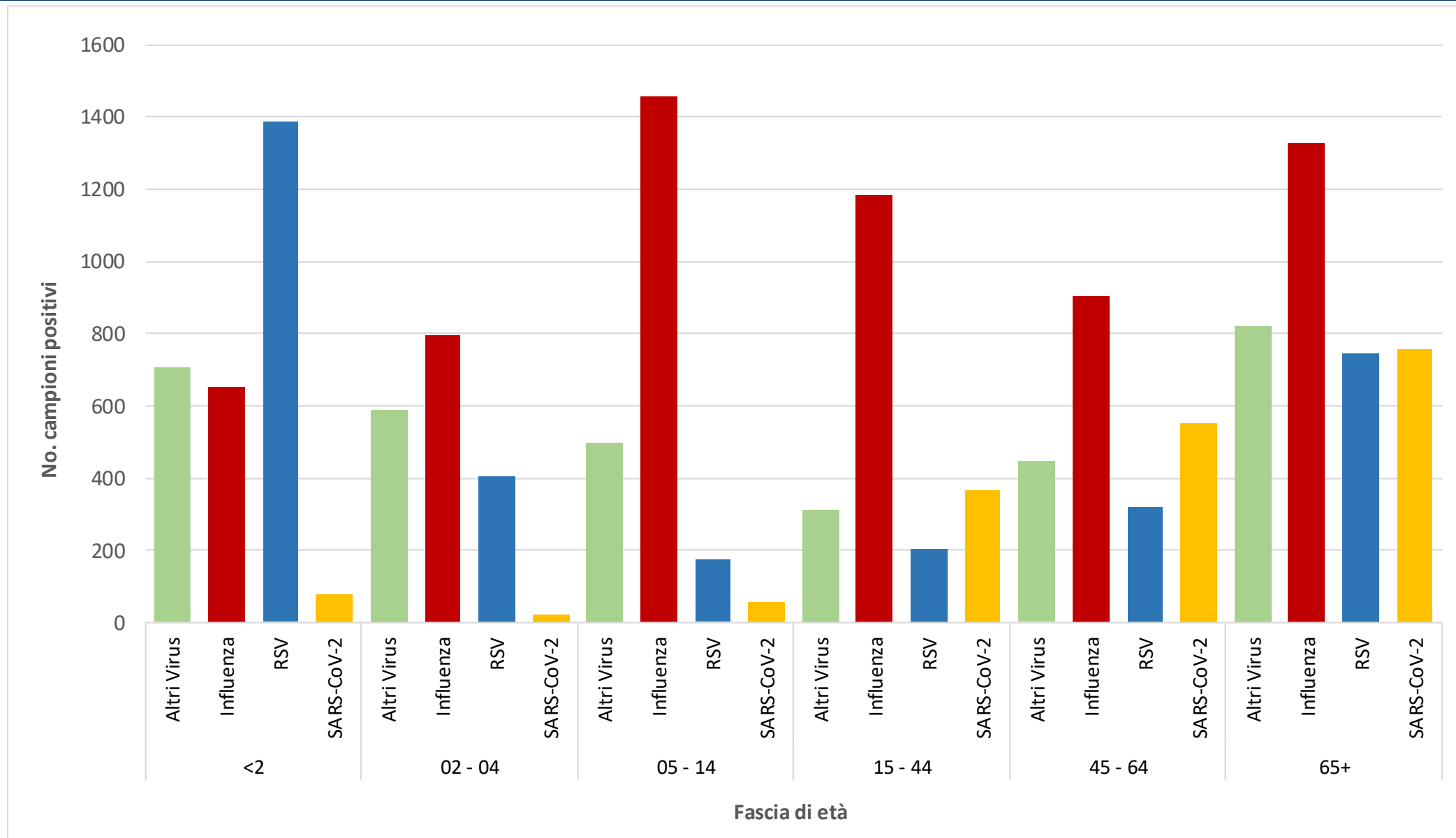
**A type: 80%**

**H3N2: 92% among A**

# Surveillance of flu-like syndromes: viruses by week (2022-2023)



# Surveillance of flu-like syndromes: viruses by age groups (2022/2023)

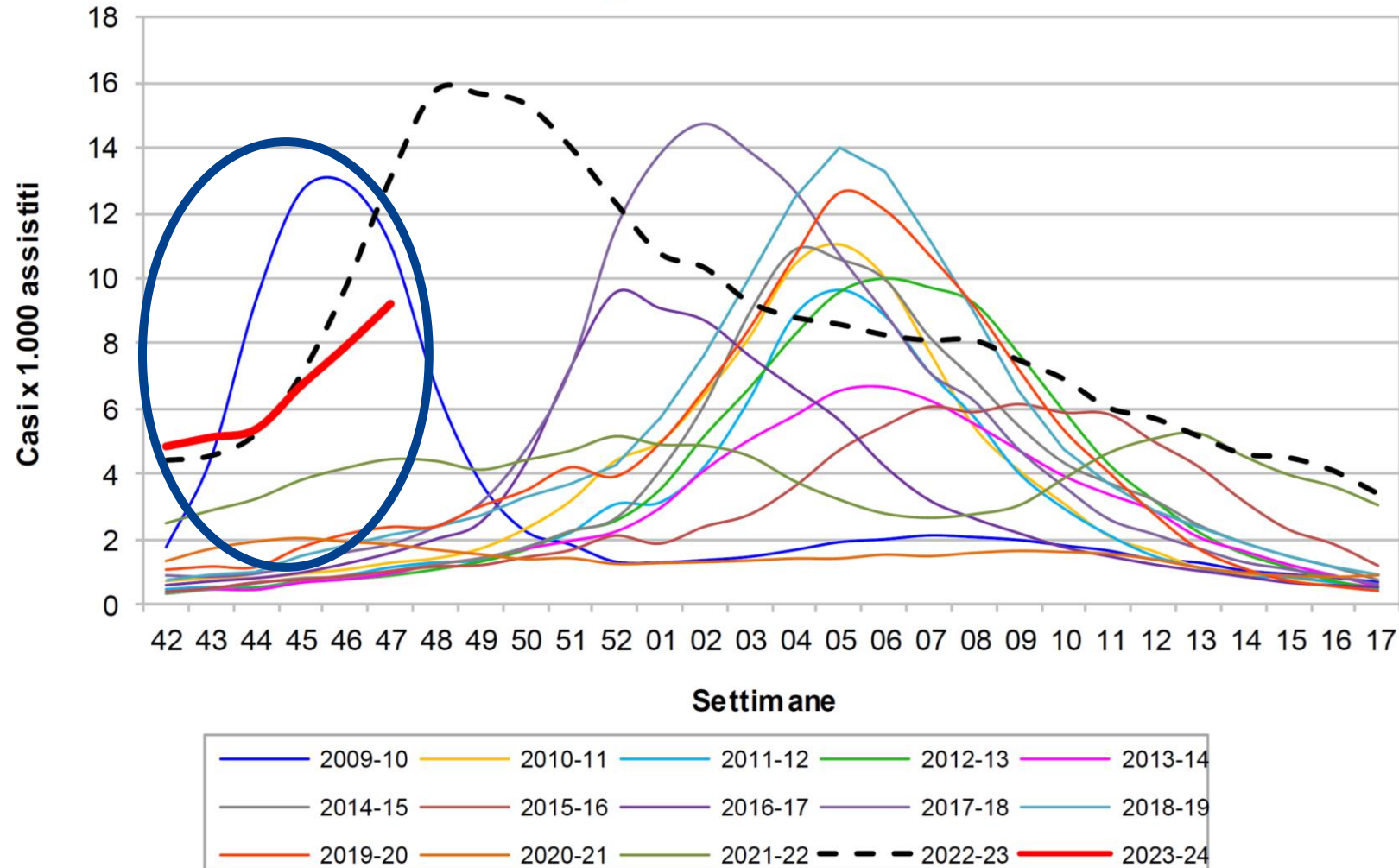


# Surveillance of flu-like syndromes in Italy (cumulative incidence)

Age group	2022-23	2021-22	2018-19
0 – 4	70,8%	32,4%	37,3%
