



# Le Nuove Frontiere della Vaccinazione Antipneumococcica per i soggetti anziani, fragili e cronici

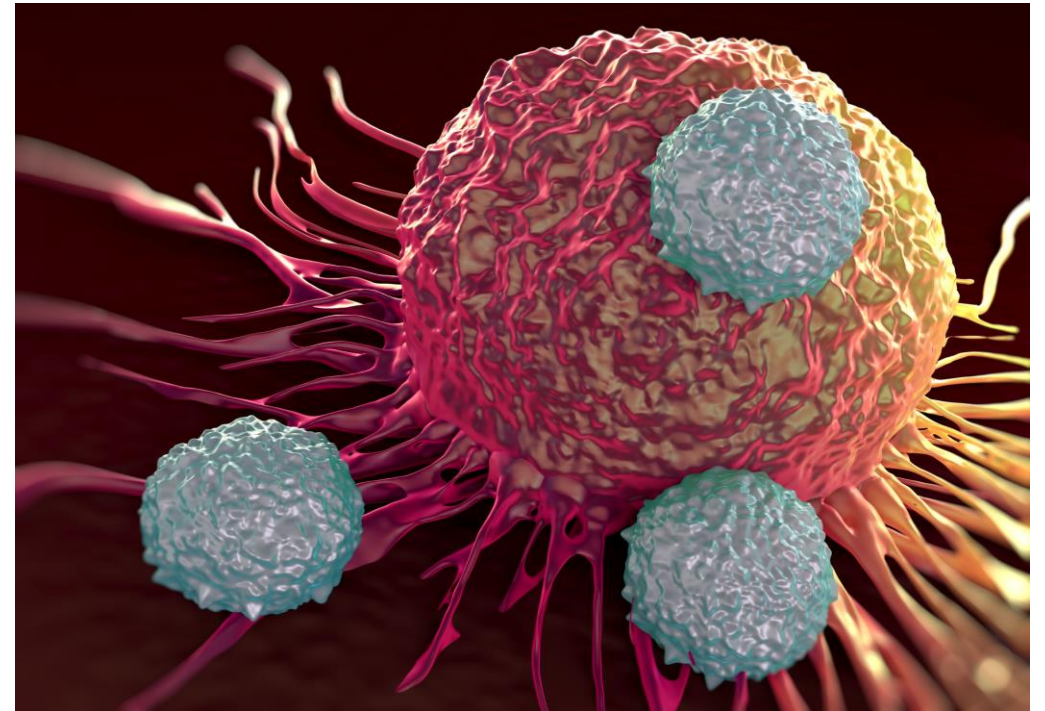
Giovanni Sotgiu

Department of Medicine, Surgery and Pharmacy  
University of Sassari - Italy

# Elderly

- Naïve B cell production decreases.
- Increased memory B cells and plasma cells with poor specificity, and sometimes impaired.

- Comorbidity, increasing the risk





Chronic heart disease\*

Chronic lung disease¶

Chronic liver disease, cirrhosis

Diabetes mellitus

Cerebrospinal fluid leak

Cochlear implant

Current cigarette smoking

Alcohol use disorder

Sickle cell disease/other hemoglobinopathy

History of invasive pneumococcal disease<sup>Δ</sup>

Congenital or acquired immunodeficiency<sup>◇ §</sup>

Congenital or acquired asplenia<sup>§</sup>

Human immunodeficiency virus infection<sup>§ ¥</sup>

Chronic kidney disease<sup>§</sup>

Nephrotic syndrome<sup>§</sup>

Leukemia<sup>§</sup>

Lymphoma<sup>§</sup>

Hodgkin disease<sup>§</sup>

Generalized malignancy<sup>§</sup>

Multiple myeloma<sup>§</sup>

Solid organ transplant<sup>§</sup>

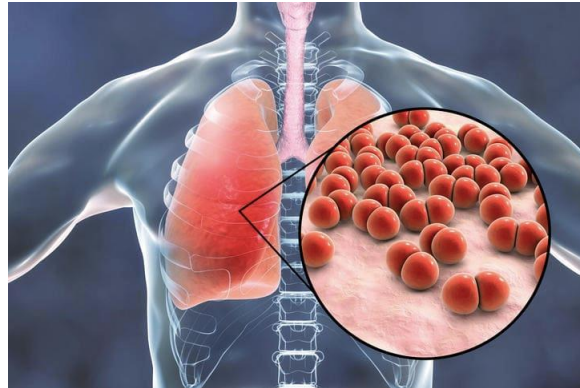
43% IPD in those >65 yrs and 48% in adults <65 yrs with predisposing conditions

