

La vaccino-terapia nell'anziano

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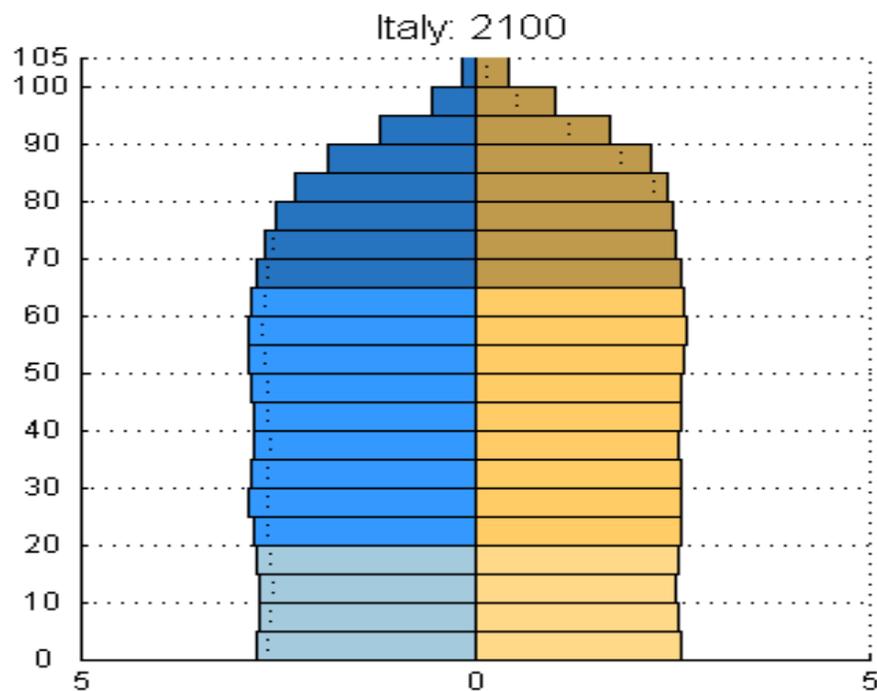
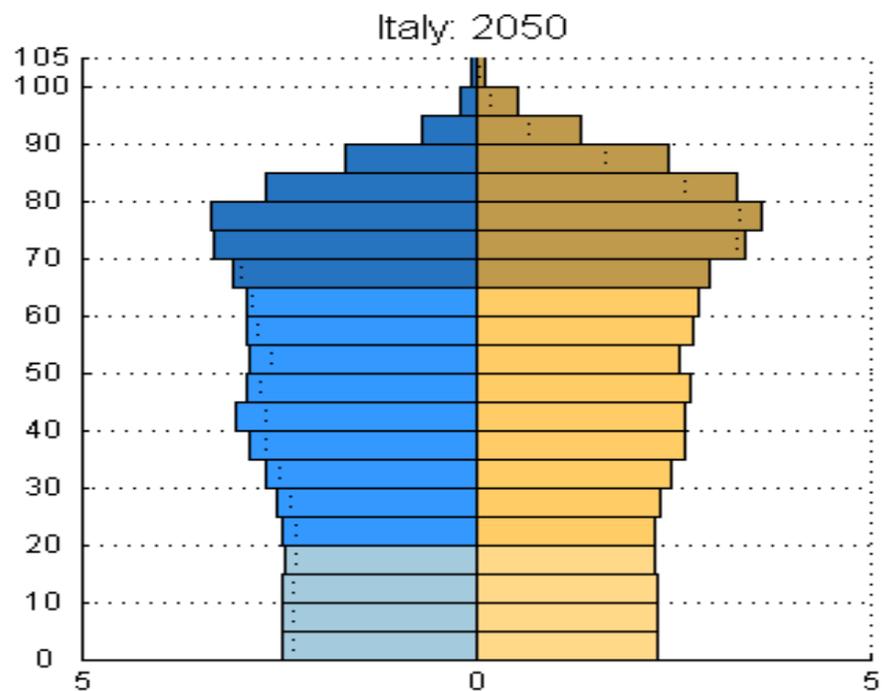
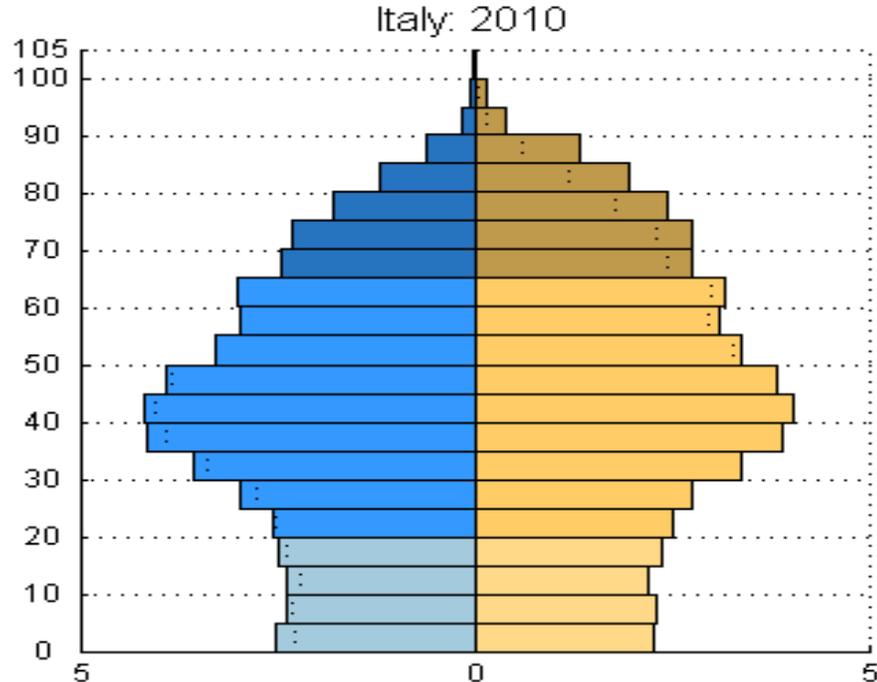
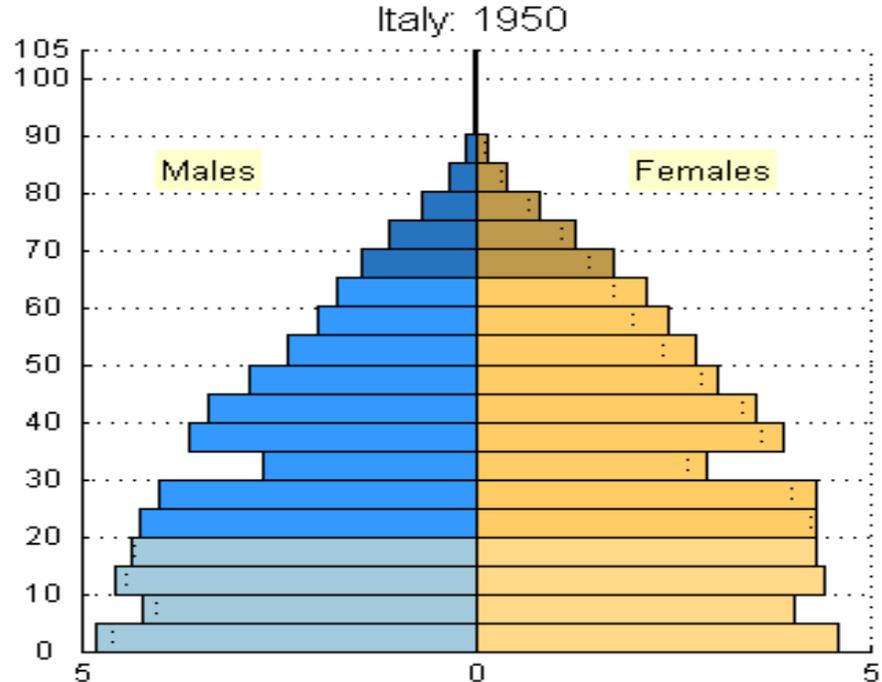
DISCLOSURE

