

BACKGROUND DOCUMENT

AIB Country Meeting

Adult Immunization in Italy: successes, lessons learned and the way forward

> Florence, Italy 6 – 7 December 2023





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Content

Purpose	e of the background document	. 3
Introd	uction	3
Meeting	g objectives	. 3
Intende	ed impact and target audience	.4
Part 1	Short agenda: AIB Country Meeting	4
Part 2	Article References by session	6
i arc z	A ticle References by session minimum	Ŭ
Meeting	g title definitions	. 6
Session	1: Opening, Introduction and Objectives	. 6
1.1	Introduction of Adult Immunization Board (AIB)	. 6
1.2 conte	Overview of the objectives of the meeting + Why is Italy interesting in the ext of adult immunization / from the AIB perspective	. 8
Session	2: Current situation: Epidemiology, Burden of Disease and Surveillance of adult	:
VPI in It	taly	L1
2.1 COVI	Adult VPI in Italy: surveillance, epidemiology and burden of disease (focus on D-19, Influenza, Pneumococcus, RSV, Tdap, Zoster)	11
Session	3: Healthcare System and the Adult Immunization Plan in Italy	L8
3.1 preve	The evolution of the Italian National Health Service (focus on ention/immunization)	19
3.2	Vaccination strategies, systems and laws within the NHS	20
3.3	Evaluation and authorization of adult vaccines in Europe/Italy	22
3.4	Lifetime Immunization Schedule	22
3.5	National Immunization Plan 2023-2025	23
Session	4: The implementation, organization, delivery, monitoring and evaluation of	
adult va	accination	24
4.1 Pi servio	rocurement, distribution, financing, organization and delivery of adult vaccination ces in different regions of Italy, highlighting the challenges and opportunities	ו 24
4.2 moni	The recording and reporting of vaccination data in Italy, including coverage rate toring and the national registry, vaccine impact monitoring and vigilance practice 26	5 S
4.3 such	Analyze the population's vaccination demand and acceptance, addressing issue as vaccine confidence and mandatory vaccination policies	es 27



Session 5	5: Adult vaccination in Italy in specific population groups	. 30
5.1	Older Adults	. 30
5.2	Healthcare workers	. 33
5.3	Pregnant women	. 35
5.4	Immunocompromised	. 39
5.5	Migrants	. 39
5.6	Young adults	. 40
5.7	Travelers	. 42
Keynote	1: New platforms and technologies to develop adult vaccines	. 42
Keynote	2: Pricing vaccines and drugs in Europe: worth differentiating?	. 44

Purpose of the background document

This pre-meeting background document contains a list of, <u>AIB secretariat selected</u>, abstracts/ references from a PubMed Medline and grey literature search on the adult immunization related topic(s) of the country meeting. In addition, speakers from the different meeting sessions were asked to provide additional relevant and interesting references. The references are ranged by publication year (*most recent first, search from earliest dates available to October 2023*) and for each year in alphabetical order of the first author's name.

This document should guide you in the preparation of the meeting, it should not be considered as a complete literature review, but hopefully it will give an overview of what has been published on the topic(s) of the country meeting.

Inclusion of references in this document does not indicate that the AIB secretariat agrees with the content or correctness of the content.

Introduction

Meeting objectives

- Provide an overview of the epidemiology and disease burden of VPI among adults in Italy. Explain the functioning of infectious disease surveillance and control programs in Italy
- Provide an overview of the healthcare system in Italy and review how (adult) immunization programs are structured within the Italian health care system. Explain the evaluation and market authorization process of (adult) vaccines in Italy
- Present the Italian Lifetime Immunization Schedule and provide an overview of the new National Immunization Plan (PNPV 2023-25), discuss the decision-making process and criteria according to which vaccines are evaluated and included