IPD incidence in

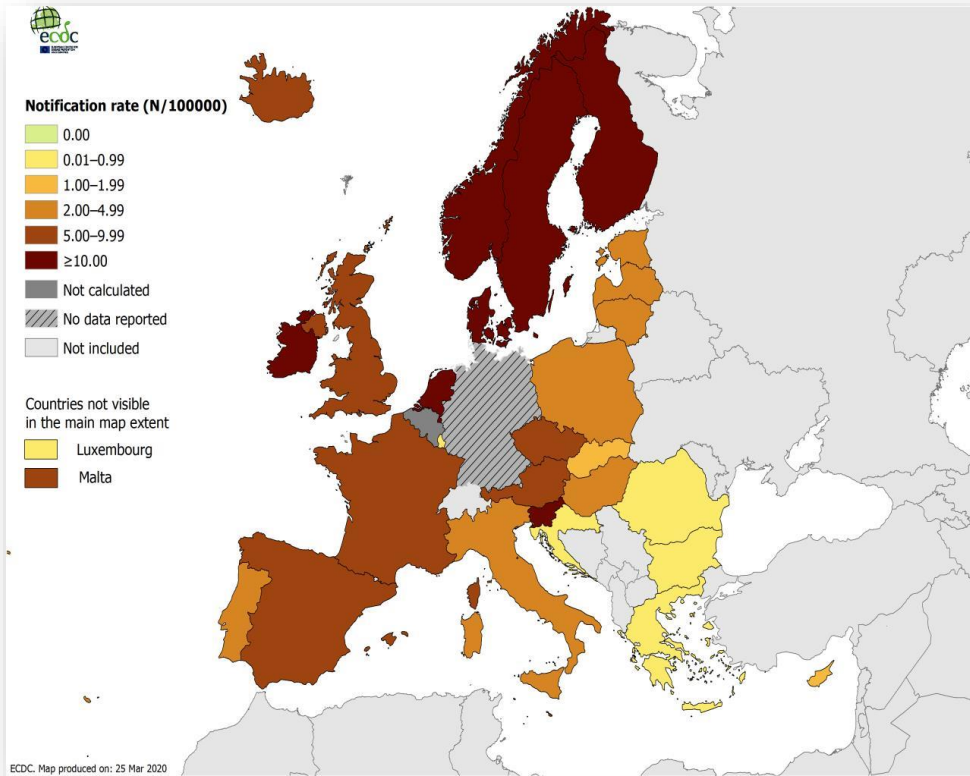
- ✓ individuals  $\geq 65$  yrs of age: **36.4** cases per 100,000
- ✓ infants <1 yr: **34.2** cases per 100,000
- ✓ individuals between **18 and 34 yrs**: **3.8** cases per 100,000
- ✓ individuals with a **hematologic malignancy**: **186** per 100,000
- ✓ individuals with **HIV infection**: **173** per 100,000



Naso-pharynx of adults (5-10%) and children (60%)



