

17-20
Dicembre
2025
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SOCIETÀ ITALIANA
DI GERONTOLOGIA
E GERIATRIA

Il burden dell'infezione pneumococcica

Andrea Corsonello (Cosenza)



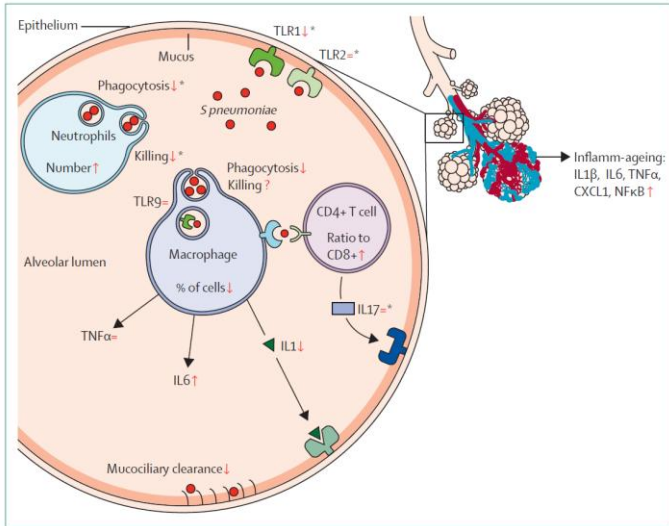
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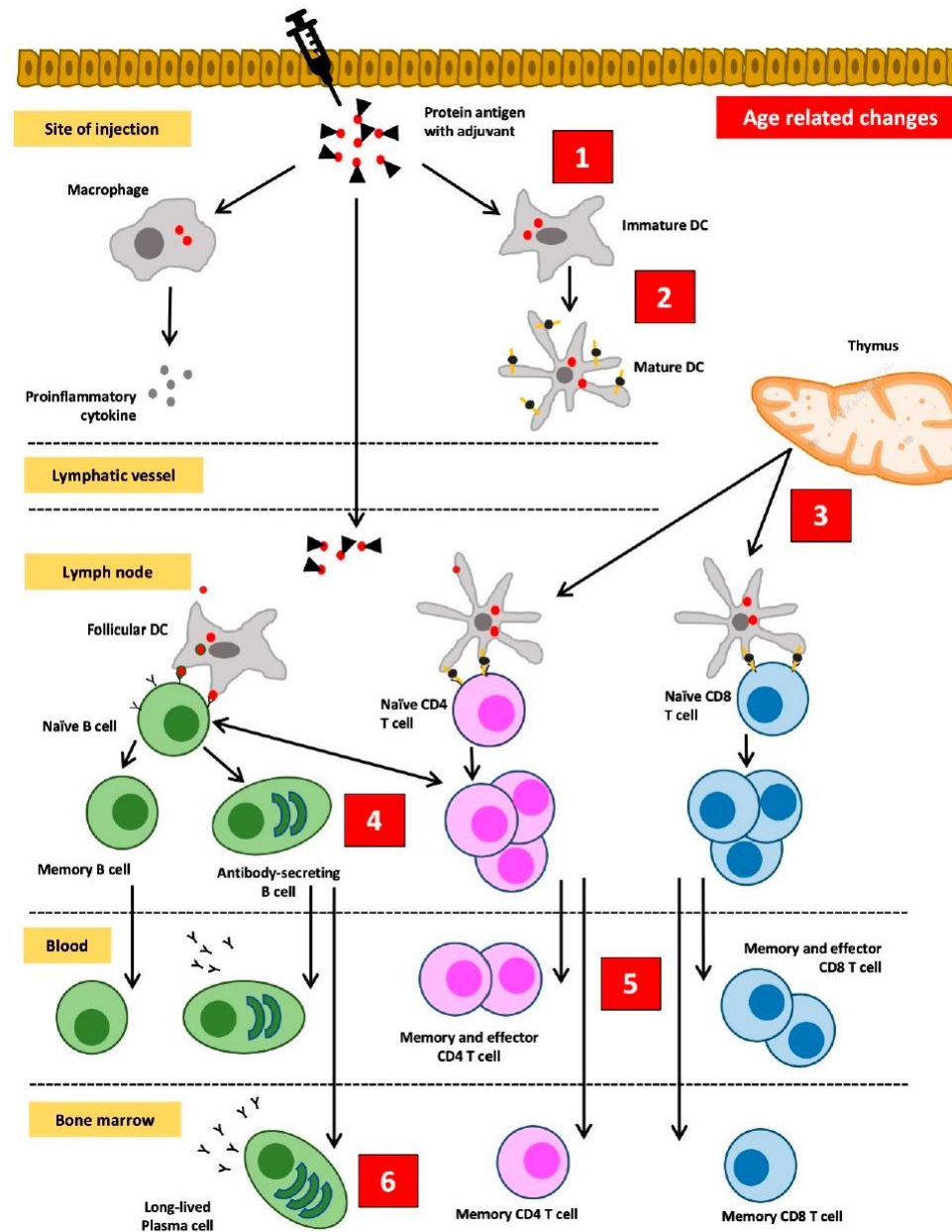


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Dimensioni geriatriche
Costi
Vaccini



Lancet Respir Med 2014;
 2: 141–53



Subclinical inflammation increases the threshold of „danger” signals to be induced by vaccines

Functionally defective antigen-presenting cells

Involution of the thymus gland

Reduced B cell production and faults in isotype switching and somatic hypermutation result in weak and low-affinity antibody responses.

An increased number of effector T cells limits immune cell diversity and threatens the desired effects of vaccination.

Compromised viability of plasma cells and shortened duration of immunological protection.

Hospital burden of pneumococcal disease in Spain (2016–2022): A retrospective study

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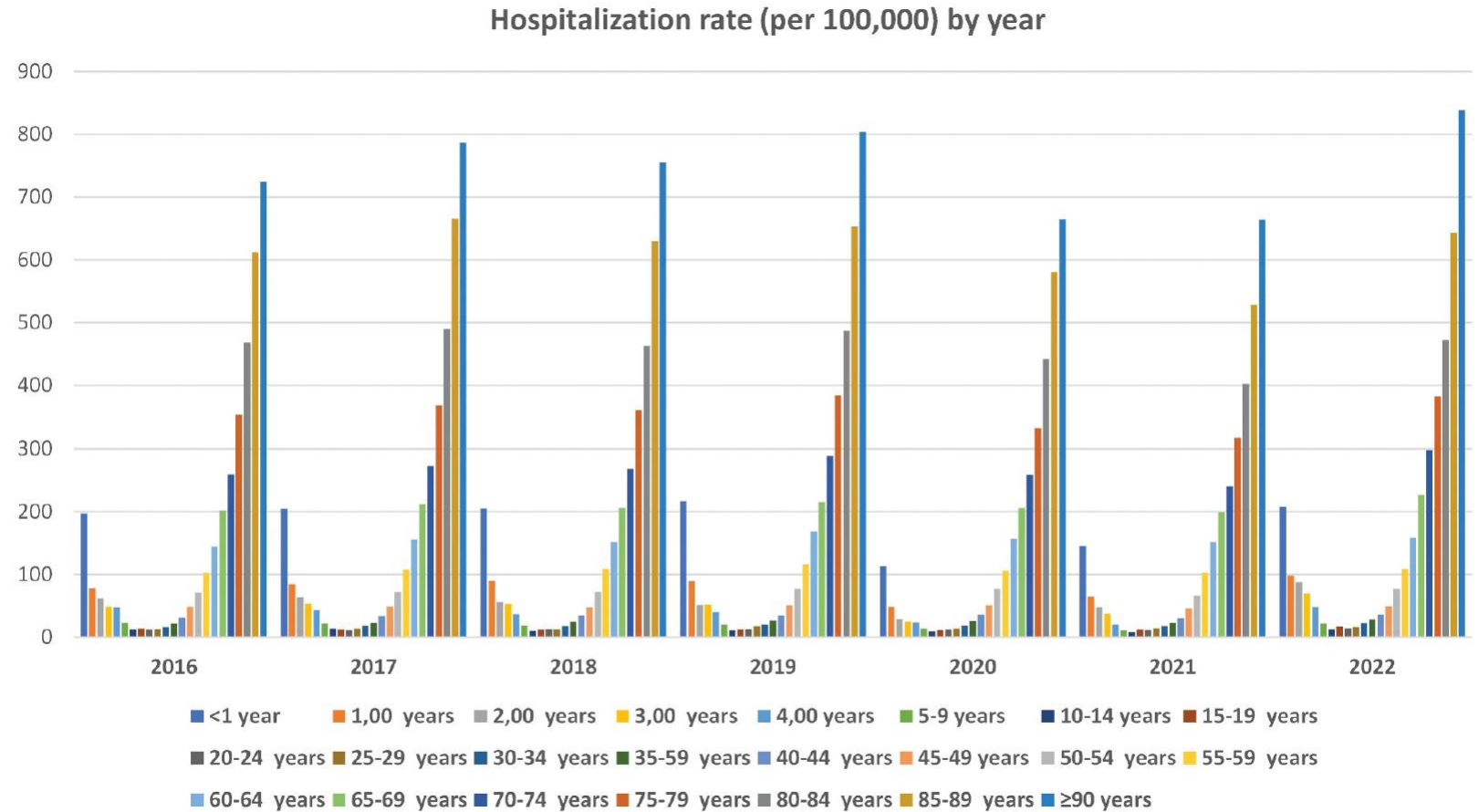


Figure 1. Hospitalization rate for pneumococcal disease in Spain by year (2016–2022).