5 – 14	34,9%	13,3%	19,8%
15 – 64	22,2%	10,7%	12,8%
65+	12,3%	5,6%	6,2%
Total	24,1%	11,1%	13,6%

# Surveillance of flu-like syndromes in Italy (season 2023/2024)

**Incidenza delle sindromi simil-influenzali (ILI) in Italia.  
Stagioni 2009/10 - 2023/24**



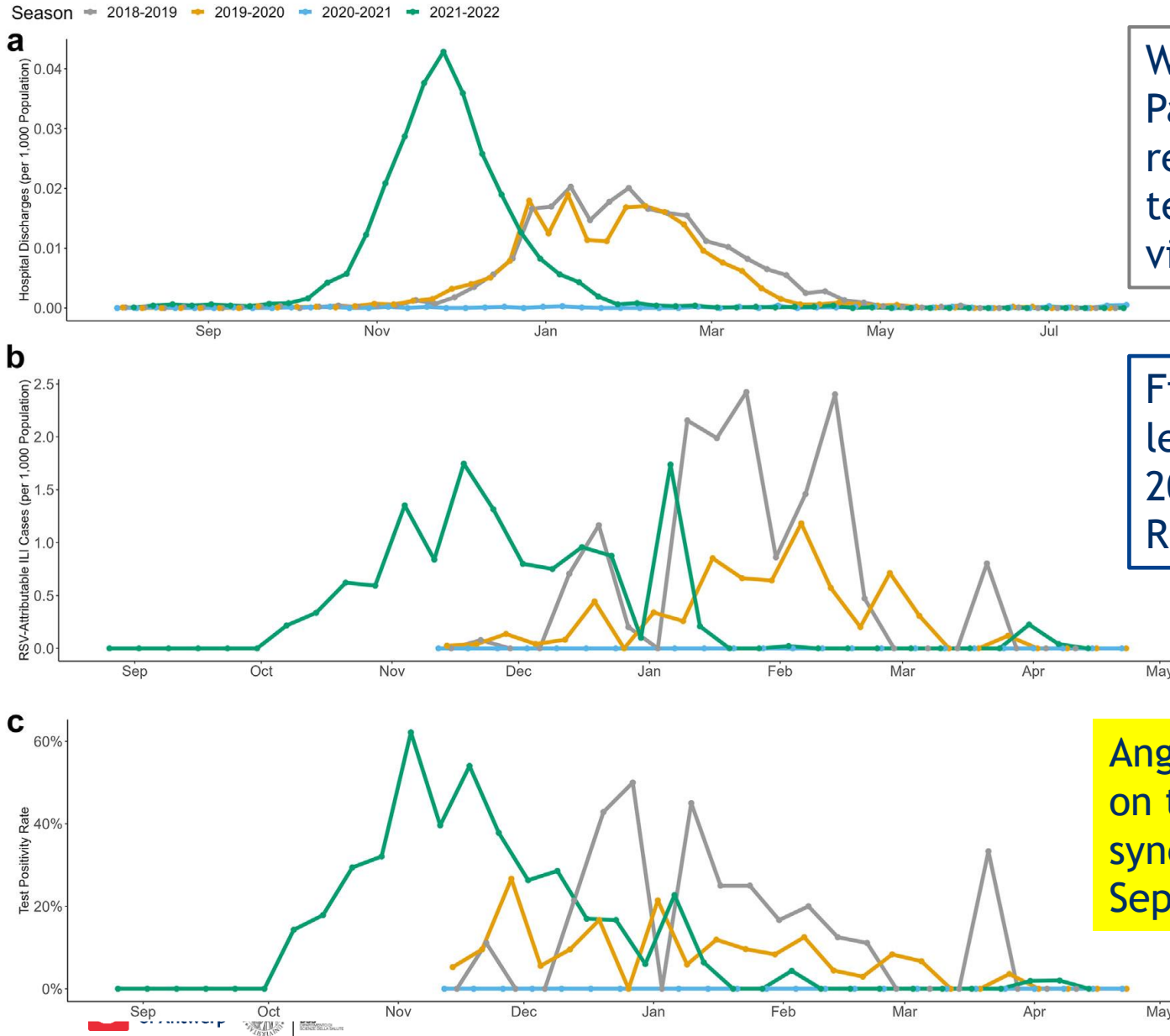
**Low circulation of influenza  
(4.1% of tested samples),  
mainly A(H1N1)pdm2009**