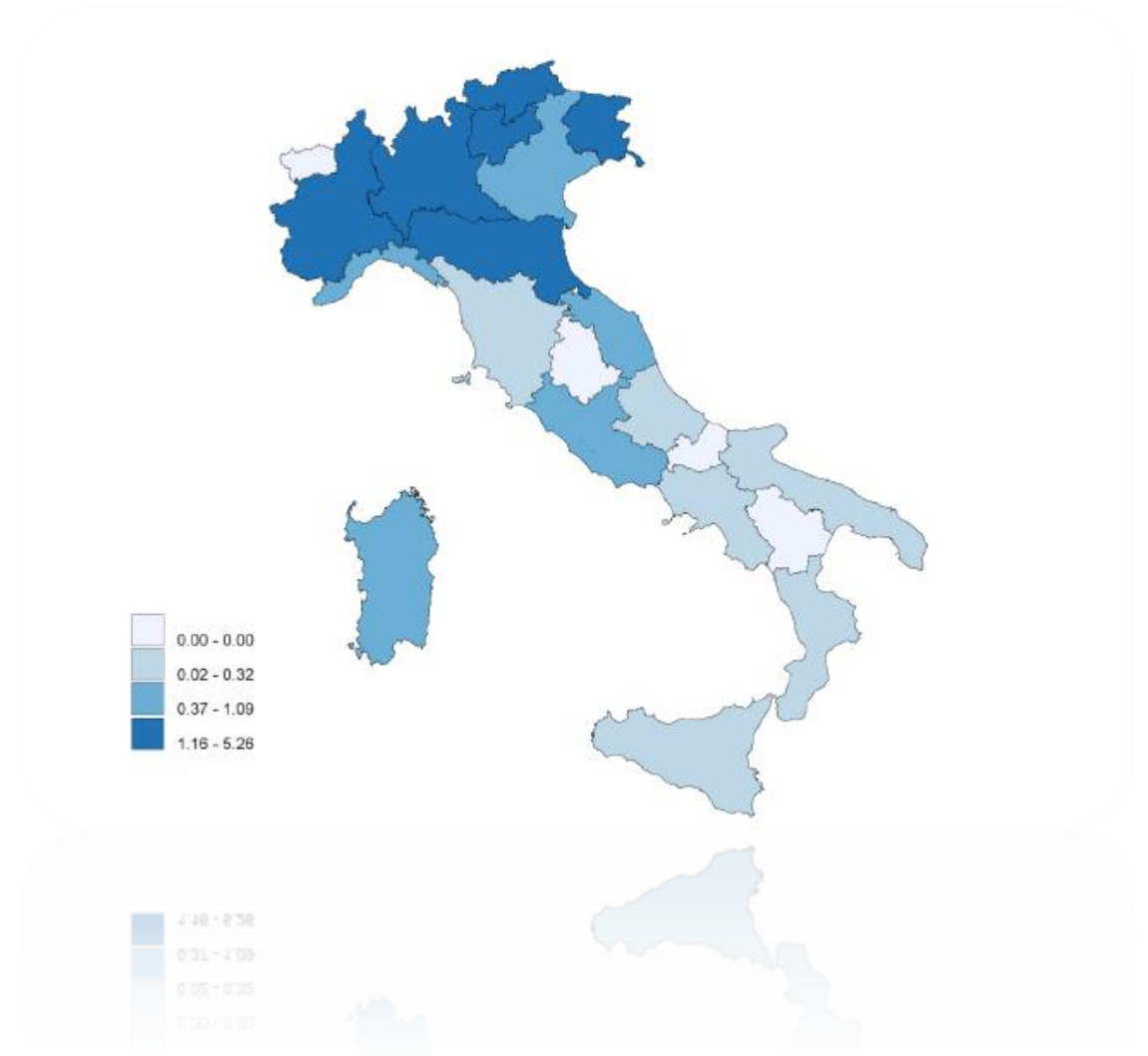
# IPD Notification



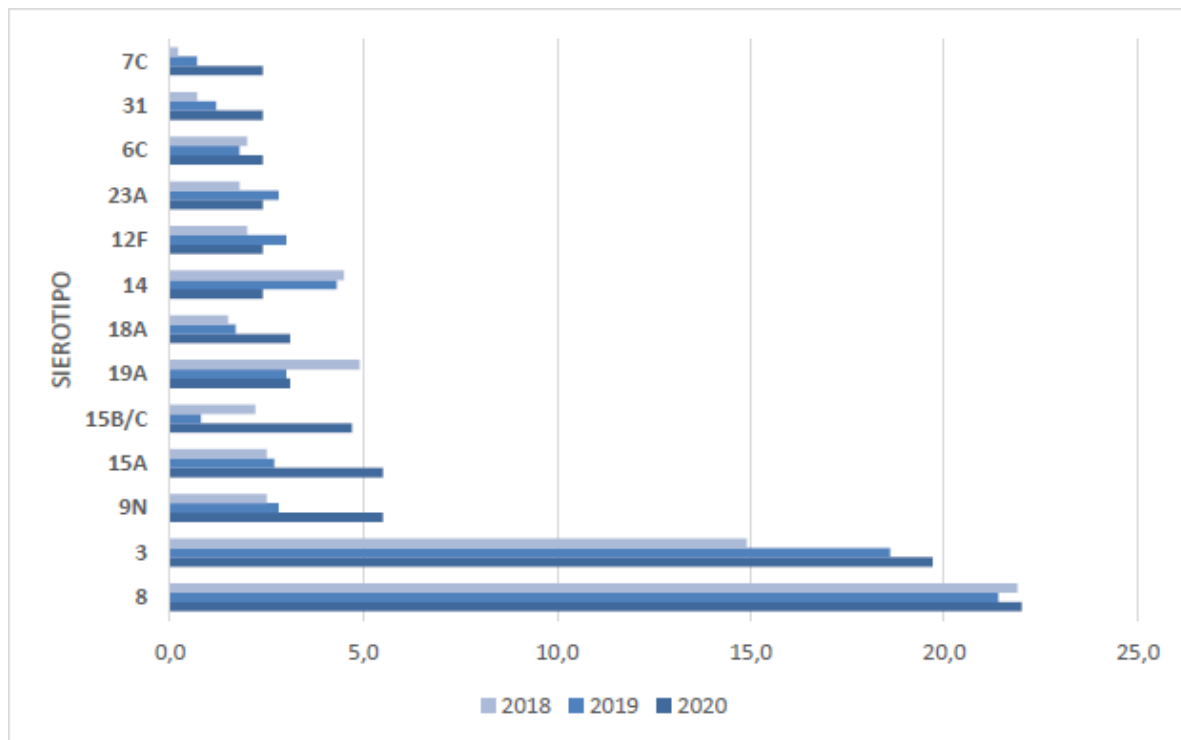
Lower than the European average

Northern-Southern gradient

→ susceptibility, transmission dynamics, under-diagnosis/ -notification.







### IPD cases

**2020:** 499

**2019:** 1,679

**2018:** 1,547

**>64 yrs:** serotypes 8 (21%) e 3 (19%)

**2020:** serotypes 8, 3, 15B/C, 15A, 9N, 19A, 18A, 14, 12F, 6C

### Association with serotype:

**2018:** 63.5%

**2019:** 58.0%

**2020:** 45.9%



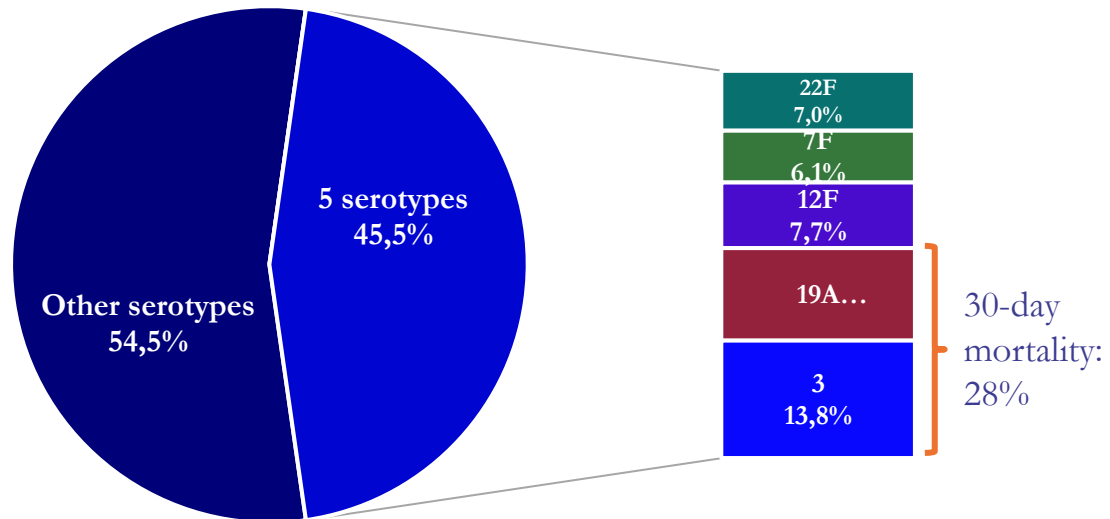
To understand the proportion prevented and not prevented by vaccines (replacement)