Hospital burden of pneumococcal disease in Spain (2016–2022): A retrospective study

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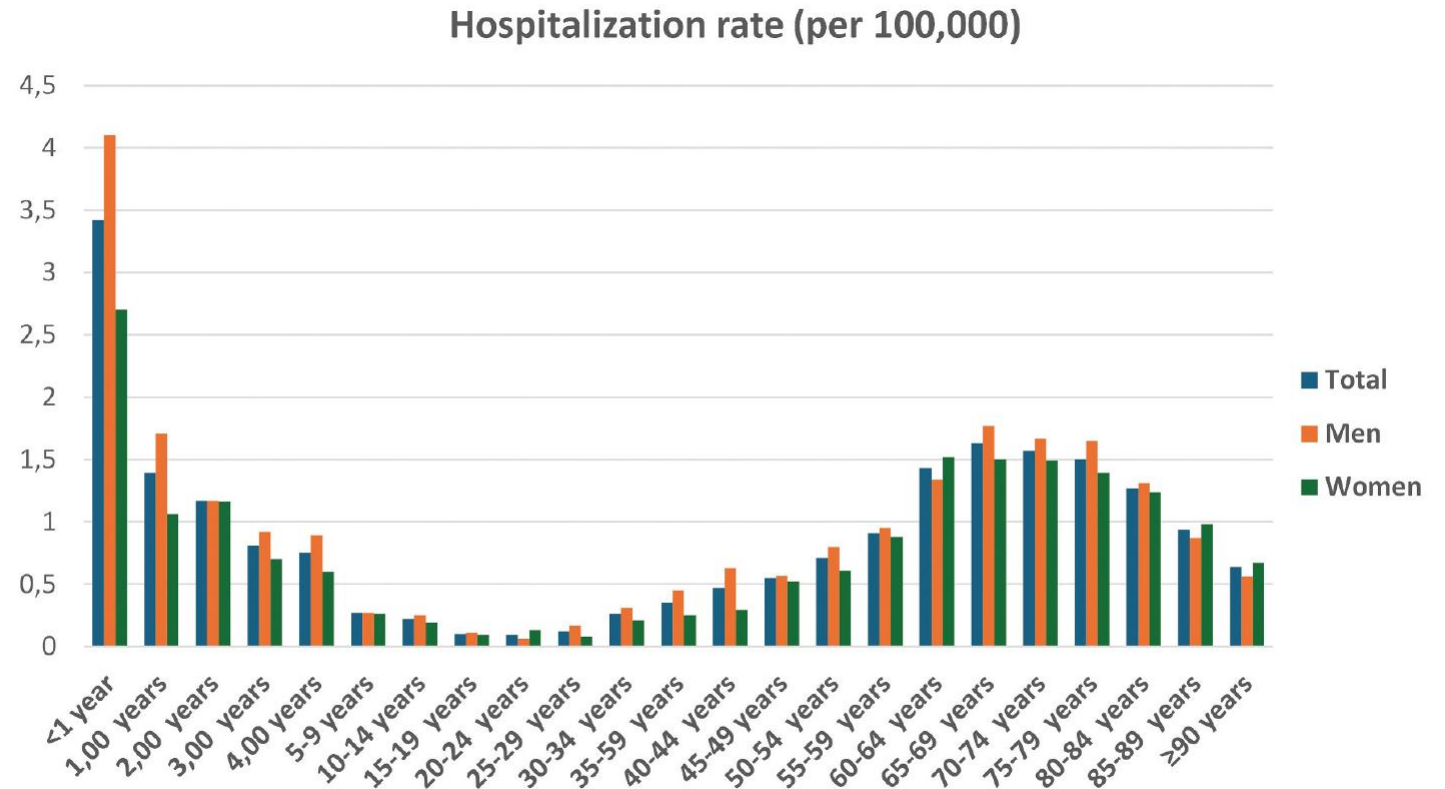


Figure 3. Hospitalization rate in Spain related to pneumococcal meningitis by sex and age.

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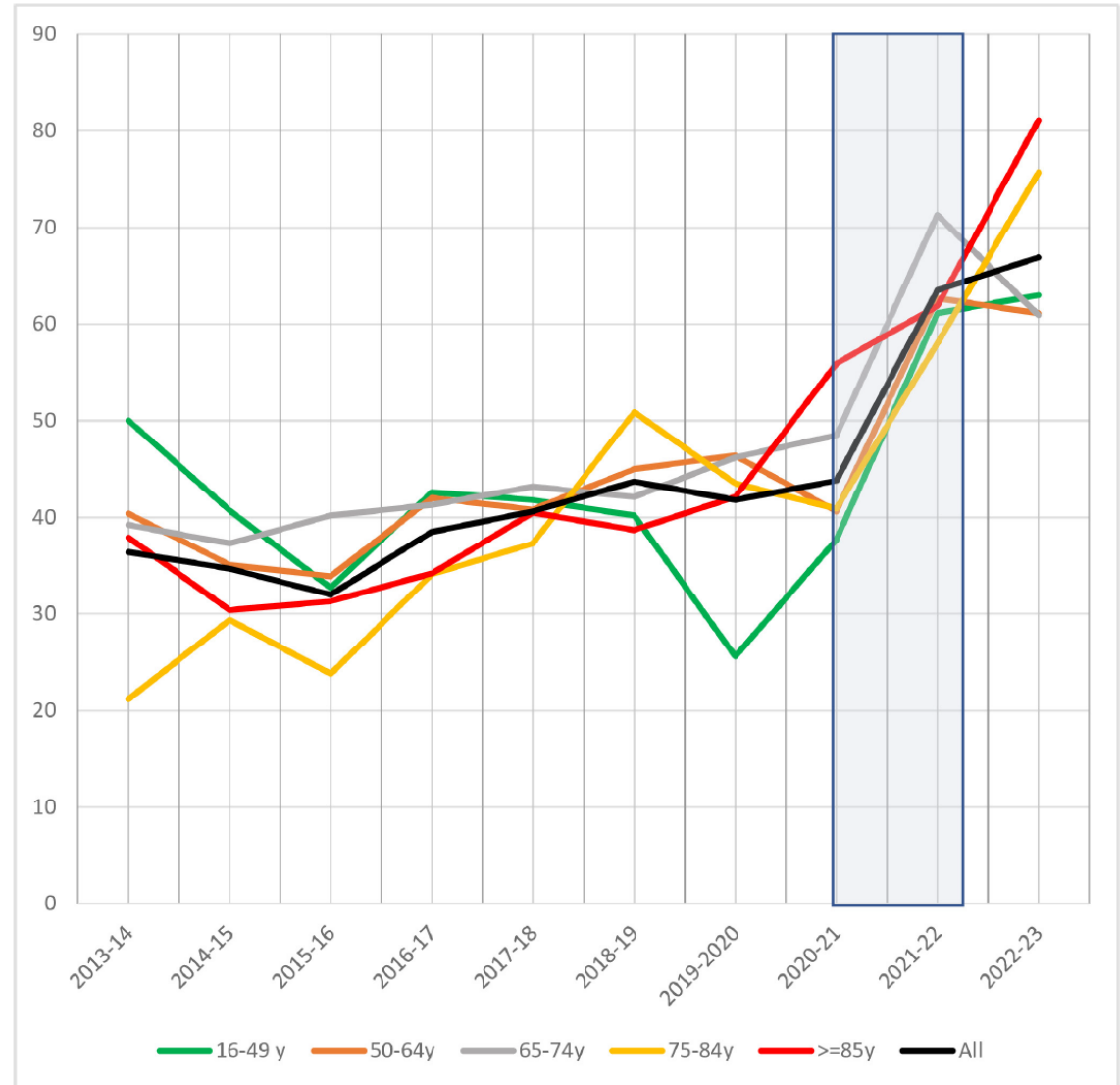


Figure 1 The absolute proportion of community-acquired pneumonia (CAP) caused by *Streptococcus pneumoniae* between 2013 and 2023 by study year and according to age group. The numerator is the number of patients with pneumococcal pneumonia per age group and the denominator is the total number of patients admitted with all-cause CAP for that age group.