IL CNR Invecchiamento ha ricevuto nel 2018 grant di ricerca da:

- TAKEDA, MSD, GSK, PFIZER, FIDIA

Outline

- Demographic trend in Italy
- Concepts of healthy ageing and frailty
- Human and economic cost of vaccine-preventable diseases (VPDs)
- Vaccination as a tool for healthy ageing and as a cost-effective preventive measure

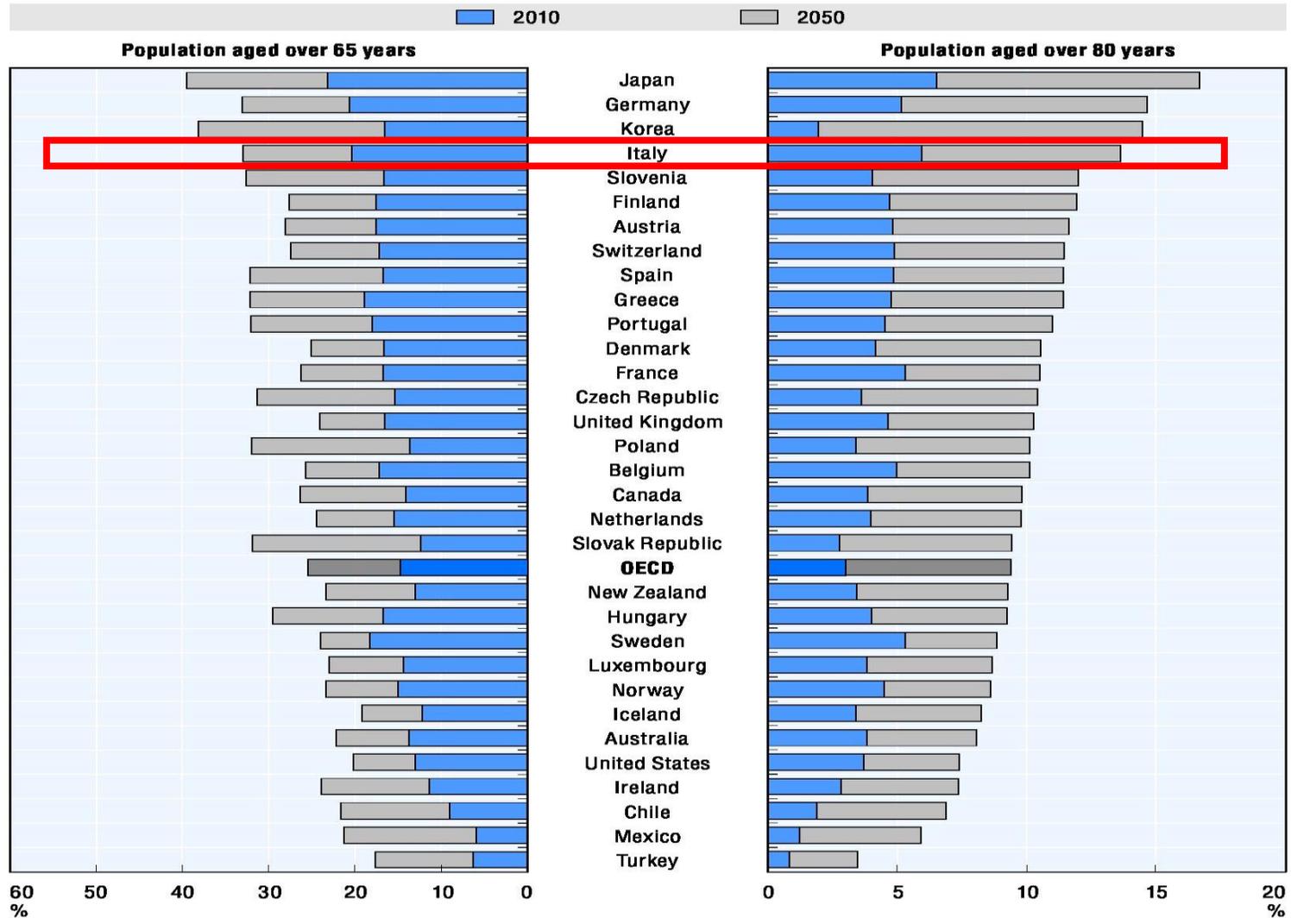


Variations in demographic pyramids in Italy, from 1950 to 2100:

Population by age groups and sex (percentage of total population) source ONU, Dipartimento Economico e Affari Sociali