														Emerging							
	4	6B	9V	14	18C	19F	23F	1	5	7F	3	6A	19A	22F	33F	8	10A	11A	12F	15B	
IPD				●		●	●	●			●	●	●	●	●	●	●	●	●	●	●
Otitis		●	●	●		●	●				●	●	●			●			●		
Severity		●				●					●	●	●	●	●	●	●	●		●	
AMR		●	●	●		●	●					●	●	●	●			●	●	●	
Meningitis		●	●	●		●	●					●	●	●	●		●			●	
Mortality		●	●	●		●	●					●	●	●	●	●	●	●		●	
Outbreaks		●	●	●		●	●					●	●			●			●		

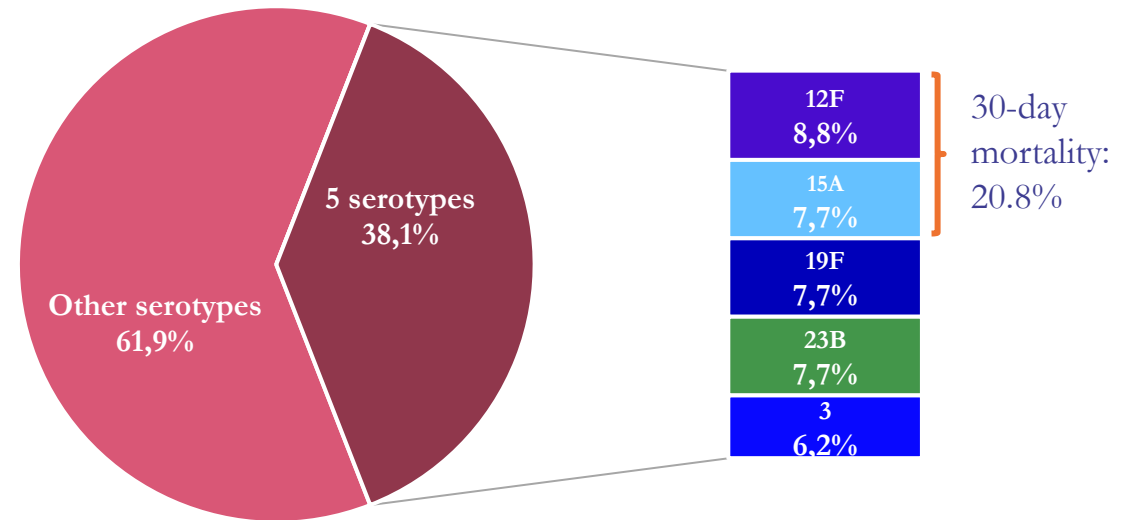
1Baisells E, et al PlosOne 2017; 2Hausdorff W & Hanage W. Hum Vaccin Immunother. 2016; 3Cohen R, et al. Expert Rev Vaccines. 2017; 4Moore M et al, Lancet Infect Dis 2015; 5Metcalf B et al, Clin Microbiol Infect 2016; 6Tomczyk S et al, Clin Infect Dis 2016; 7Mendes R et al, Antimicrob Agents Chemother 2015; 8Olarite L et al, Clin Infect Dis. 2015; 9Thigpen M et al, NEJM 2011; 10Oligbu G et al. Clin Infect Dis 2017; 11van Hoek et al, PlosOne 2012; 12Stanek R et al, Am J Med Sci 2016; 13Harboe et al, PlosOne 2009; 14Zivich et al, Pneumonia, 2018.; 15Zulz T et al, JCM 2013 16Perdrizet J, et al[online ePoster/abstract 287]. ISPPD-12 2020