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Table 3 Trends in characteristics of pneumococcal CAP patients between 2013 and 2023 by study year

	Study year (number of patients)										P value for trend
	2013–2014 (n=180)	2014–2015 (n=202)	2015–2016 (n=165)	2016–2017 (n=248)	2017–2018 (n=283)	2018–2019 (n=321)	2019–2020 (n=238)	2020–2021 (n=125)	2021–2022 (n=219)	2022–2023 (n=212)	
Median age (IQR)	67.4 (49.9–80.1)	68.0 (51.5–77.4)	66.9 (50.9–78.7)	70.1 (53.9–81.1)	71.8 (59.2–81.7)	71.9 (58.4–81.5)	72.8 (60.2–81.3)	71.6 (58.5–80.3)	69.5 (60.0–78.6)	70.8 (60.1–80.0)	0.14*‡ 0.10†‡
Sex, male (%)	91 (50.6)	96 (47.5)	86 (52.1)	110 (44.4)	132 (46.6)	169 (52.2)	136 (56.7)	99 (79.2)	136 (62.1)	135 (63.7)	0.22*‡ 0.06†‡
PPV23 receipt (%)	59/163 (36.2)	80/189 (52.3)	46/153 (29.9)	79/234 (33.8)	96/262 (36.6)	100/321 (31.2)	81/238 (34.0)	55/125 (44.0)	109/219 (49.8)	107/212 (50.5)	0.02*‡ 0.03†‡
Severity											
30-day mortality (%)	8 (4.4)	11 (5.4)	4 (2.4)	19 (7.7)	12 (4.2)	30 (9.3)	20 (8.4)	14 (11.2)	20 (9.1)	9 (9.1)	0.02*§ 0.01†§
Readmitted (%)	20/172 (11.6)	19/191 (9.9)	12/161 (7.4)	20/223 (9.0)	25/271 (9.2)	46/291 (15.8)	34/218 (15.6)	12/111 (10.8)	30/199 (19.6)	20/203 (9.8)	0.63*¶ 0.20†¶
Critical care admission (%)	18 (10.0)	22 (10.9)	19 (11.5)	28 (11.3)	22 (7.8)	29 (9.0)	27 (11.3)	12 (9.6)	15 (6.8)	13 (6.1)	0.52*** 0.50†***

Trends in characteristics and outcomes in patients hospitalised with pneumococcal CAP between 2013 and 2023 by study year. Absolute numbers and the corresponding percentages are presented for each variable for each year. Estimated p values for trends were obtained by restricted cubic spline regression with five knots at admission dates of 6 April 2014, 24 June 2016, 5 February 2018, 2 September 2019 and 25 December 2022 for the entire study period, and at 12 March 2014, 5 January 2016, 9 August 2017, 12 November 2018 and 29 December 2019 for the prepandemic period only, based on Harrell's recommended percentiles. p-values <0.05 are indicated in bold.

*P value for trend across the 10-year study period excludes patients admitted between 13 March 2020 and 31 August 2021.

†P value for prepandemic trend between 2013–2014 and 2019–2020 only.

‡Adjusted for sex, PPV23 receipt and COPD.

§Adjusted for age, smoking status and CURB65.

¶Adjusted for age, PPV23 receipt and COPD.

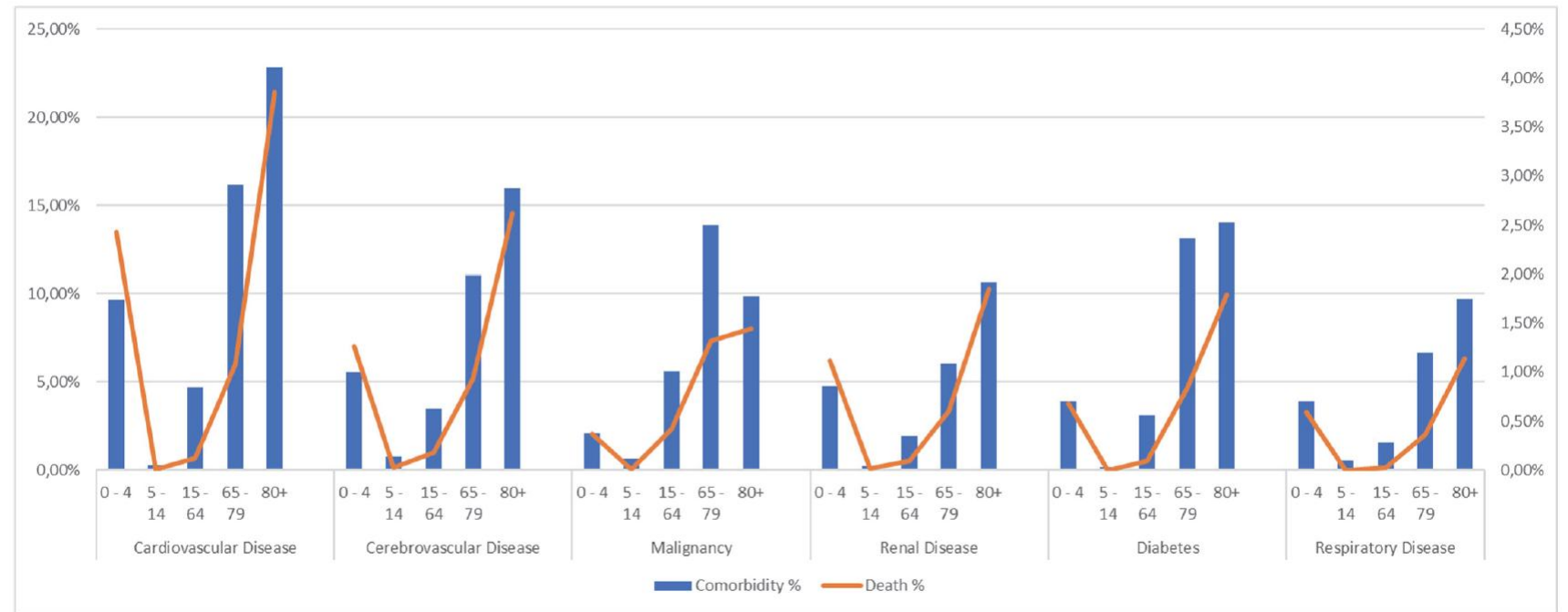
***Adjusted for age, PPV23 receipt and CURB65.

CAP, community-acquired pneumonia; COPD, chronic obstructive pulmonary disease; PPV23, pneumococcal polysaccharide vaccine.

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The Burden of Streptococcus pneumoniae-Related Admissions and In-Hospital Mortality: A Retrospective Observational Study between the Years 2015 and 2022 from a Southern Italian Province

Fabrizio Cedrone ^{1,*}, Vincenzo Montagna ^{2,†}, Livio Del Duca ¹, Laura Camplone ³, Riccardo Mazzocca ³, Federica Carfagnini ¹, Valterio Fortunato ¹ and Giuseppe Di Martino ^{4,5}



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28-days mortality

Table 6 ROC curve analysis: comparison with standard severity scores

Model/Predictor	AUC (95% CI)	p vs. CURB-65
CURB-65	0.68 (0.53–0.83)	—
LUS total score (≥ 13)	0.70 (0.56–0.85)	0.40
CT % consolidation ($\geq 28\%$)	0.69 (0.54–0.84)	0.46
Severe frailty (CFS ≥ 7)	0.72 (0.59–0.85)	0.24
LUS + Frailty	0.75 (0.62–0.87)	0.10
LUS + CT + Frailty	0.77 (0.63–0.88)	0.06

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<https://doi.org/10.1093/eurpub/ckad212> Advance Access published on 7 December 2023

Cost of illness of the vaccine-preventable diseases influenza, herpes zoster and pneumococcal disease in France

Key points

- The incidence of vaccine-preventable diseases continues to be high despite the availability of vaccines.
- A cost calculator was developed to assess the cost of illness of influenza, herpes zoster, and pneumococcal disease in France among older adults aged ≥ 65 years.
- Influenza is the leading cause of vaccine-preventable diseases and is associated with the highest economic burden among older adults.
- Increasing vaccine uptake could alleviate the substantial economic burden caused by influenza.