**SARS-CoV-2 13%**

**RSV 3.3% of tested samples**

**Rhinovirus and Adenovirus  
the most frequent**

# Impact of SARS-CoV-2 restriction measures on RSV circulation in Lombardy

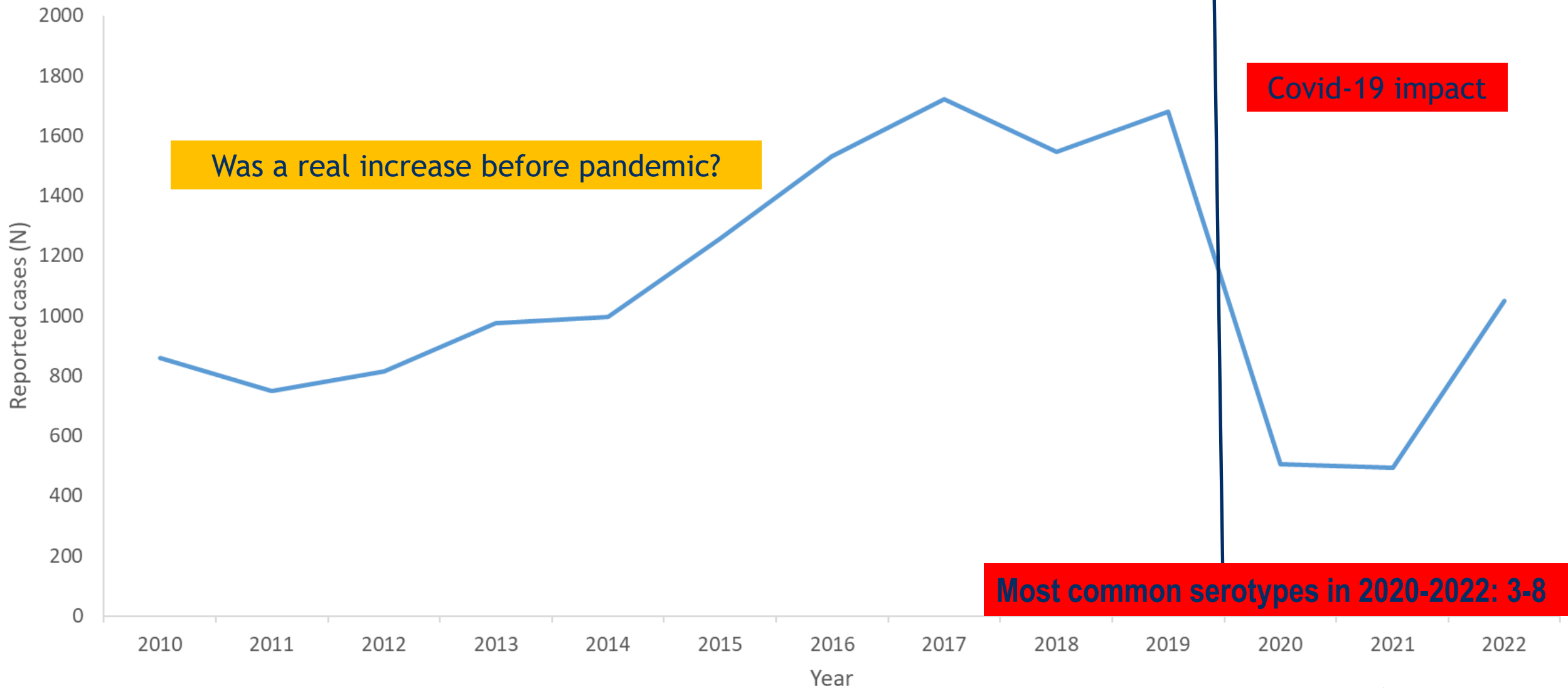


Weekly RSV data from 2018-2019 to 2021-2022. Panels show: (a) hospital discharges, (b) average reconstructed RSV-attributable ILIs, and (c) RSV test positivity rates. RSV, respiratory syncytial virus; ILI, influenza-like illness.

Findings: substantial increase in the population-level susceptibility to RSV in Lombardy during 2019-2021, which contributed to an increase in primary RSV infections in 2021-2022

Ang HJ et al. Reconstructing the impact of COVID-19 on the immunity gap and transmission of respiratory syncytial virus in Lombardy, Italy. EBioMedicine. 2023 Sep;95:104745. doi: 10.1016/j.ebiom.2023.104745

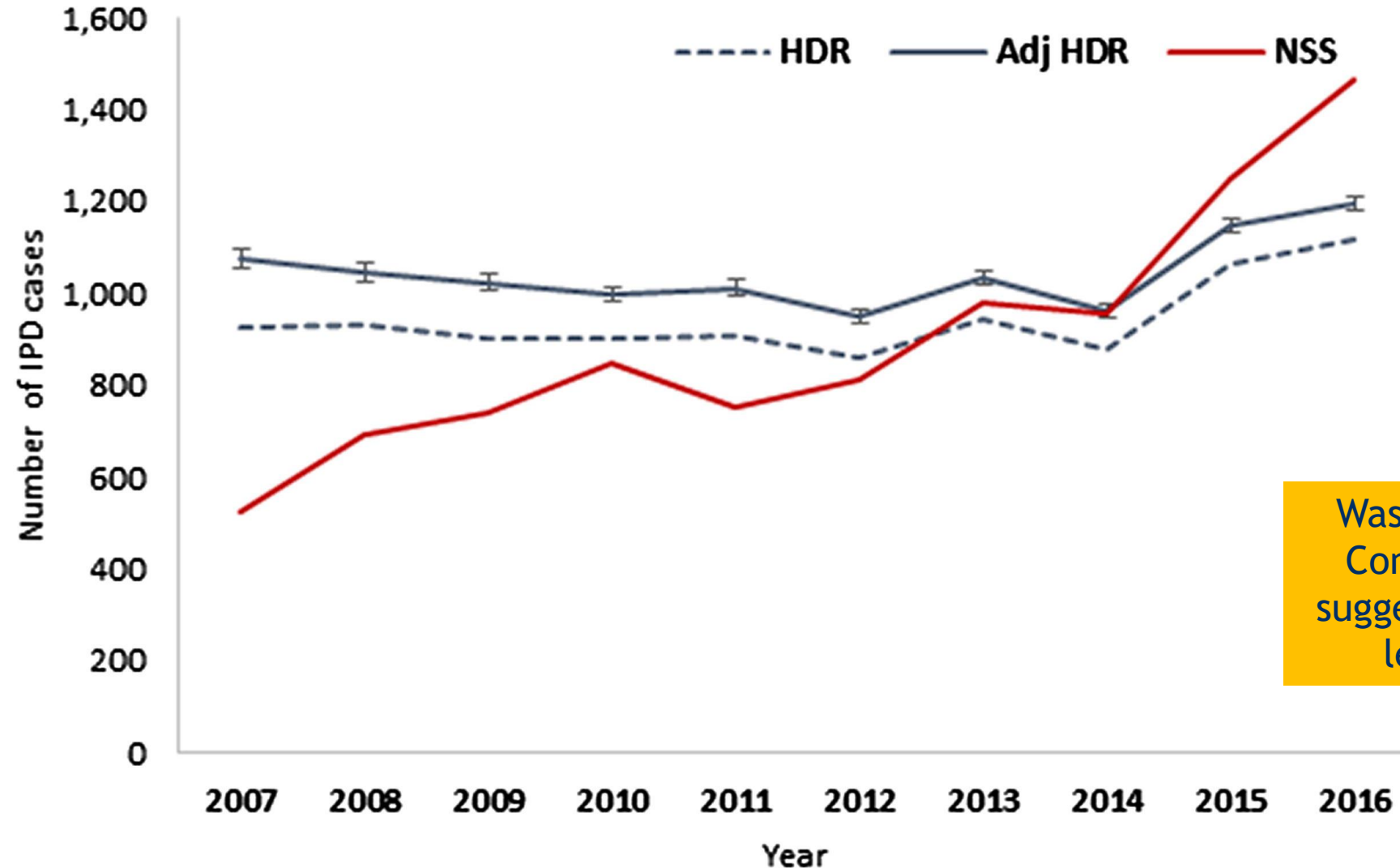
# Surveillance of invasive pneumococcal disease in Italy