## IPD (no Meningitis)

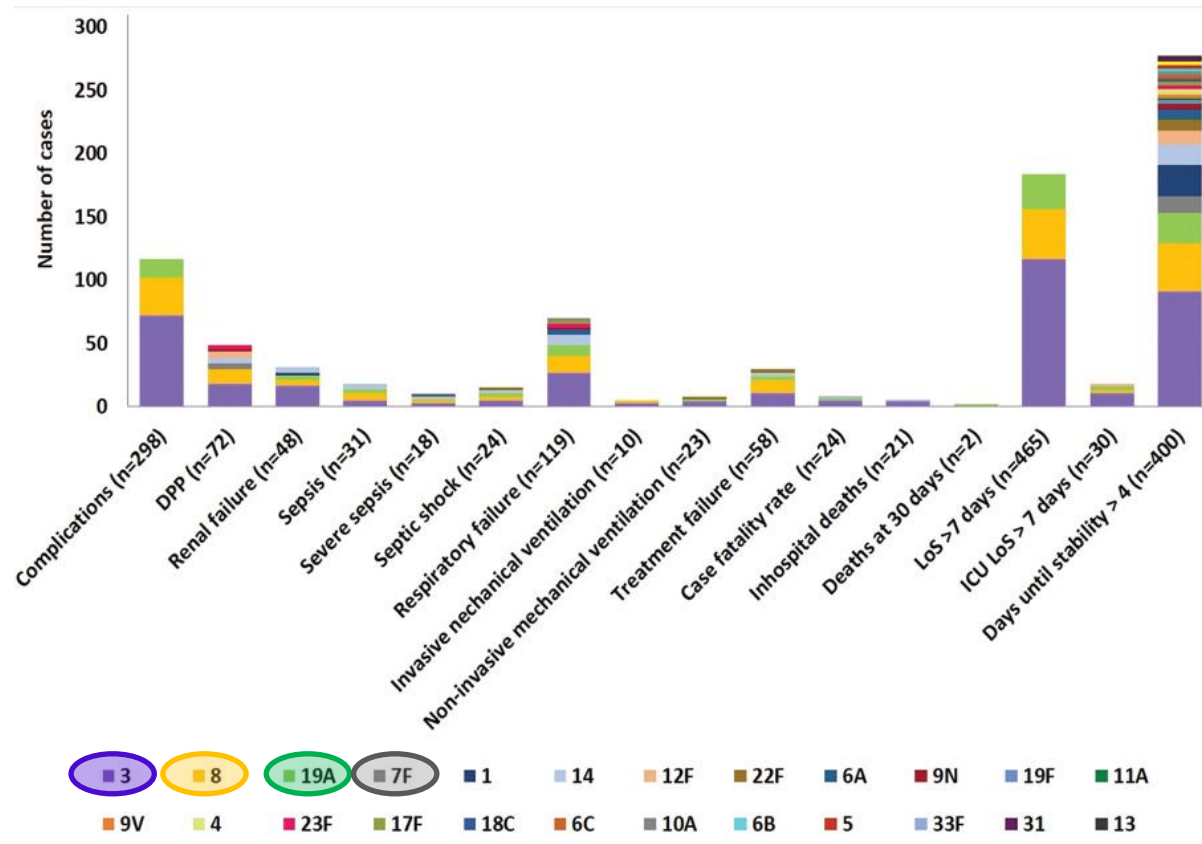


## Meningitis



1. Torres A, Menéndez R, España PP, Fernández-Villar JA, Marimón JM, Cilloniz C, Méndez R, Egorola M, Botana-Rial M, Ercibengoa M, Méndez C, Cifuentes I, Gessner BD; CAPA Study Group. The Evolution and Distribution of Pneumococcal Serotypes in Adults Hospitalized With Community-Acquired Pneumonia in Spain Using a Serotype-Specific Urinary Antigen Detection Test: The CAPA Study, 2011-2018. Clin Infect Dis. 2021 Sep 15;73(6):1075-1085.

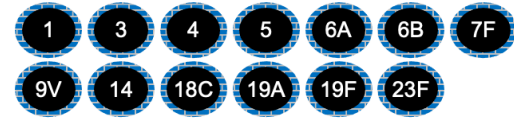
2. Benadji A, Duval X, Danis K, Hoen B, Page B, Béraud G, Vernet-Garnier V, Strady C, Brieu N, Maulin L, Roy C, Ploy MC, Gaillat J, Varon E, Tubiana S; COMBAT Study Group; SIIP Study Group. Relationship between serotypes, disease characteristics and 30-day mortality in adults with invasive pneumococcal disease. Infection. 2021 Sep 1.