Population aged over 65 years

Population aged over 80 years

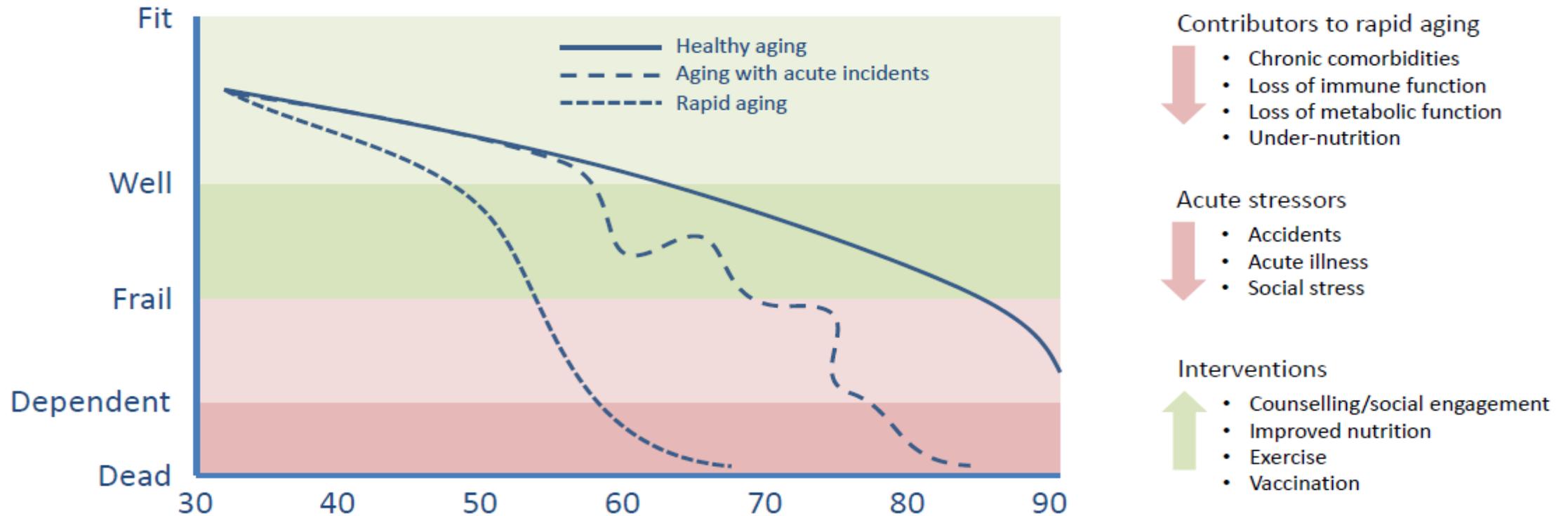


Source: OECD Labour Force and Demographic Database, 2010; OECD (2011), *Help Wanted? Providing and Paying for Long-term Care*, OECD, Paris.

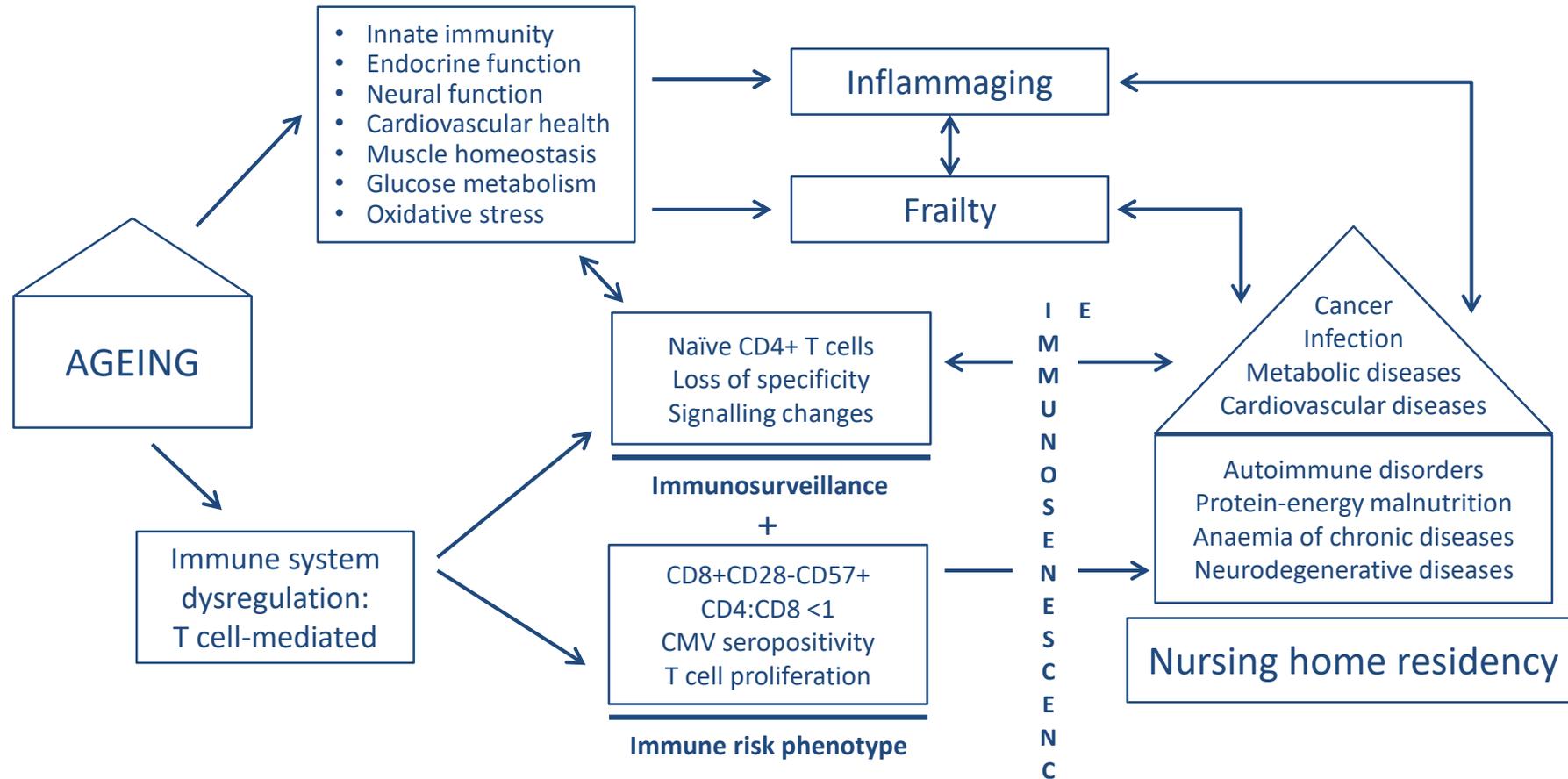
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Ageing trajectories: focus on function



Development of frailty associated with immunosenescence and higher susceptibility to infectious diseases and their complications