Table 1 Incidence and costs of influenza

Concept category	Age category		
	65+	65–74	75+
Annual incidence of inpatient visits	26 438	6266	18 903
Annual incidence of outpatient visits	135 911	72 915	62 996
Total annual incidence	162 349	79 181	81 899
Direct costs: inpatients	€130 606 528	€29 726 781	€97 667 313
Direct costs: outpatients	€3 291 662	€1 765 943	€1 525 720
Total inpatient costs	€130 606 528	€29 726 781	€97 667 313
Total outpatient costs	€3 291 662	€1 765 943	€1 525 720
Total costs	€133 898 190	€31 492 723	€99 193 033

Table 2 Incidence and costs of pneumococcal disease

Concept category	Age category		
	65+	65–74	75+
Annual incidence of inpatient visits	12 350	4472	10 019
Annual incidence of outpatient visits	29 564	15 861	13 703
Total annual incidence	41 914	20 333	23 722
Direct costs: inpatients	€94 112 146	€33 975 041	€76 551 455
Direct costs: outpatients	€3 730 307	€2 001 271	€1 729 036
Total inpatient costs	€94 112 146	€33 975 041	€76 551 455
Total outpatient costs	€3 730 307	€2 001 271	€1 729 036
Total costs	€97 842 453	€35 976 312	€78 280 491

Table 3 Incidence and costs of HZ

Concept category	Age category		
	65+	65–74	75+
Annual incidence of inpatient visits	0	0	0
Annual incidence of outpatient visits	129 893	58 436	71 457
Total annual incidence	129 893	58 436	71 457
Direct costs: inpatients	€0	€0	€0
Direct costs: outpatients	€37 716 629	€13 136 036	€26 172 185
Total outpatient costs	€37 716 629	€13 136 036	€26 172 185
Total costs	€37 716 629	€13 136 036	€26 172 185

Pneumococcal disease burden in high-risk older adults: Exploring impact of comorbidities, long-term care facilities, antibiotic resistance, and immunization policies through a narrative literature review

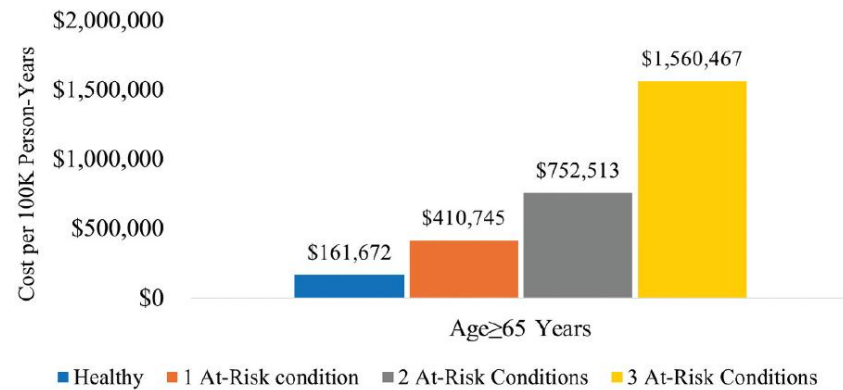


Figure 2. Annual cost for invasive pneumococcal diseases (per 100,000 person-years), stratified by the numbers of chronic medical conditions. The data was adapted from reference 39.

Table 2A. Incidence rates of pneumococcal pneumonia among adults by age group and risk group (per 100,000 person-years).

	Shea et al. ¹⁸ (2006–2010) ^{b)}			Grant et al. ¹⁹ (2016–2019) ^{c)}		
	18 ~ 49 years	50 ~ 64 years	≥65 years	18 ~ 49 years	50 ~ 64 years	≥65 years
Healthy ^{a)}	14	25	67	114.2	191.9	442.2
Asthma	52	124	398	324.8	795.8	1,854.3
Chronic heart disease	72	106	254	419.0	774.9	1,664.9
Chronic liver disease	90	148	287	364.7	795.4	1,416.7
Chronic lung disease	126	248	516	642.5	1,448.8	2,737.8
Diabetes mellitus	44	76	187	330.2	575.2	1,180.1
Sickle cell disease/other hemoglobinopathies	–	–	–	1,583.1	2,985.6	4,977.6
HIV infection	138	165	329	692.5	1,437.8	2,467.7
Leukemia	–	–	–	2,037.1	2,952.6	4,844.5
Lymphoma	–	–	–	1,319.6	2,345.9	4,024.3
Iatrogenic immunosuppression	–	–	–	422.5	1,094.9	2,472.4
Nephrotic syndrome	–	–	–	1,263.3	3,424.7	4,576.0
Hodgkin's disease	–	–	–	1,078.2	2,540.8	4,595.8
Multiple myeloma	–	–	–	2,561.1	3,967.5	5,775.3
Chronic renal failure	197	285	438	1,691.5	2,597.2	3,188.1
Neuromuscular/seizure disorders	81	136	330	–	–	–
Congenital or acquired immunodeficiencies	–	–	–	1,315.6	2,805.9	5,251.6z

HIV, Human immunodeficiency virus.

a) Excludes immunocompromising, chronic, and other medical conditions.

b) Shea et al.¹⁸ is a retrospective cohort study using data from 3 healthcare claims repositories (2006–2010) in US

c) Grant et al.¹⁹ is a study that used data from US adults with CDC-indicated medical conditions from 2016 to 2019.

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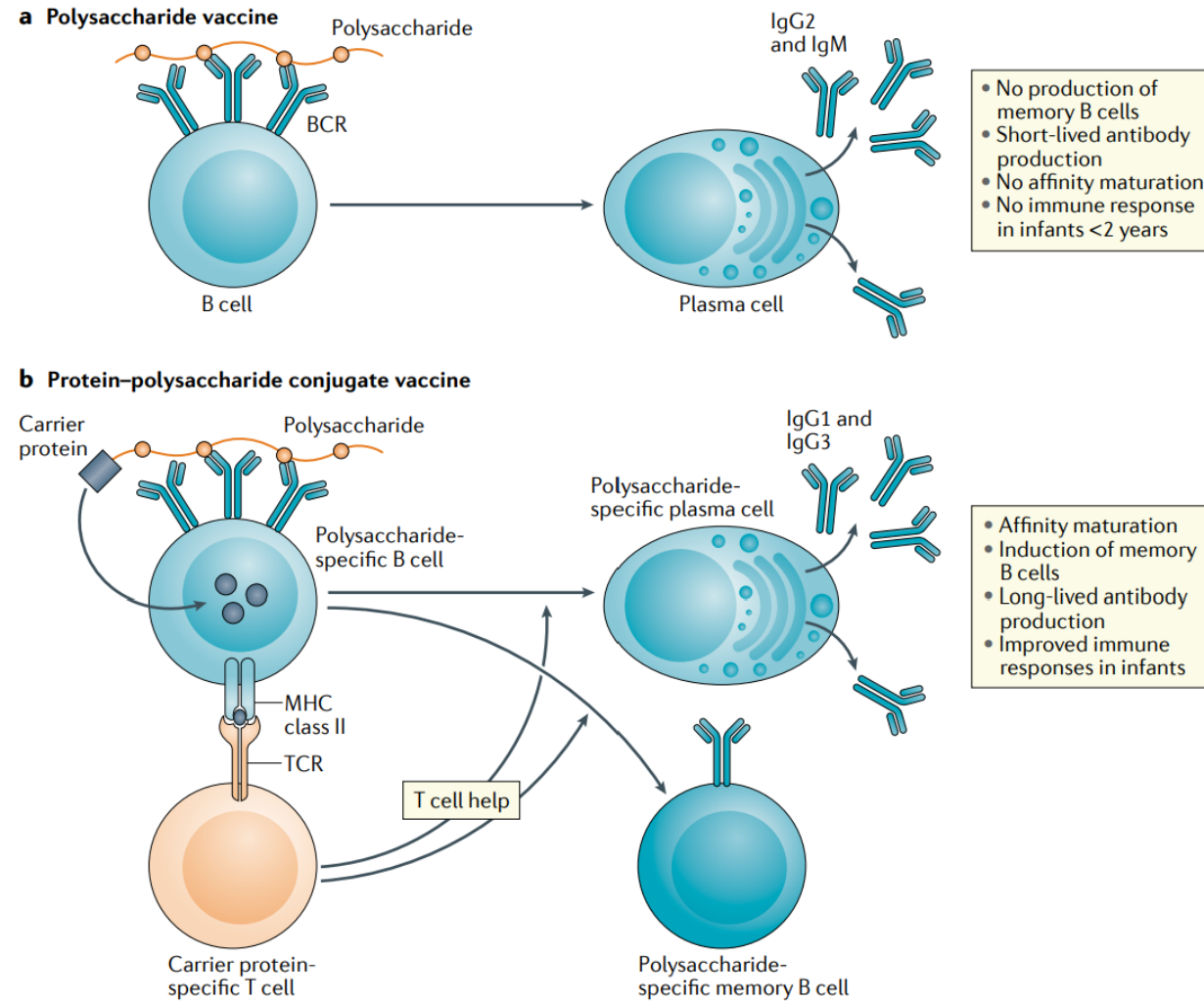


Fig. 6 | Immune responses to polysaccharide and protein-polysaccharide conjugate vaccines. **a** | Polysaccharide vaccines induce antibody-producing plasma cells by cross-linking the B cell receptor (BCR). However, affinity maturation of the antibody response and the induction of memory B cells do not occur. **b** | Protein-polysaccharide conjugate vaccines can engage T cells that recognize the carrier protein, as well as B cells that recognize the polysaccharide. T cells provide help to B cells, leading to affinity maturation and the production of both plasma cells and memory B cells. TCR, T cell receptor. Adapted from REF.³⁵, Springer Nature Limited.