More severe disease:  
3, 8, 19A, 7F



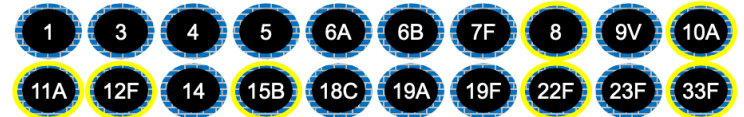
PCV-13 Serotypes

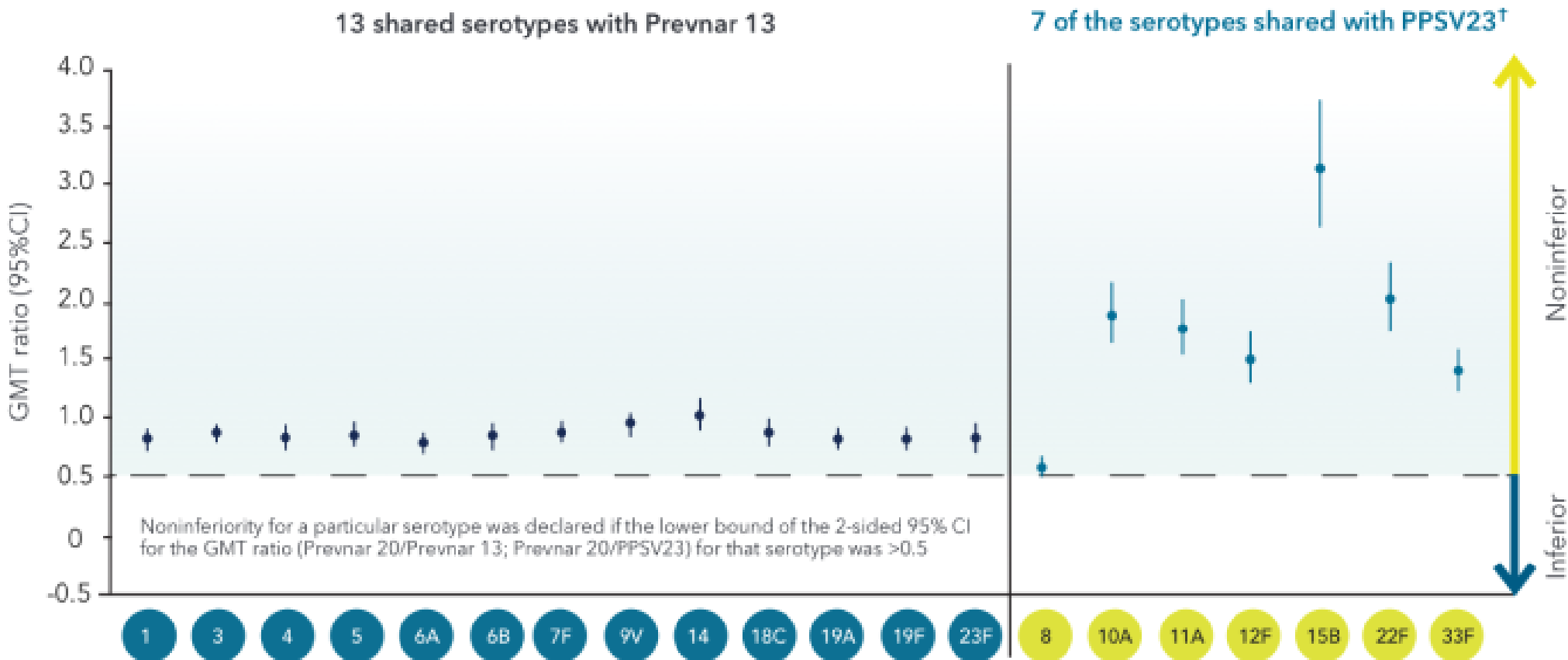


PCV-15 Serotypes



PCV-20 Serotypes





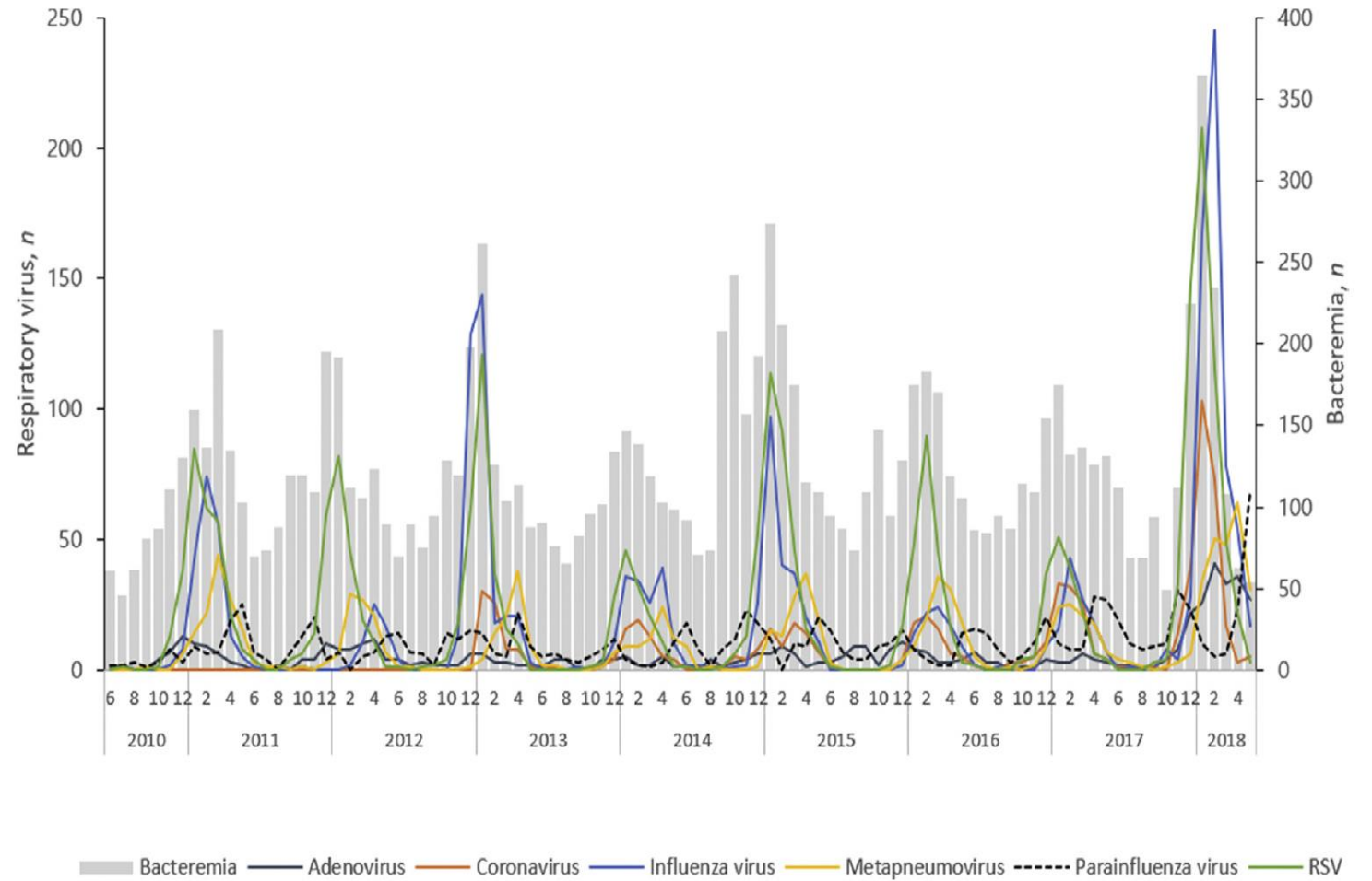
# *S. pneumoniae* and Viruses

- Virus-induced inflammation in the upper airway impairs innate (monocyte/cytokine) responses to pneumococci
- acquisition of **pneumococcal carriage** and **loss of control** over progression to secondary bacterial pneumonia
- ❖ Pneumococcal carriers have diminished mucosal antibody responses to influenza virus challenge;
- ❖ Higher likelihood of both acquiring respiratory viruses and thereafter experiencing acute respiratory symptoms;
- ❖ Those interactions have been shown to promote transmission of both pneumococci and viruses.