# Surveillance of invasive pneumococcal disease

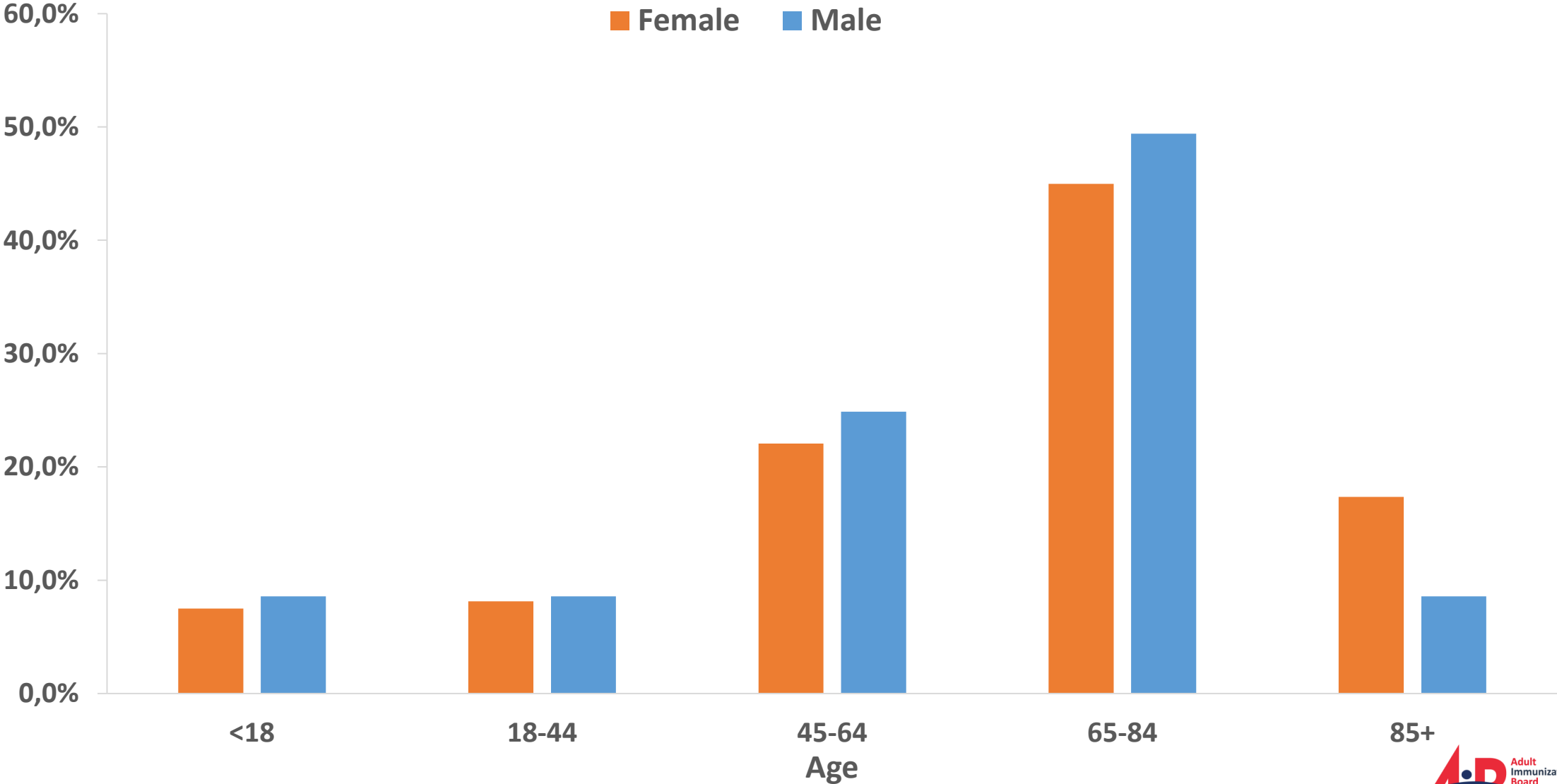
## *Streptococcus pneumoniae*



Was a real increase before pandemic?  
Comparison with hospital admissions suggests that surveillance was gradually less affected by under-reporting