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Sorveglianza nazionale delle
malattie batteriche invasive

Dati 2022-2024

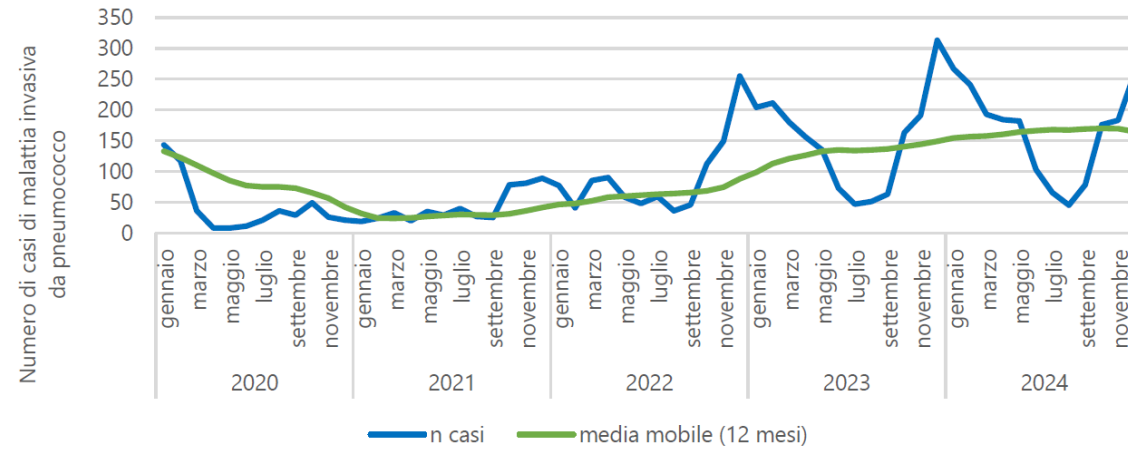


Figura 3. Numero di casi segnalati di malattia invasiva da pneumococco, per mese e anno. Italia 2020-2024

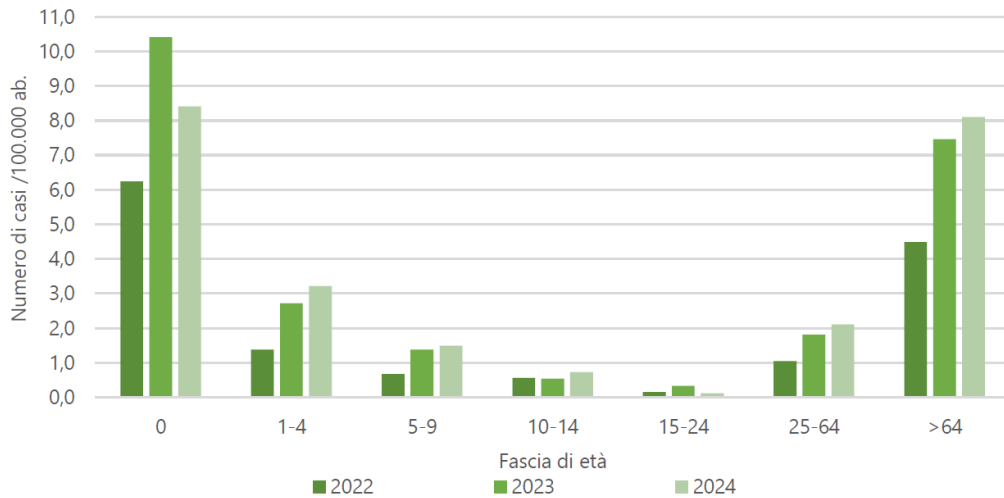


Figura 17. Incidenza dei casi di malattia invasiva da pneumococco per fascia di età, 2022-2024

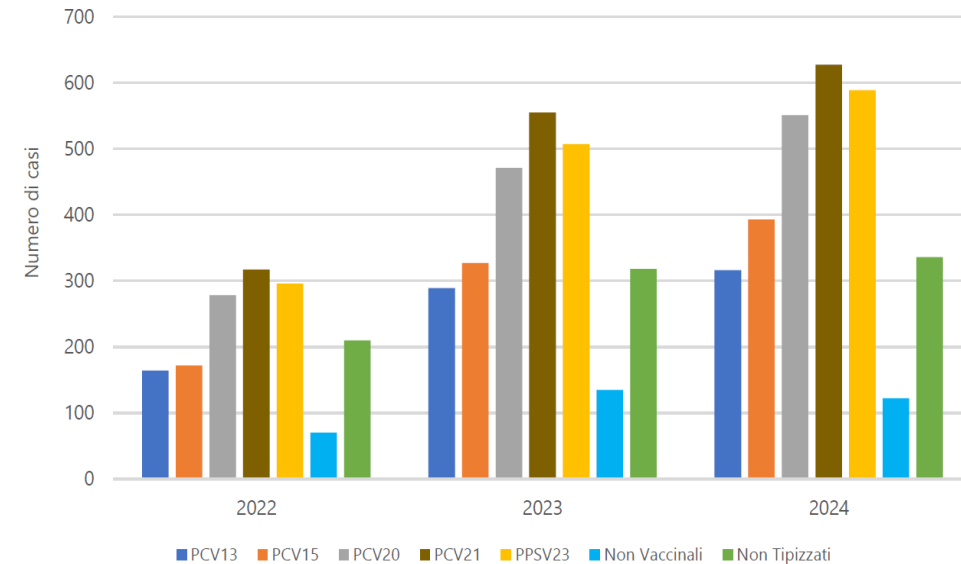


Figura 27. Numero di casi di malattia invasiva da pneumococco nella fascia di età >64 anni distribuiti per sierotipi inclusi nei vaccini 13-valente, 15-valente, 20-valente, 21-valente, 23-valente, sierotipi non vaccinali e casi non tipizzati, notificati nel periodo 2022-2024 in Italia

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Tab. I. Pneumococcal vaccines: the evolution.

FIRST GENERATION
1911: whole-cell vaccine
1930: vaccine serotypes combined with live attenuated bacteria
Mid-1930s: multivalent vaccines containing partially purified capsular material
Late 1940s: multivalent polysaccharide vaccines
Early 1950s: first generation of pneumococcal polysaccharide vaccines introduced into the market
SECOND GENERATION
Unconjugated polysaccharide vaccines
1977: 14-valent vaccine approved in the USA
1983: 23-valent vaccine (1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 11F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F) approved in the USA
Conjugated polysaccharide vaccines
2000: 7-valent vaccine (PCV-7) (4, 6B, 9V, 14, 18C, 19F, 23F) approved in the USA and shortly afterwards in Europe (2001)
THIRD GENERATION
Conjugated polysaccharide vaccines with expanded antigenic coverage
2009-2010: approval of the 10-valent vaccine (1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, 23F) and the 13-valent vaccine (1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F)
December 2021 (European approval) - March 2021 (Italian approval): 15-valent vaccine (1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 22F, 23F and 33F) approved for adults ≥ 18 years.
February 2022 (European approval) - May 2022 (Italian approval): 20-valent vaccine for individuals ≥ 18 years.
March 2025 (European approval) - May 2025 (Italian approval): 21-valent vaccine (3, 6A, 7F, 19A, 22F, 33F, 8, 10A, 11A, 12F, 9N, 17F, 20, 15A, 15C, 16F, 23A, 23B, 24F, 31 and 35B) approved for individuals aged ≥ 18 years.