CMV, cytomegalovirus

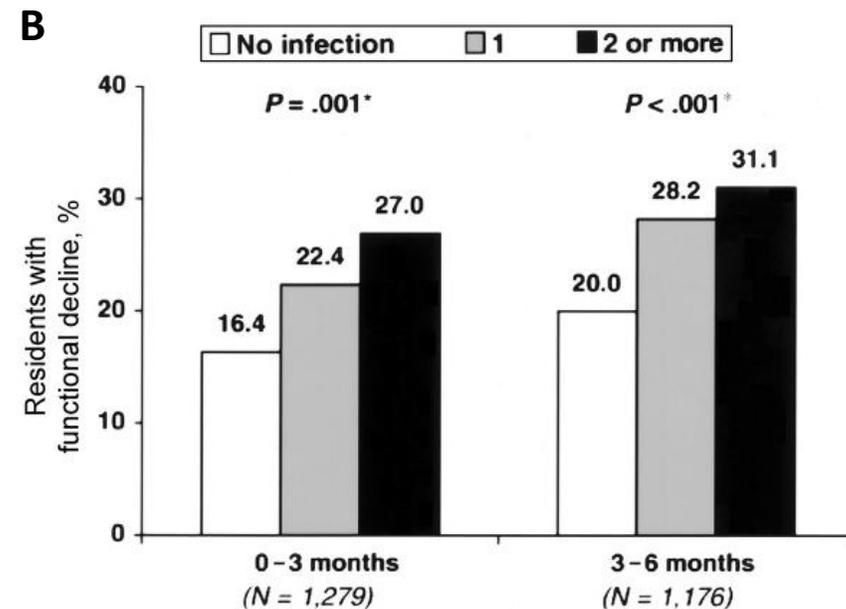
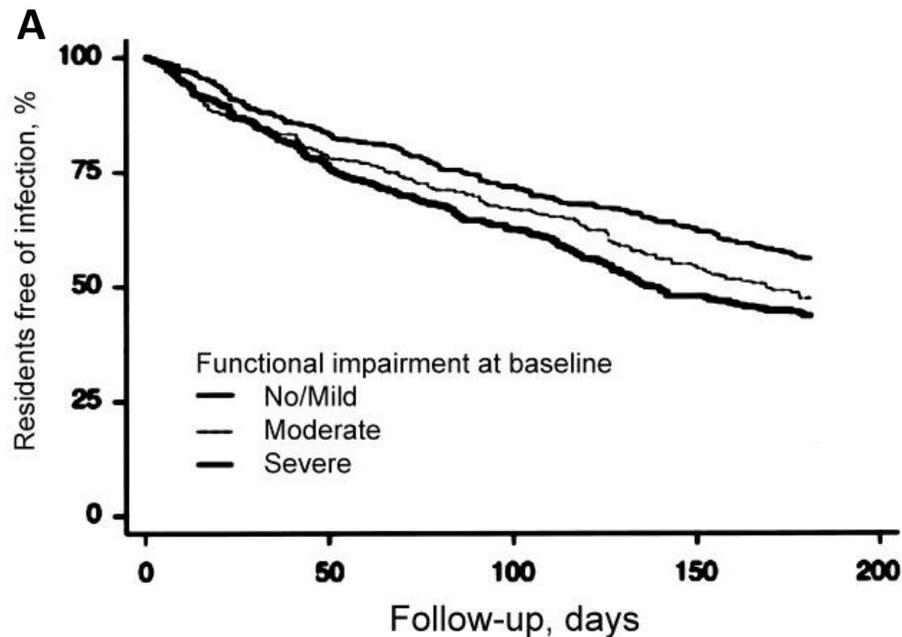
Figure reproduced from Immunosenescence and Vaccination in Nursing Home Residents. Fulop T *et al.* *Clin Infect Dis* 2009; 48:443–448

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Infectious diseases and disability

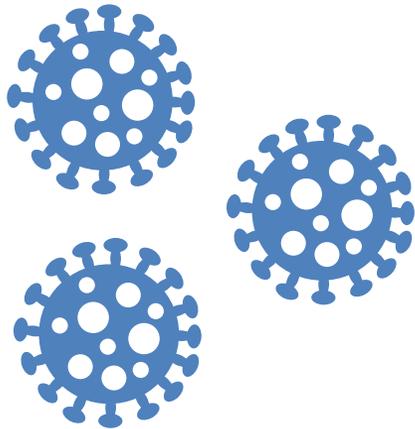
- Functional status as risk factor and outcome of infectious diseases: *strong interaction*
- 1324 residents in nursing home followed for 6 months