# Surveillance of invasive pneumococcal disease; age and sex distribution (2022)



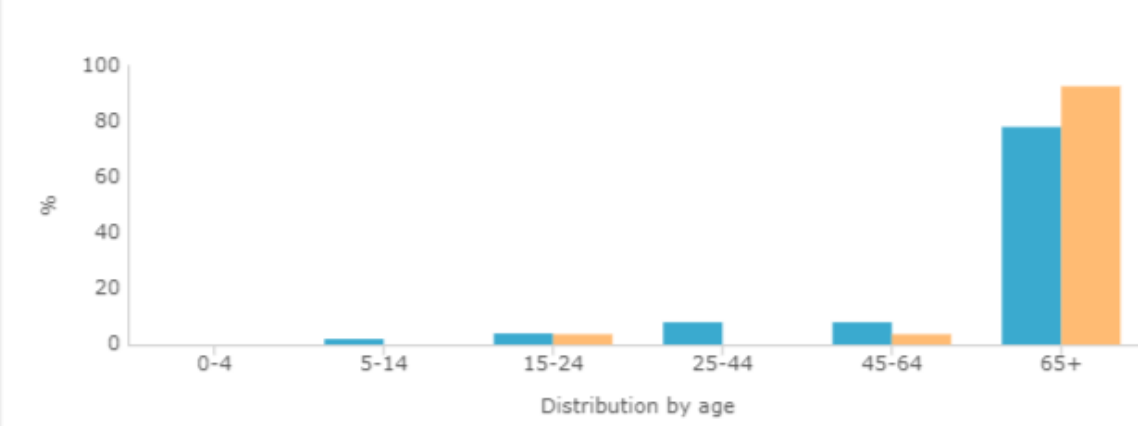
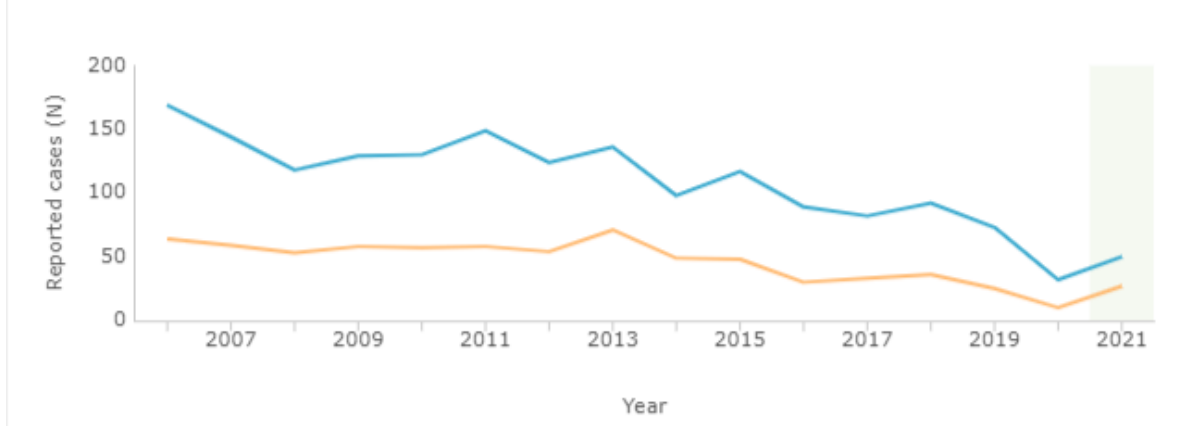
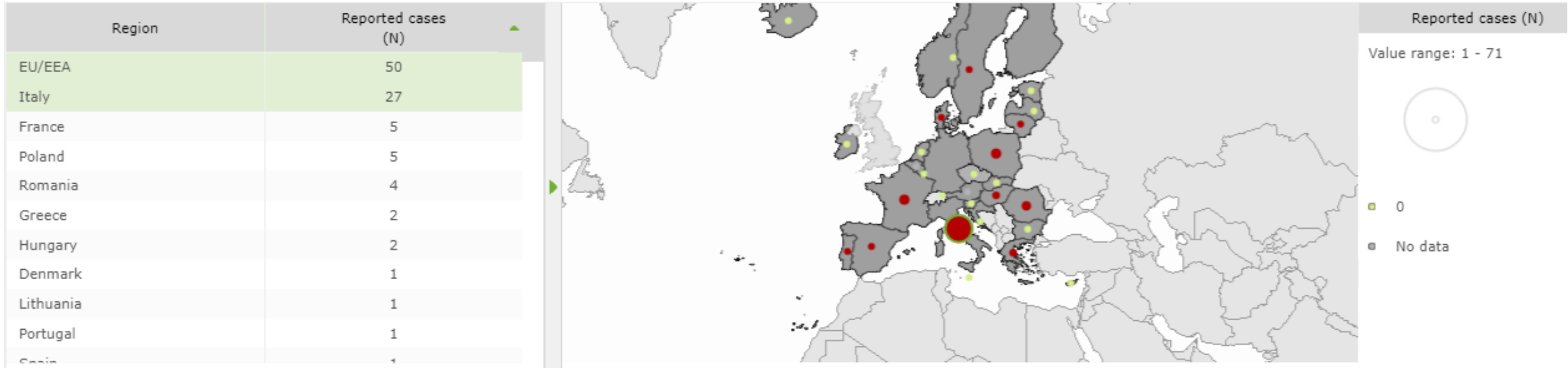
# Reported cases of tetanus in Europe



## Surveillance Atlas of Infectious Diseases

Tetanus ▾ | All cases ▾ | Reported cases ▾ | 2021 ▾

**Italy accounted for 40% of European cases; 90% of Italian cases were 65+ years**



■ EU/EEA ■ Italy

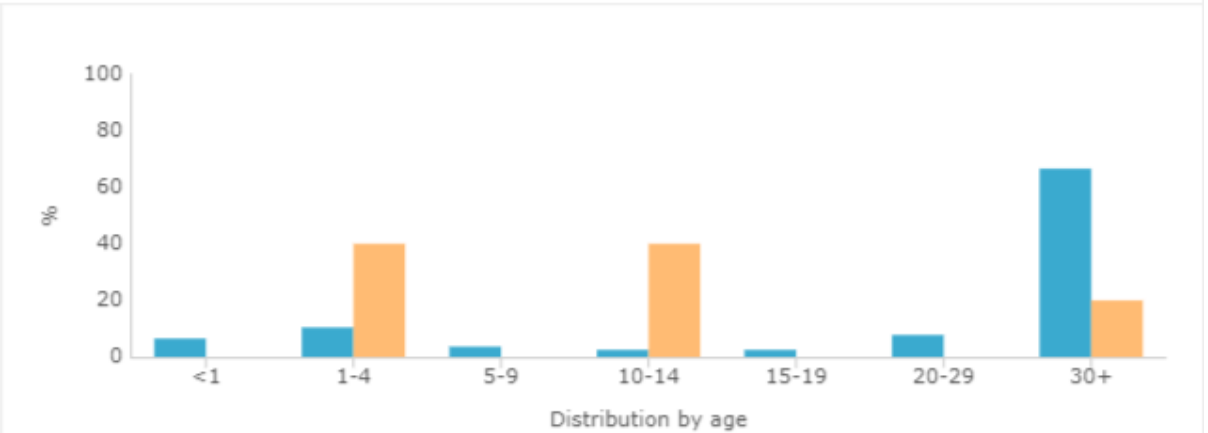
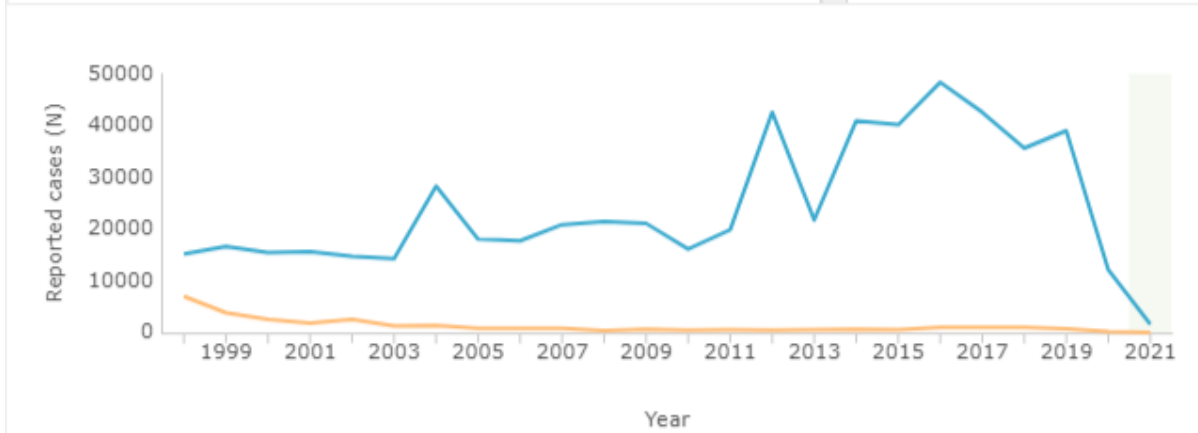
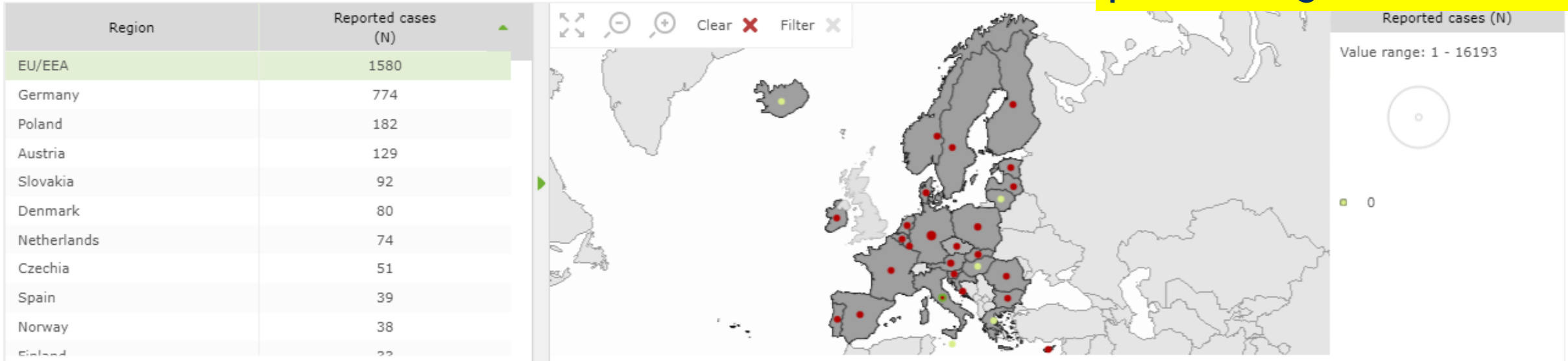
# Reported pertussis cases in Europe