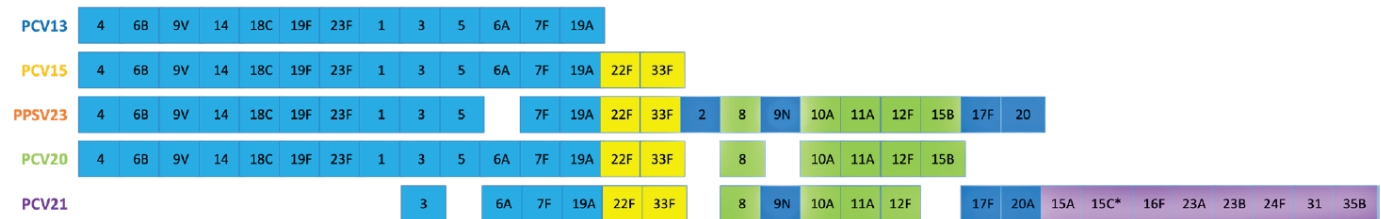


Pneumococcal Vaccination of Adults in Italy: What Strategies?

ELVIRA MASSARO¹, GIOVANNI GABUTTI²

¹ ASL3 Healthcare System of the Liguria Region, Genoa, Italy; ² Italian Society of Hygiene, Preventive Medicine, and Public Health (SIIt), Cogorno (Ge), Italy; Adult Immunization Board (AIB)

Fig. 1. Evolution of third-generation pneumococcal vaccine.



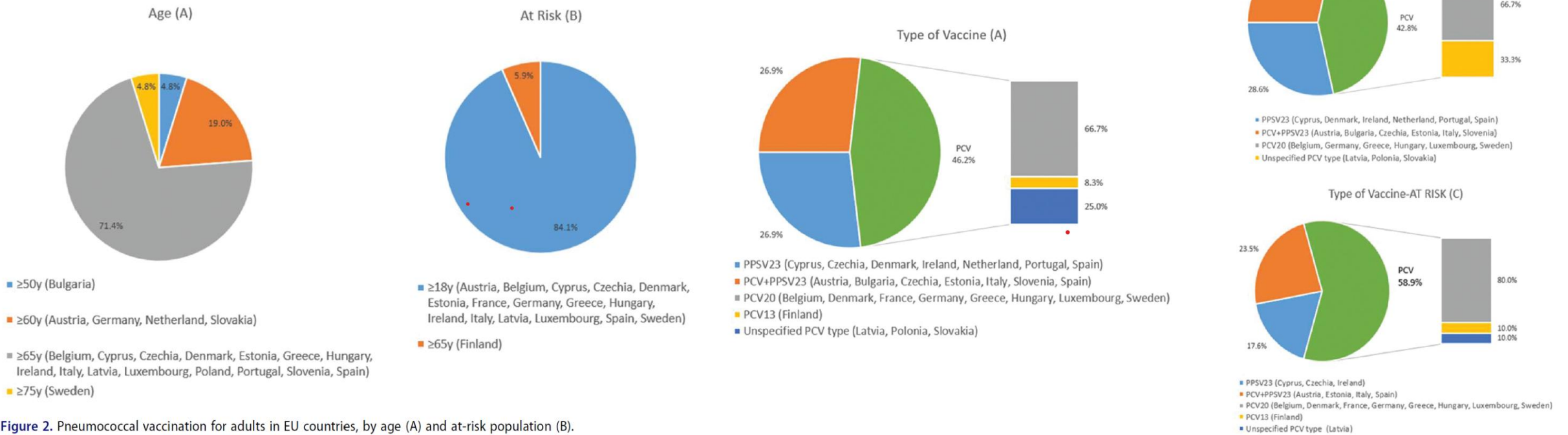
* For PCV21, a cross-reactive immune response was observed versus serotype 15B; this was elicited by serotype 15C, which is structurally similar to serotype 15B.

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REVIEW

 OPEN ACCESS  Check for updates

Pneumococcal vaccination offer and schedules in adults in EU countries: An update



The Awareness issue

Suscettibilità

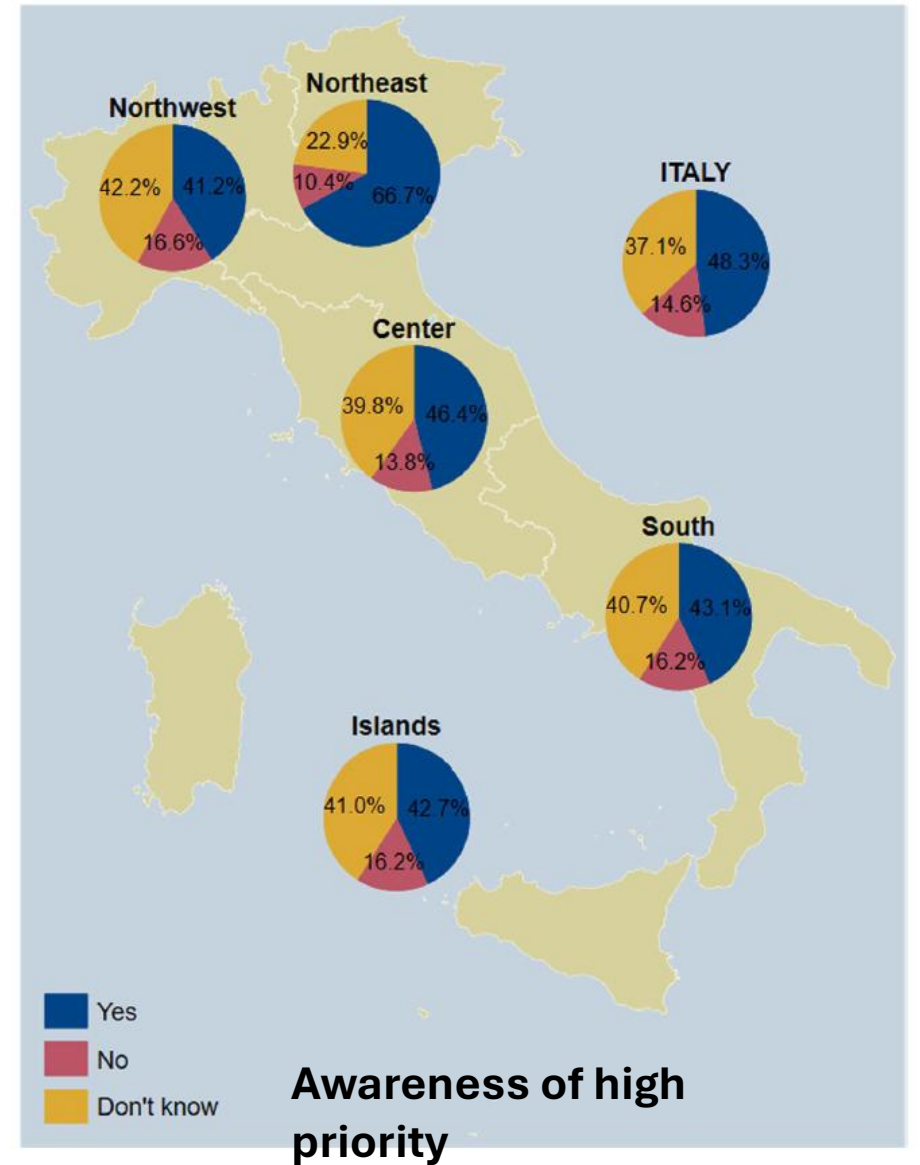
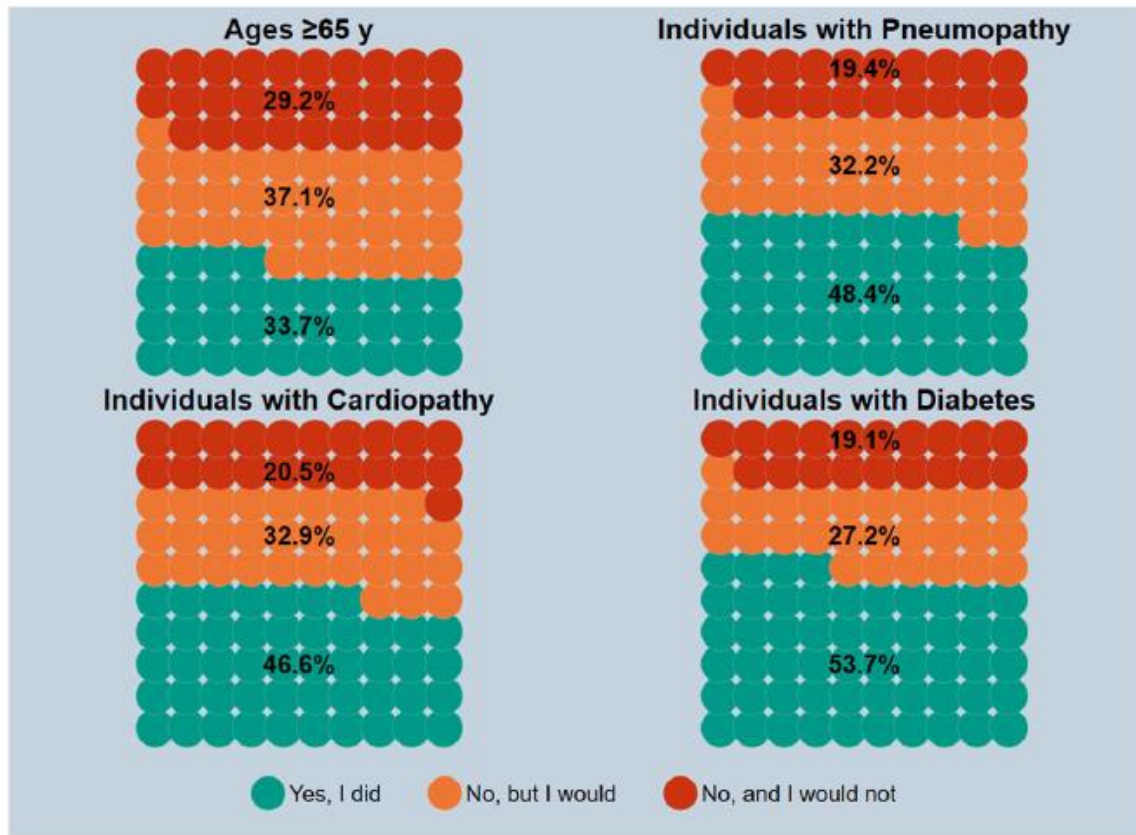
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Vaccini ← Vaccine uptake in high risk groups