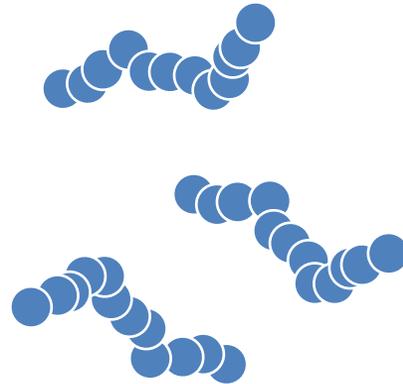
*Mantel-Haenszel test for trend

'The cursed triad' among the vaccine-preventable diseases in older adults

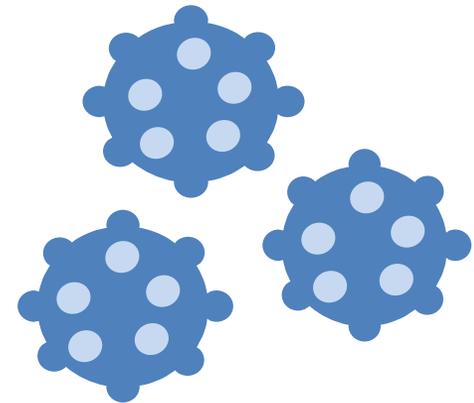
Influenza



Pneumococcal pneumonia



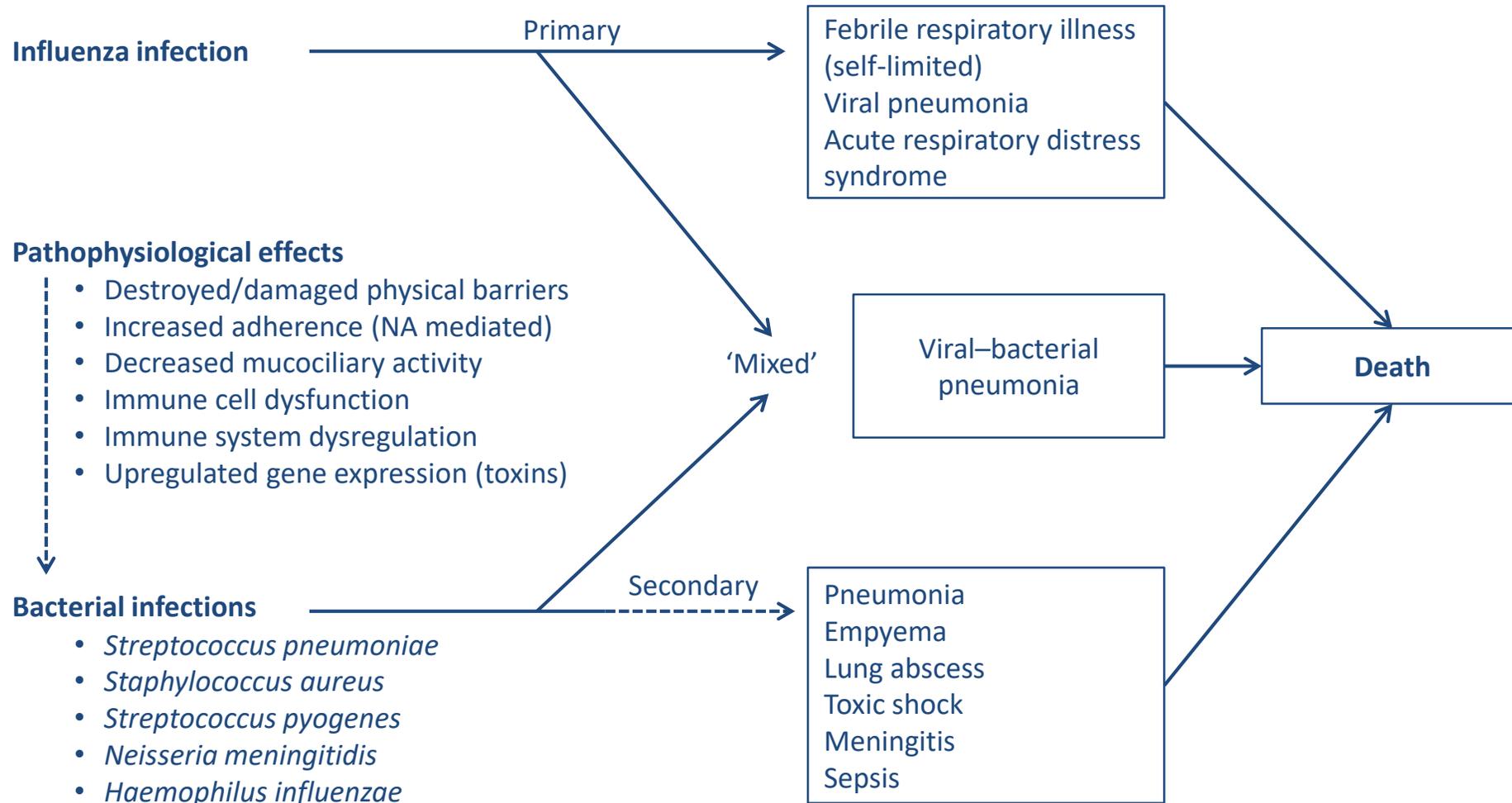
Herpes zoster



Number of influenza cases in Europe

- 5–15% of the population each year¹
- 4–50 million symptomatic cases in EU/EEA each year²
- 15,000–70,000 influenza-associated deaths in Europe every year²
- Influenza associated hospitalisations are more common in adults ≥65 years of age (309/100,000 persons-years)²

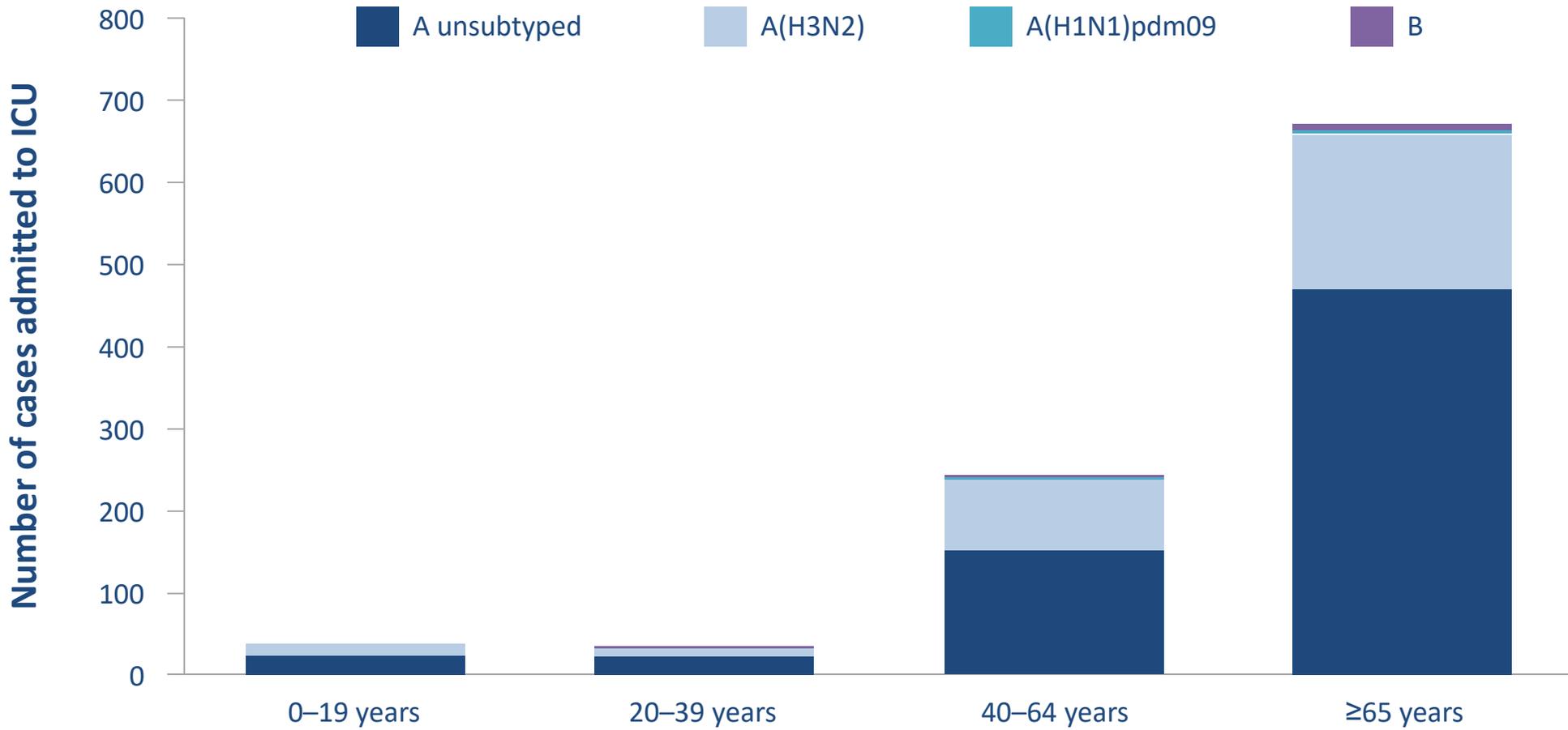
Examples of pathophysiological interactions between influenza and bacterial respiratory pathogens and various clinical expressions



NA, neuraminidase

Figure reproduced from Epidemiology, microbiology, and treatment considerations for bacterial pneumonia complicating influenza. Metersky ML et al. *Int J Infect Dis* 2012;16:321–331

Distribution of confirmed influenza cases admitted to ICUs, by virus types/subtypes and age group, EU/EEA, weeks 40/2016–1/2017



EEA, European Economic Area; ICU, Intensive Care Unit

The figure is reproduced with the permission of ECDC. It was first published in European Centre for Disease Prevention (ECDC), 2017. Risk assessment of seasonal influenza, EU/EAA, 2016–2017. <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/Risk-assessment-seasonal-influenza-2016-2017-update.pdf> (accessed August 2018)

ECDC threat assessment for the EU (2016–17)

- Older adults account for 48% of all targeted groups for influenza vaccination in Europe¹
- Excess mortality above normal seasonal levels, particularly in adults aged >65 years²
- Most EU member states report vaccination coverage <50% for older adults, other at-risk groups and healthcare workers, so the majority of target groups are not effectively immunised²

Copertura vaccinale in Italia: circa 50%
(target minimo 75%, target ottimale 95%)

Incidence (per 1000 person-years) of community-acquired pneumonia (CAP) in Europe in the adult population and by risk group