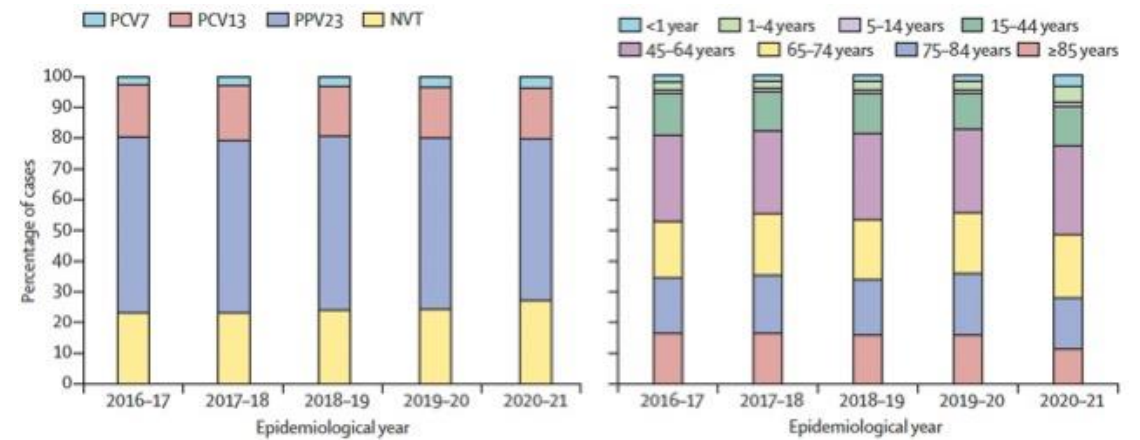
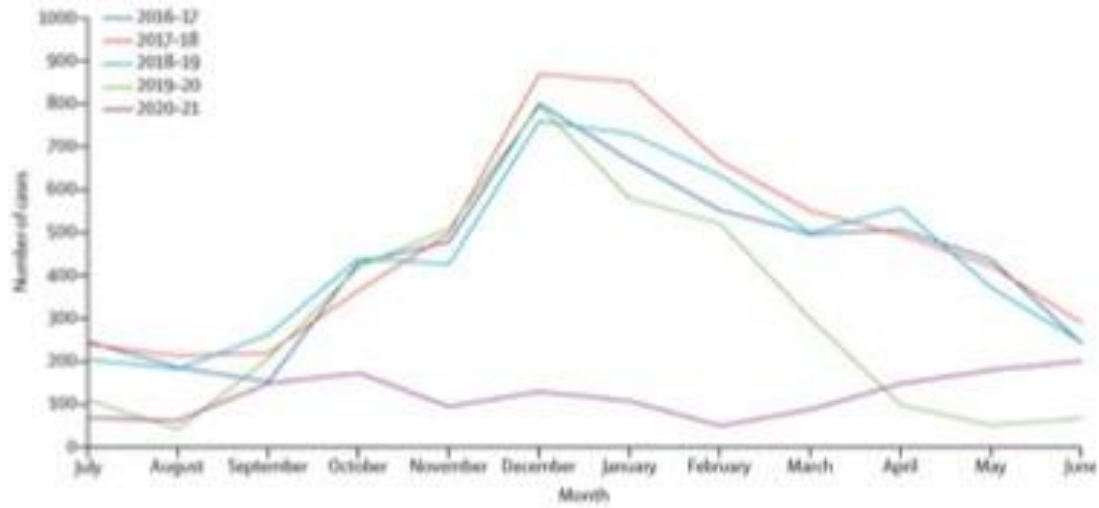


# Seasonality

Climate change and social contacts



## Out-of-season increased number of viral infections (e.g., RSV in august 2021)

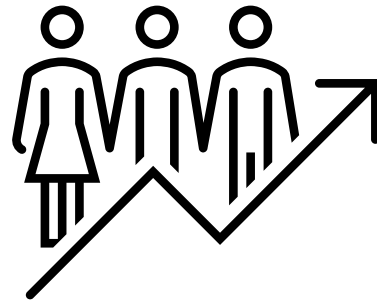




# Seasonality?

All-year-round pneumococcal disease

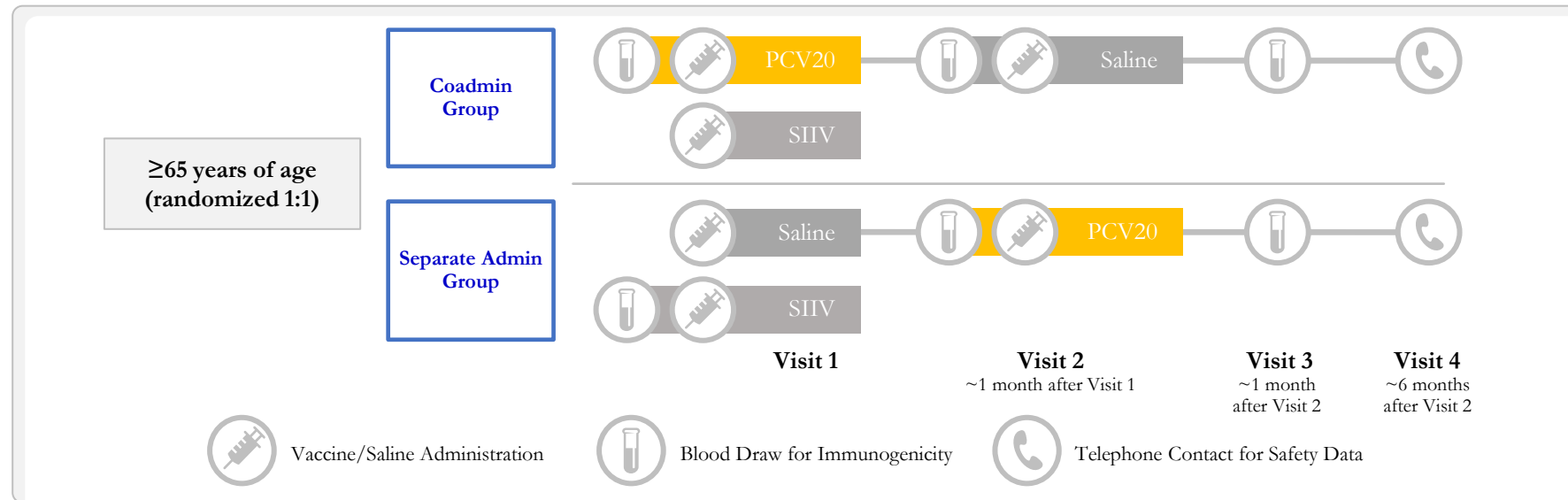
Flu and pneumococcal vaccinations: increased compliance