Di Valerio et al. *BMC Public Health* (2024) 24:736
<https://doi.org/10.1186/s12889-024-18216-3>



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Vaccinations Included in the National Immunization Calendar as a Tool to Tackle Antimicrobial Resistance: Current Evidence for Selected Pathogens in Italy

Giulia Carla Marchetti ¹, Paolo Giuseppino Castiglia ², Andrea Lombardi ³, Federico Marchetti ⁴
 and Giovanni Gabutti ^{5,*}

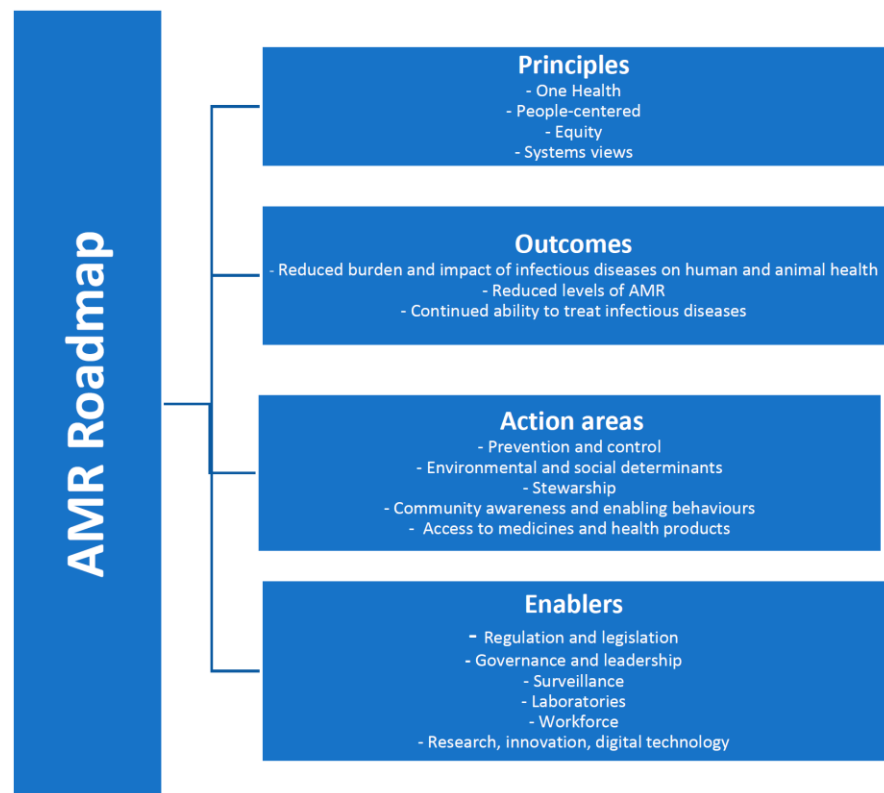


Table 1. Type of evidence for the impact of selected vaccinations included into the Italian national immunization plan on the reduction in use of antibiotics.






Documented	Postulated
Pneumococcus	Pertussis
Influenza	Meningococcus B
Rotavirus	Meningococcus ACWY
Varicella	Measles
Respiratory Syncytial Virus	Herpes Zoster

Vaccines **2025**, *13*, 1141

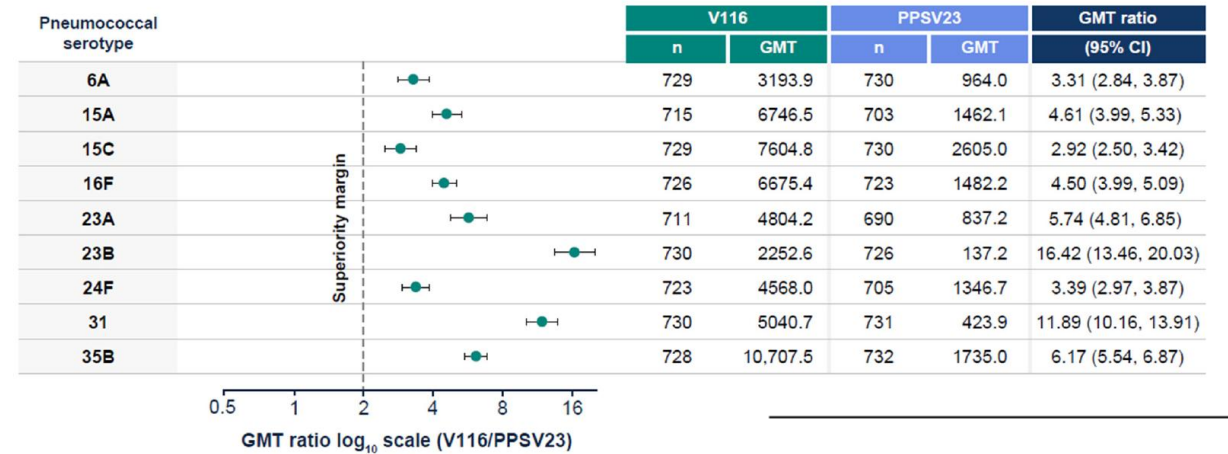
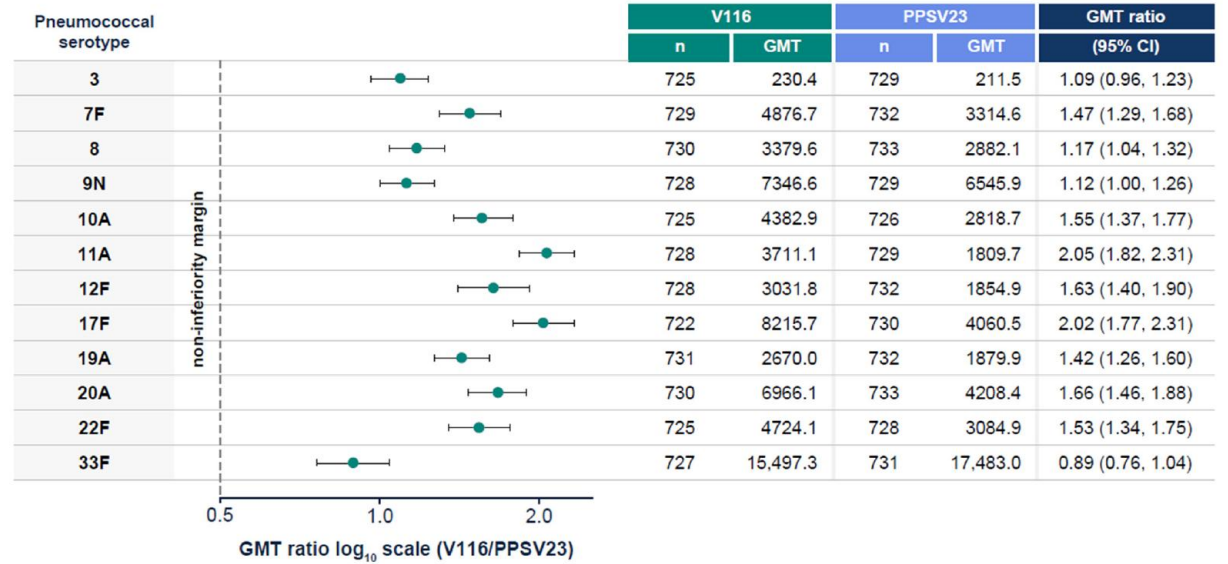
Figure 1. Roadmap on antimicrobial resistance for the WHO European Region 2023–2030 (modified from [14]).