CAP incidence in
men aged >15 years
1.22 (1.18–1.26)¹

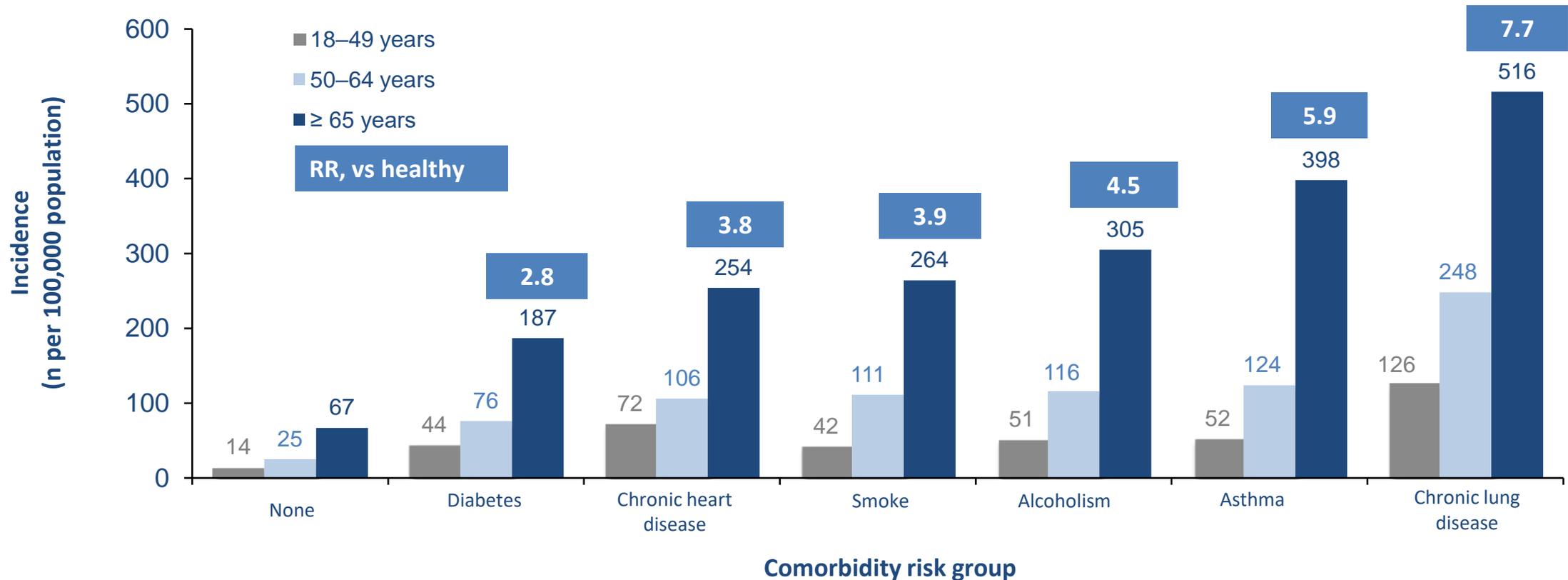


CAP incidence in
women aged >15 years
0.93 (0.89–0.96)¹

**Incidence in adults aged >65 years
14.0 (12.7–15.3)^{1,2}**

Common medical conditions increase pneumococcal pneumonia risk in adults

Data from a retrospective cohort study from three large, longitudinal, US healthcare databases of medical and outpatient pharmacy claims from 2006 to 2010*



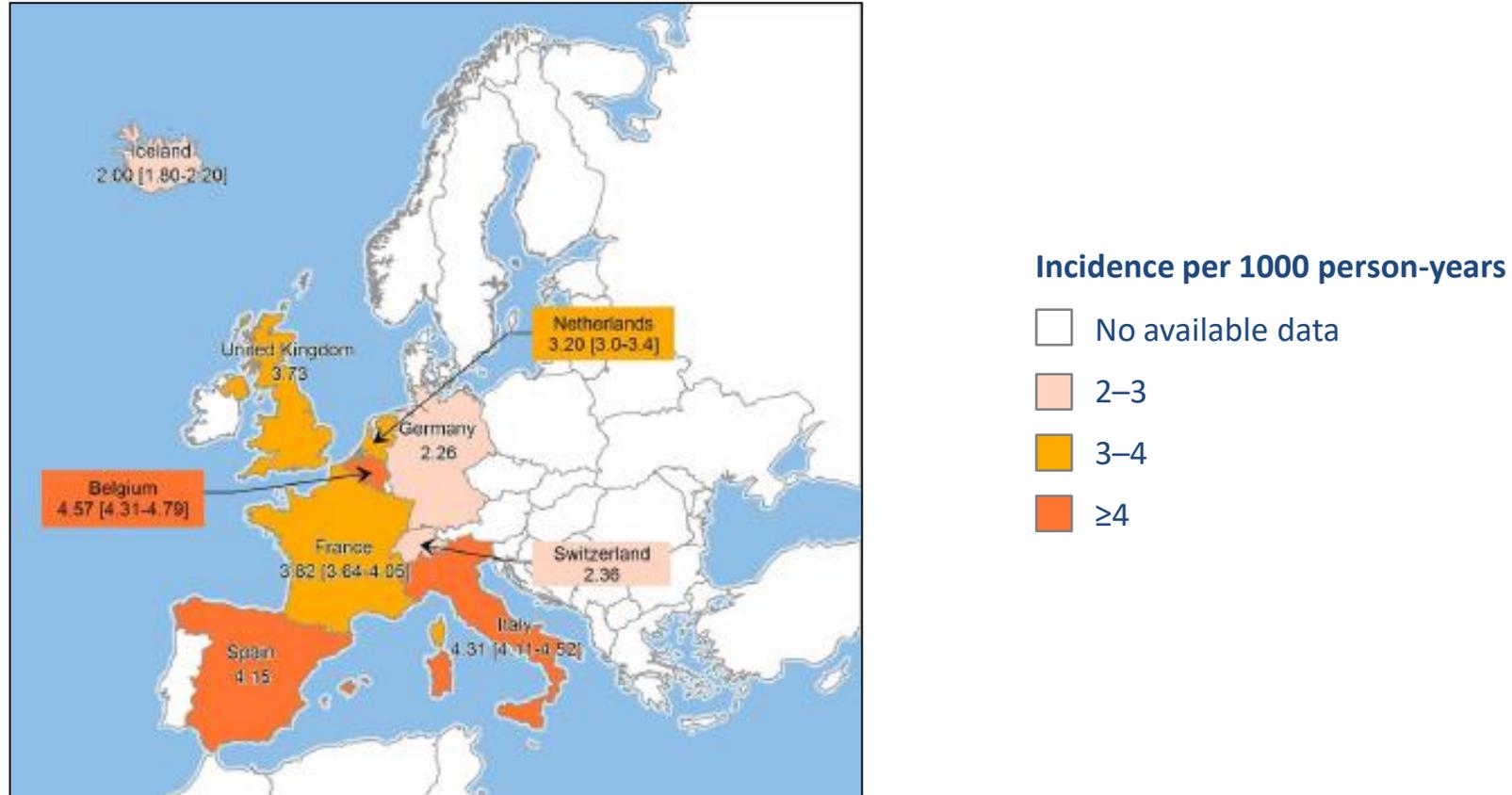
*Persons aged 18–49 years, 50–64 years, and ≥65 years contributed a total of 49.3 million, 30.6 million and 11.7 million person-years of observation, respectively; RR, risk ratio. The same results were first published in Shea KM et al. *et al. Open Forum Infect Dis* 2014;1:[Epub] 2014.