## Surveillance Atlas of Infectious Diseases

Pertussis ▾ | All cases ▾ | Reported cases ▾ | 2021 ▾

**Strong decrease in 2020-2021 likely due to non-pharmacological measures**



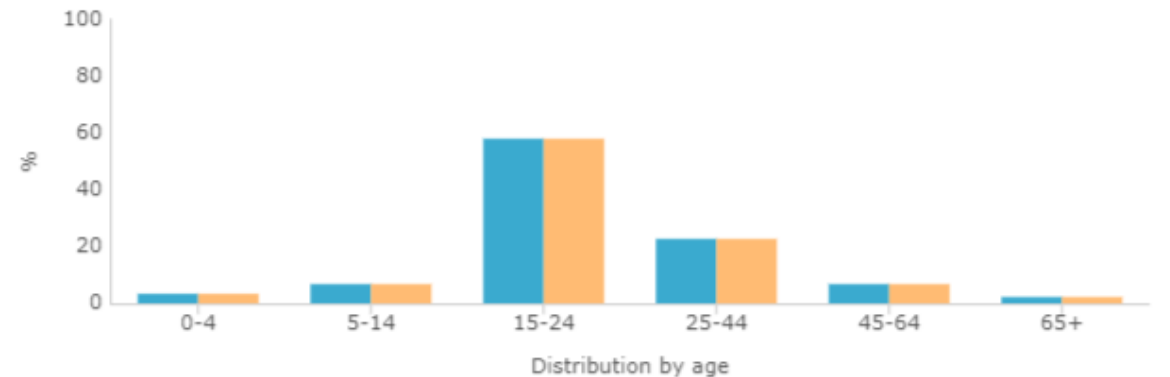
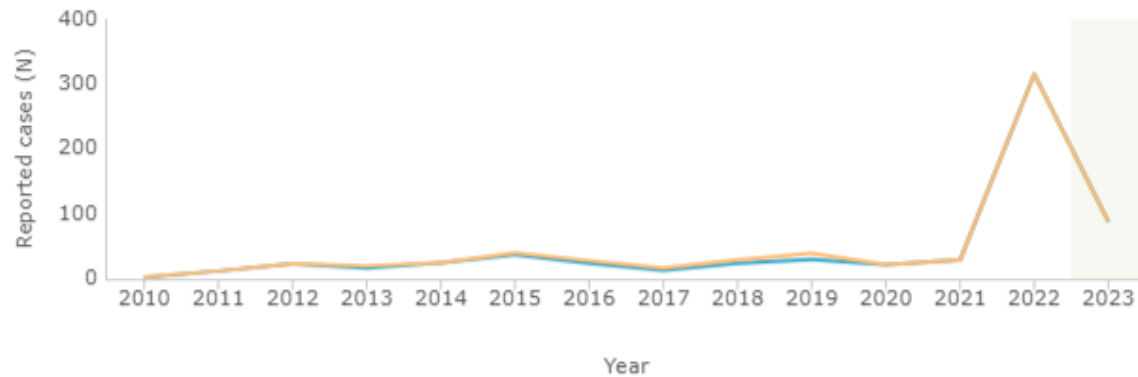
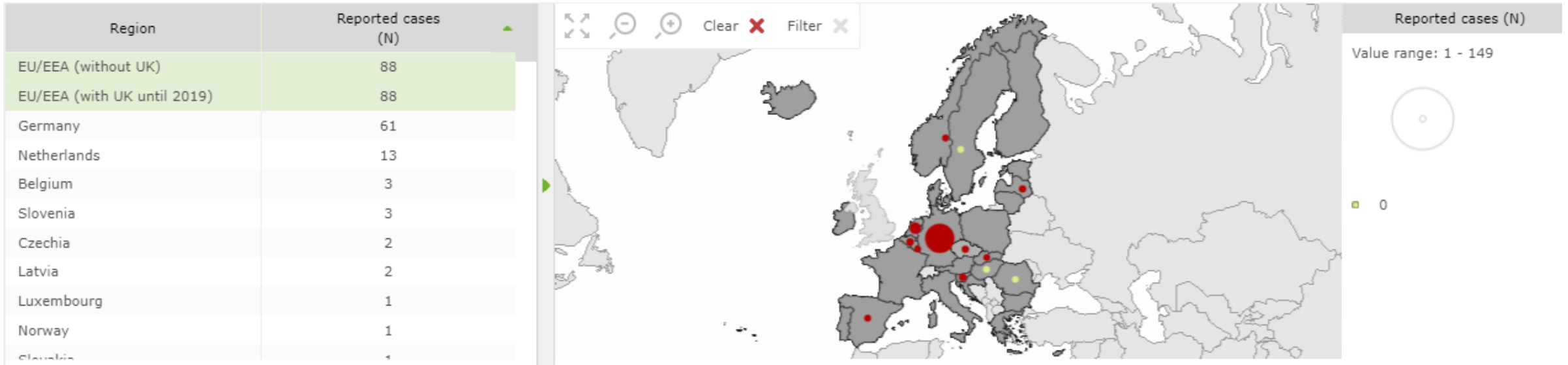
■ EU/EEA ■ Italy