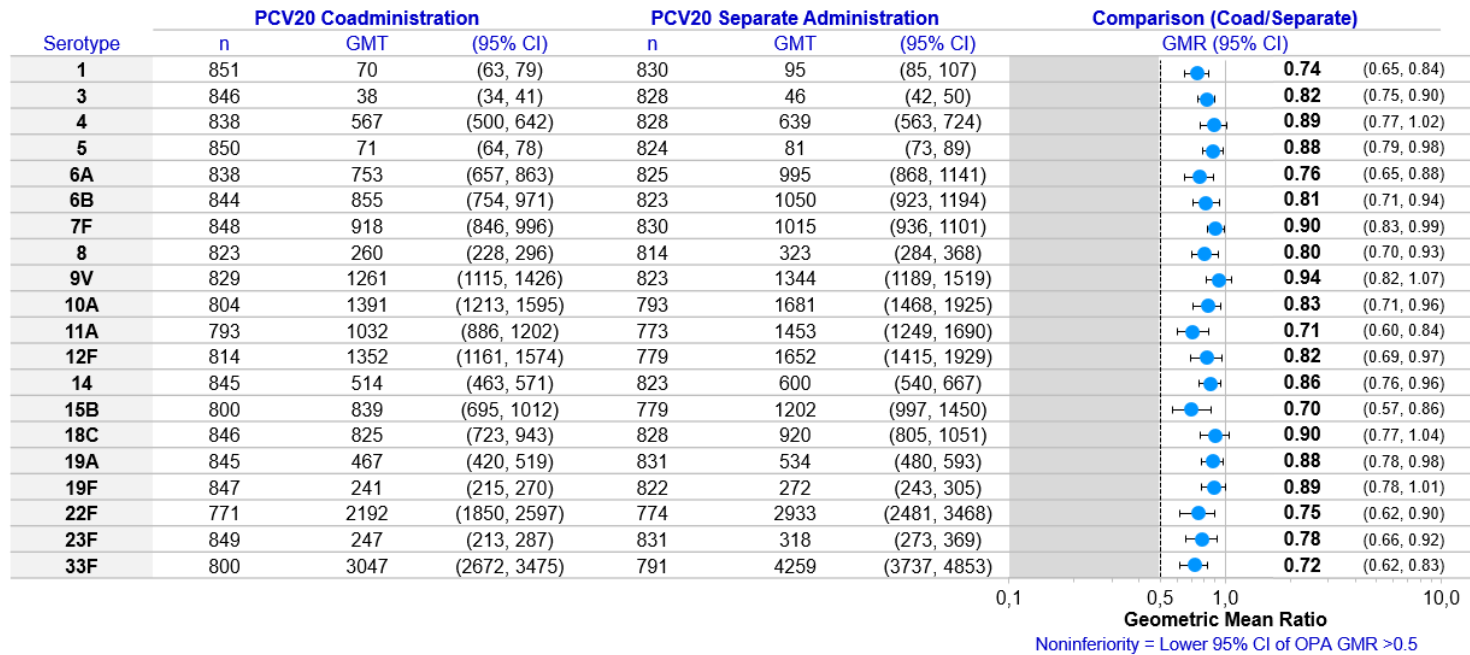
# SARS-CoV-2 Positivity and Influenza and Pneumococcal Vaccination

	All			18 to 64 years of age			65 to 104 years of age		
	OR	95% CI	<i>p</i> -Value	OR	95% CI	<i>p</i> -Value	OR	95% CI	<i>p</i> -Value
<b>(a) Not adjusted model</b>									
Flu vaccine during previous autumn	1.02	0.91–1.15	0.7387	0.86	0.75–0.99	0.0301	0.83	0.60–1.14	0.2440
Pneumococcal vaccination	0.77	0.58–1.02	0.0635	0.67	0.46–0.97	0.0342	0.42	0.26–0.66	0.0002
<b>(b) Adjusted model*</b>									
Flu vaccine during previous autumn	0.89	0.78–1.01	0.1408	0.85	0.74–0.98	0.0235	0.87	0.59–1.28	0.4826
Pneumococcal vaccination in previous 12 months	0.56	0.41–0.75	0.0001	0.61	0.41–0.91	0.0156	0.56	0.33–0.95	0.0313

# PCV20 and adjuvanted quadrivalent flu vaccine



# Non-inferiority



- Good safety
- PCV20: OPA GMTs against 20 serotypes similar to those in the control arm