Vaccinazione antipneumococcica in Italia

- Le patologie pneumococciche si verificano durante tutto l'anno
- La vaccinazione pneumococcica è disponibile tutto l'anno, e può essere co-somministrata con quella influenzale
- La copertura attuale in Italia è sconosciuta, ma sicuramente bassa (<15%) e l'obiettivo è di raggiungere il 40% nel 2018, per poter arrivare al 75% nel 2020-21

Incidence of herpes zoster in Europe

Overall annual herpes zoster incidence in Europe (per 1000 person-years)

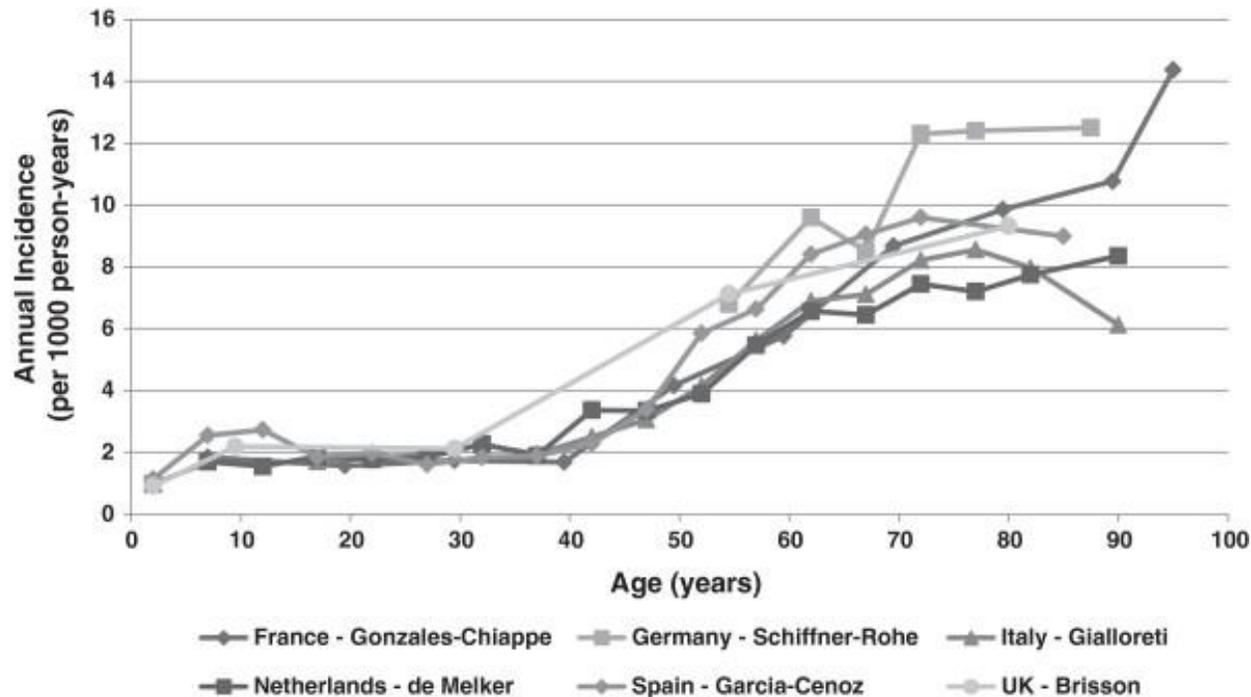


The confidence interval is presented if available in the original publication. In the case of several publications per country, the publication with the most recent data and the highest herpes zoster case sample size is presented

Similar herpes zoster incidence across Europe: results from a systematic literature review. Pinchinat S *et al.* *BMC Infect Dis* 2013;13:170, under Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>)

The incidence rates of herpes zoster and PHN increase with age

2/3 of cases occur in >50-years-olds



Euro estimates

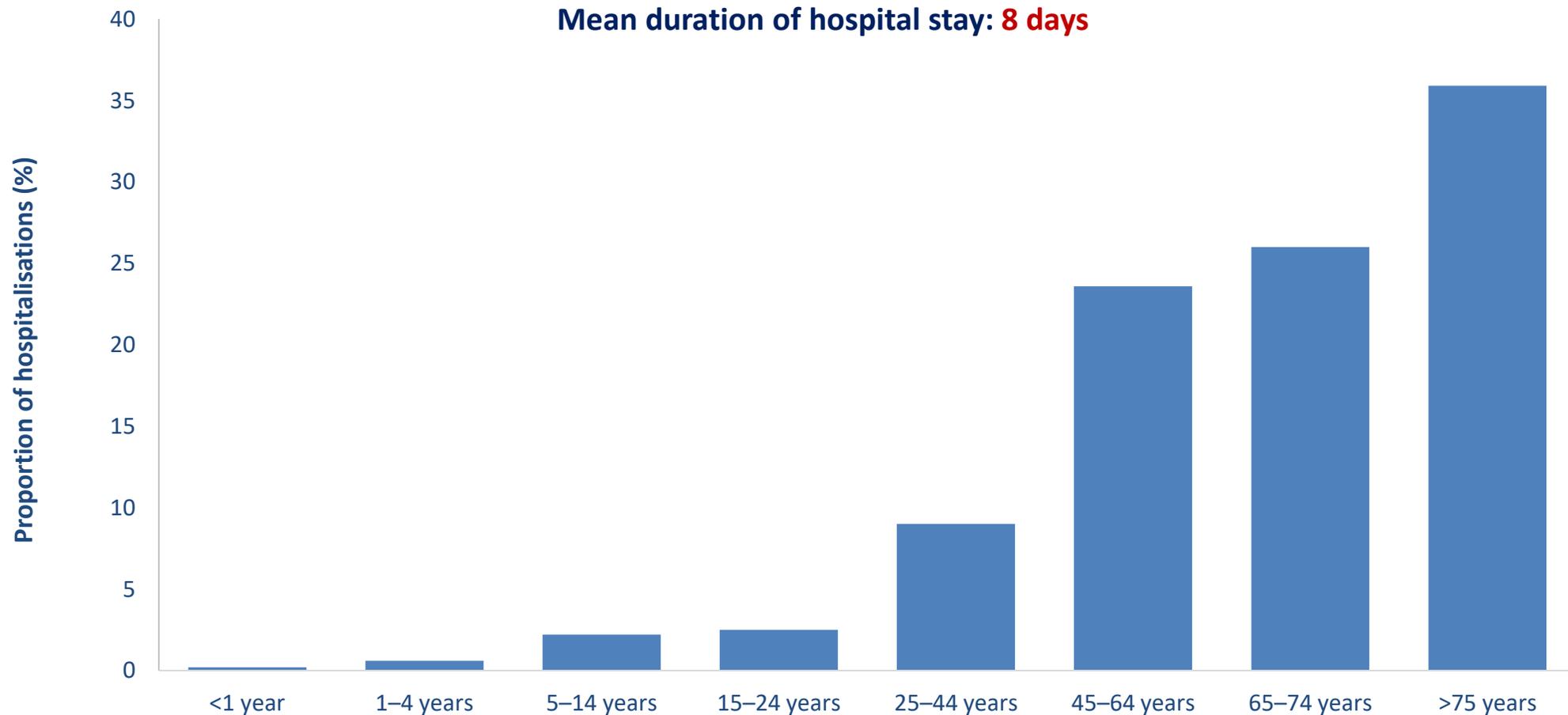
(new cases x 1000 person-years)