# C. diphtheriae cases In Europe



## Surveillance Atlas of Infectious Diseases

Diphtheria ▾ C. diphtheriae cases ▾ Reported cases ▾ 2023 ▾

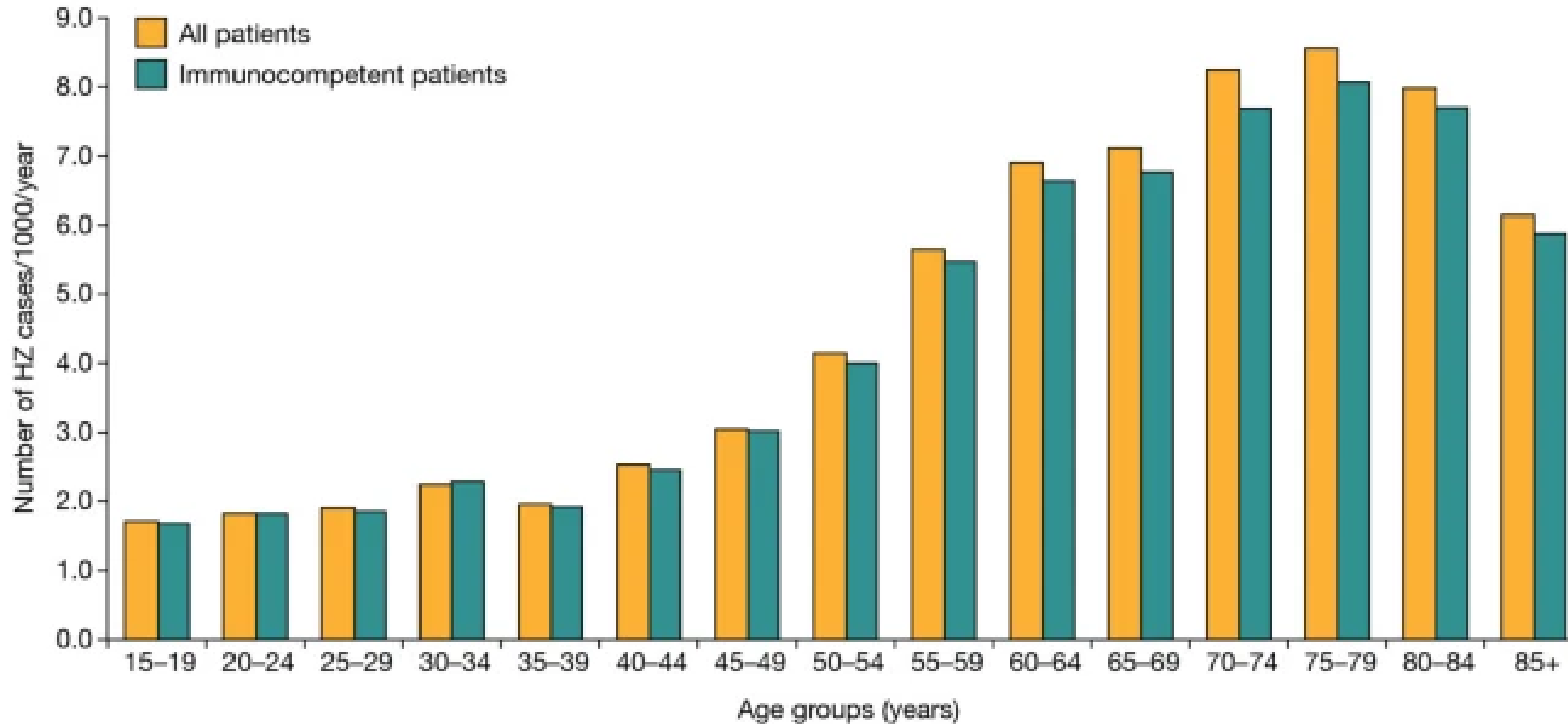


■ EU/EEA (without UK) ■ EU/EEA (with UK until 2019)

# C. diphtheriae cases In Europe (update)



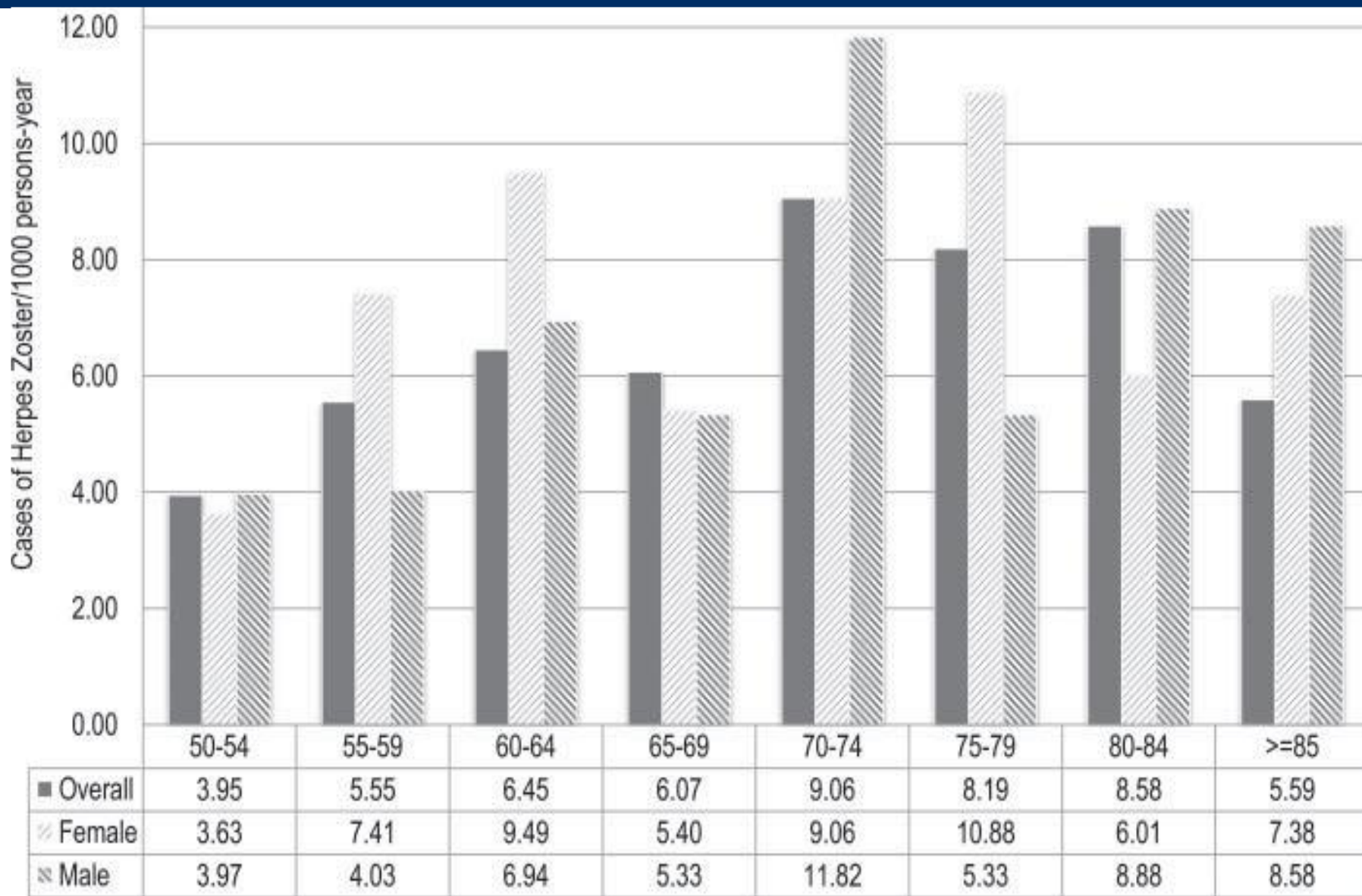
# Incidence of HZ and PHN in 4 Italian regions (2003-2005) (from clinical charts of GPs, Health Search Database (HSD))