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A Phase 3 Randomized Trial Investigating the Safety, Tolerability, and Immunogenicity of V116, an Adult-Specific Pneumococcal Vaccine, Compared with PPSV23, in Adults ≥ 50 Years of Age (STRIDE-10)

Veronika Jotterand ^{1,†}, Vinita Jagannath ^{2,*,†} , Andrea Accini Diaz ³, Juan Diego Velez ⁴, Arna Letica ⁵, Silvia Narejos Perez ⁶ , Rebecca Clark ⁷, Yoseph Caraco ⁸, Olaf Degen ⁹, Kyung-Hwa Park ¹⁰, Serhat Ünal ¹¹ , Frederick Wittke ¹² , Kimberly Hurtado ¹³, Clay Churchill ¹³, Ying Zhang ¹³, Doreen Fernsler ¹³, Jianing Li ¹³, Ulrike K. Buchwald ¹³  and Heather Platt ¹³

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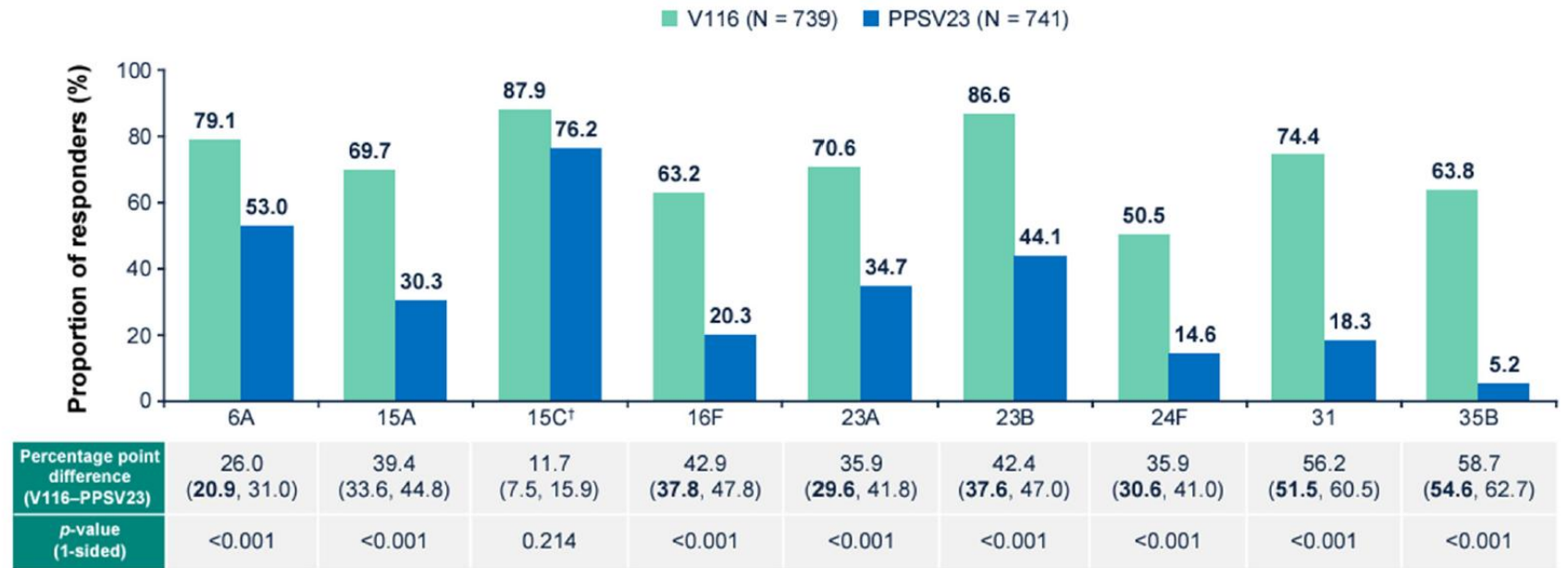


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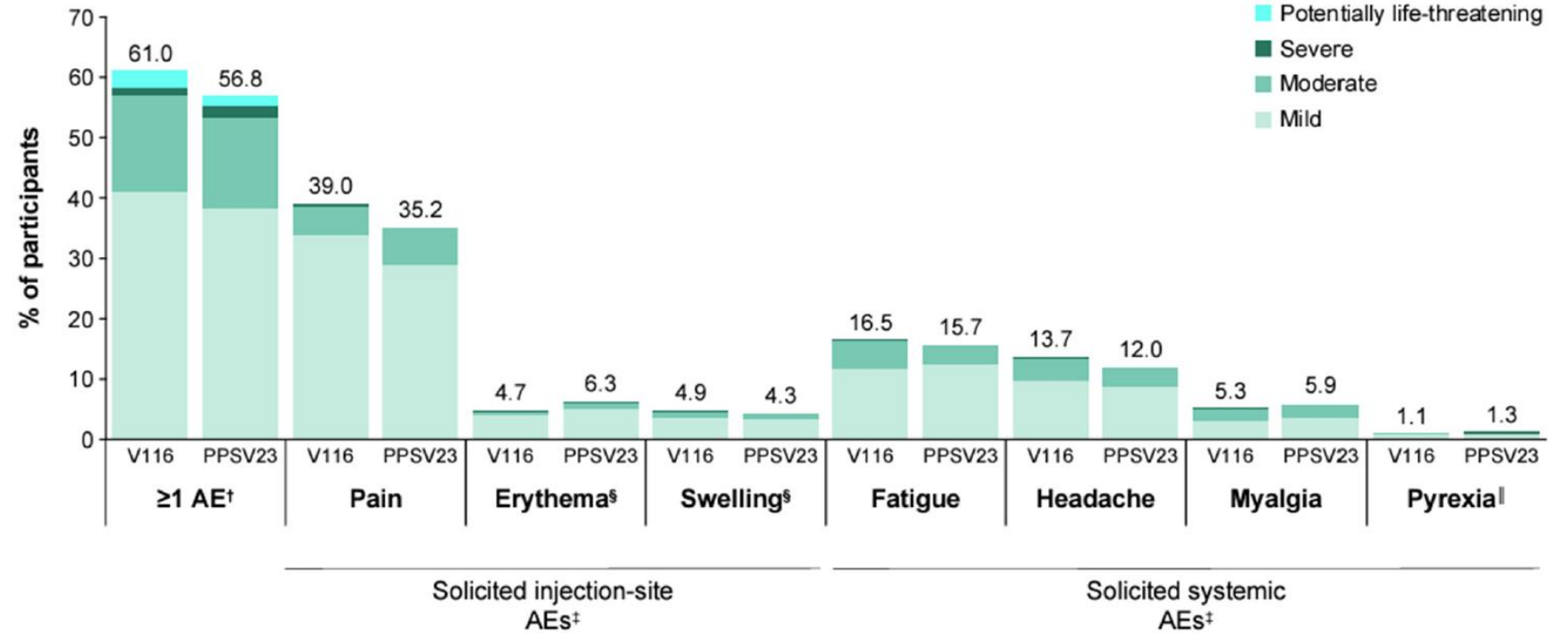
Fig. 1. Evolution of third-generation pneumococcal vaccine.



* For PCV21, a cross-reactive immune response was observed *versus* serotype 15B; this was elicited by serotype 15C, which is structurally similar to serotype 15B.



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CONCLUSIONI

- L'immunosenescenza predispone ad un maggior rischio di contrarre l'infezione ma anche ad una minore risposta alla stimolazione vaccinale
- L'infezione pneumococcica rappresenta nella popolazione anziana una causa maggiore di morbilità e mortalità, soprattutto nei soggetti con multimorbilità e/o fragilità
- La copertura vaccinale è insufficiente: basso livello di consapevolezza
- La disponibilità del nuovo PCV21 sembra aggiungere maggiore protezione
- Ma resta indispensabile migliorare le strategie di comunicazione, educazione ed implementazione delle campagne vaccinali