- 2.0–4.6 overall
- 7–8 in ≥50-year-olds
- 10 in ≥80-year-olds
- 20–50% of patients affected by PHN

Pinchinat 2013: In the case of several publications per country, the studies with the most recent data and the highest herpes zoster case sample size is presented
PHN, post-herpetic neuralgia

Similar herpes zoster incidence across Europe: results from a systematic literature review. Pinchinat S *et al.* *BMC Infect Dis* 2013;13:170, under Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>)

Herpes zoster: hospitalisations and day-hospital admissions stratified by age classes, Italy (1999–2005)





Piano Nazionale Prevenzione Vaccinale
PNPV 2017-2019



17 gennaio 2017

PNPV 2017-2019

Graduale aumento delle coperture vaccinali dal 2017
al 2020

Fascia di età	Vaccinazioni	Obiettivo di copertura vaccinale		
		2017	2018	2019
I anno di vita	Meningo B	≥60%	≥75%	≥95%
	Rotavirus	≥60%	≥75%	≥95%
II anno di vita	Varicella (1° dose)	≥60%	≥75%	≥95%
5-6 anni di età	Varicella (2° dose)	≥60%	≥75%	≥95%
Adolescenti	HPV nei maschi 11enni	≥60%	≥75%	≥95%
	IPV	≥60%	≥75%	≥90%
	meningo tetravalente ACWY135	≥60%	≥75%	≥95%
Anziani	Pneumococco (PCV13+PPV23)	40%	55%	75%
	Zoster	20%	35%	50%

- LA TERZA VACCINAZIONE RILEVANTE PER IL SOGGETTO ANZIANO È QUELLA CONTRO L'HERPES ZOSTER.

C'È UN PROBLEMA DI CONOSCENZA/COMUNICAZIONE :
INCIDENZA ?
VACCINO ?

Outline

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Benefits from vaccinations: *not only prevention of infectious diseases, BUT also of FRAILTY*

- **Avoid mortality and costs linked to VPD**

E.g. Influenza vaccination coverage of 75% among individuals >65 years in Europe would result in 1.6–2.1 million cases prevented, and 25,000–37,000 related deaths avoided^{1,2}

- **Reduce complications and hospitalisation for chronic diseases**

E.g. **CVD, T2D, COPD, renal and hepatic diseases are more often associated with negative outcomes** in cases of infectious diseases^{1,3}

- **Decrease antibiotic use/polypharmacy**

E.g. **Antibiotic prescription was reduced by 64%** following influenza vaccination in Ontario, Canada⁴

- **Decrease antibiotic-resistant infections**

E.g. Pneumococcal vaccines reduce the incidence of **penicillin-resistant *Streptococcus pneumoniae***⁵

- **Improve quality of life and reduction of noncommunicable diseases**

E.g. Herpes zoster vaccine increases quality-adjusted life years in older adults by decreasing the burden of disease, including **decreased risk of stroke**^{1,6}

Influenza and pneumococcal vaccination may reduce the incidence of MI up to 50%^{1,7}

COPD, chronic obstructive pulmonary disease; CVD, cardiovascular disease; MI, myocardial infarction; T2D, type II diabetes

1. Doherty TM *et al. Eur Geriatr Med* 2018;9:289–300; 2. Preaud E *et al. BMC Public Health* 2014;14 [Epub]; 3. Andre FE *et al. Bull World Health Organ* 2008;86:140–146; 4. Kwong JC *et al. Clin Infect Dis* 2009;49:750–756; 5. Dagan R. *Clin Microbiol Infect* 2009;15:S16–20; 6. Maggi S *et al. Aging Clin Exp Res* 2015;27:5–11; 7. Bonanni P *et al. J Mark Access Health Policy* 2015;3 [Epub]

Economic benefits from vaccinations

- Generally, economic evaluations of vaccinations in older adults show a favourable cost-effectiveness ratio and cost is lower than for other preventive actions¹
- Influenza vaccination coverage of 75% among individuals >65 years in Europe would result in €153–219 million saved in healthcare cost^{1,2}

BUT ALSO

- Intangible economic benefits due to:
 - **attenuated severity of disease**³
 - **reduction in complications** (influenza and pneumococcal vaccinations may reduce the incidence of MI by up to 50%; herpes zoster is associated with an increased risk of stroke) and comorbidities^{1,3}
 - **decreased polypharmacy and antibiotics use**⁴

Clear need for mental shift from treatment to prevention

Embed older adult vaccination in core preventive services

Italian immunization plan (2017–2019)

Routine vaccinations for adults

Vaccine:	19–49 yrs	50–64 yrs	≥64 yrs
DTPa	1 dose every 10 years		
Pneumococco V			PCV + PPSV
Influenza			1 dose annually
HZ			1 dose*

*'1 dose' refers to ZOSTAVAX, whereas SHINGRIX is given as two primary doses

DTPa, diphtheria, tetanus, and acellular pertussis; HPV, human papillomavirus; HZ, herpes zoster; IPV, inactivated poliovirus; PCV, pneumococcal conjugate vaccine
 The same results were first published in Italian Ministry of Health, 2017. Piano Nazionale Prevenzione Vaccinale: PNPV 2017-2019.
http://www.salute.gov.it/imgs/C_17_pubblicazioni_2571_allegato.pdf (accessed May 2018). The graph has been independently created by GSK from the original data

ESCMID-EUGMS-WAIDID recommendations for older adults

Vaccine programme	Recommended vaccines	Clinical considerations
Starting at 65 years (but possibly earlier)	Influenza	Adapted to seasonal strain
	Herpes zoster	Assess vaccine status
	Diphtheria/tetanus/pertussis, pneumococcal	Assess vaccine status – booster or complete vaccination series, as appropriate
Revaccination	Influenza	Every year
	Herpes zoster	Not yet determined
	Pneumococcal	Every 5 years
	Diphtheria/tetanus/pertussis	Every 10 years
<i>Special indications</i>		
New injury event	Tetanus, tetanus/diphtheria or diphtheria/tetanus/pertussis	Booster or complete vaccination series, as appropriate
Repeated hospital admission	Pneumococcal	Assess vaccine status
Nursing home admission	Influenza	Adapted to seasonal strain
	Herpes zoster	Assess vaccine status
	Diphtheria/tetanus/pertussis, pneumococcal	Assess vaccine status – booster or complete vaccination series, as appropriate

A public health MUST

- The population in Italy is rapidly ageing^{1,2}
- Older adults constitute the largest risk group for VPDs^{1,2}
- VPDs in older adults place a substantial burden on individuals and on the health system²
- In spite of the availability of effective vaccines, some VPDs affect massively the Italian population annually, with the greatest burden in older adults^{1,2}