1.71	1.82	1.91	2.25	1.95	2.51	3.06	4.15	5.63	6.90	7.11	8.22	8.56	7.97	6.13
1.67	1.82	1.84	2.26	1.93	2.43	3.04	4.00	5.47	6.61	6.75	7.68	8.06	7.69	5.85

HZ = herpes zoster

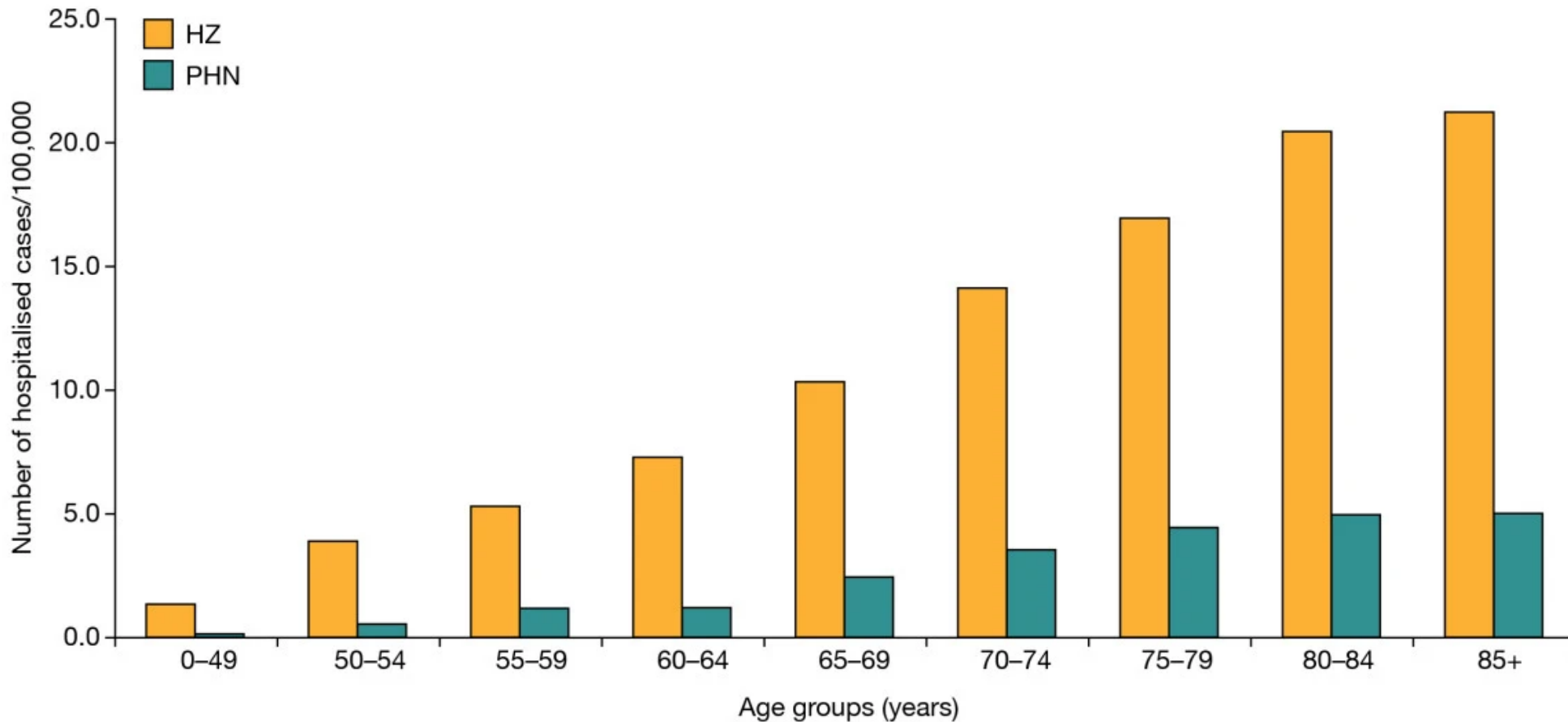
# Incidence of HZ (clinical charts from 56 GPs) (2013-2015)



Similar results in Salvetti A, et al. Incidence of herpes zoster and postherpetic neuralgia in Italian adults aged ≥50 years: A prospective study. Prev Med Rep. 2019

**Alicino C et al. Incidence of herpes zoster and post-herpetic neuralgia in Italy: Results from a 3-years population-based study. Hum Vaccin Immunother. 2017 Feb;13(2):399-404**

# Incidence of HZ and PHN hospitalization in 4 Italian regions (2003-2005) (discharge hospital registry in 4 regions)



■ HZ	1.31	3.83	5.28	7.19	10.31	14.07	16.99	20.48	21.55
■ PHN	0.12	0.58	1.15	1.20	2.45	3.57	4.45	4.97	4.99

HZ = herpes zoster; PHN = post-herpetic neuralgia



# Conclusion

- ❑ **SARS-CoV-2 infections still very common; natural and vaccine immunity wane rapidly but current acute severity is very low compared to 2020; vaccination remains the main pharmacological measure**
- ❑ **Need for a change in the surveillance of SARS-CoV-2 possibly only integrated with other respiratory viruses ... waste water surveillance as a close future option for many pathogens?**
- ❑ **Restriction measures impacted the susceptibility of other infectious diseases (e.g., Influenza and RSV in terms of susceptibility; pneumococcal disease?)**
- ❑ **Current diphtheria upsurge in EU more related to migration; rapid offer of vaccination to migrants?**

# THANKS!!!