- Explore the organization and delivery of adult vaccination services in different regions of Italy
- Discuss the recording and reporting of vaccination data in Italy, including coverage rate monitoring and the national registry, as well as vaccine impact monitoring and vigilance practices
- Analyze the population's vaccination demand and acceptance, addressing issues such as vaccine confidence and compulsory vaccination policies for specific adult population groups
- Present the strategies and programs implemented in Italy to vaccinate specific adult population groups, highlighting the challenges and opportunities
- Explore future prospects and potential solutions to overcome barriers and enhance adult immunization efforts in Italy and other European countries

Intended impact and target audience

AIB country meetings are organized to discuss country specific aspects of adult immunization together with local experts. For these meetings, the AIB invites local academics, health care professionals, public health representatives and policy makers to present on adult immunization strategies implemented in the country, as well as educational and communicative initiatives aimed at increasing adult vaccine acceptance and coverage rates.

The aim of these meetings is to establish a collaborative network of national experts of different fields, creating a platform for the exchange of knowledge and best practices in adult immunization.

More information about the adult immunization board: www.adultimmunizationboard.org

Sessions	Topics	Speaker(s)
Session 1: Opening, Introduction and Objectives	1.1 Introduction of Adult Immunization Board (AIB)	Pierre Van Damme
	1.2 Overview of the objectives of the meeting + Why is Italy interesting in the context of adult Immunization / from the AIB perspective?	Paolo Bonanni
Session 2: Current situation: Epidemiology, Burden of Disease and Surveillance of adult VPI in Italy	2.1 Adult VPI in Italy: surveillance, epidemiology and burden of disease (focus on COVID-19, Influenza, Pneumococcus, RSV, Tdap, Zoster)	Patrizio Pezzotti

Part 1 Short agenda: AIB Country Meeting



Session 3: Healthcare System and the Adult Immunization Plan in	3.1 The evolution of the Italian National Health Service (focus on prevention/immunization)	Walter Ricciardi
Italy	3.2 Vaccination strategies, systems and laws within the NHS	Francesco Paolo Maraglino
	3.3 Evaluation and authorization of adult vaccines in Europe/Italy	Marco Cavaleri (online)
	3.4 Lifetime Immunization Schedule	Paolo Bonanni
	3.5 National Immunization Plan 2023-2025 and annual updates of immunization schedule	Carlo Signorelli
Session 4: The implementation, organization, delivery, monitoring and evaluation of adult vaccination	4.1 Procurement, distribution, financing, organization and delivery of adult vaccination services in different regions of Italy, highlighting the challenges and opportunitiesVezzosi Luigi Barbara Porchia Emanuela Balocchini Pierluigi Lopalco4.2 Discuss the recording and Martine Del ManceMartine Del Mance	
	4.2 Discuss the recording and reporting of vaccination data in Italy, including coverage rate monitoring and the national registry, vaccine impact monitoring and vigilance practices	Martina Del Manso Alberto Tozzi Alfredo Vannacci
	4.3 Analyse the population's vaccination demand and acceptance, addressing issues such as vaccine confidence and mandatory vaccination policies	Rachel Eagan Caterina Rizzo Fortunato D'Ancona
Session 5: Adult vaccination in Italy in specific population groups	Specific population groups: older adults, HCW, pregnant women, immunocompromised, migrants, young adults, travellers	Stefania Maggi Claudio Costantino Angela Bechini Laura Sticchi Silvia Declich Alessandro Ghelardi Andrea Rossanese
Keynote lectures	New platforms and technologies to develop adult vaccines	Rino Rappuoli
	Pricing vaccines and drugs in Europe: worth differentiating?	Livio Garattini



Part 2 Article References by session

Meeting title definitions

Adult immunization	Adult immunization refers to the administration of vaccines (active immunization) or antibodies (passive immunization) to individuals who are 18 years of age or older in order to protect them against various infectious diseases, before or after exposition. <i>Source: AIB secretariat</i>
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Session 1: Opening, Introduction and Objectives

Session 1: Opening, Introduction and Objectives	1.1 Introduction of Adult Immunization Board (AIB)	Pierre Van Damme
	1.2 Overview of the objectives of the meeting + Why is Italy interesting in the context of adult Immunization / from the AIB perspective	Paolo Bonanni

1.1 Introduction of Adult Immunization Board (AIB)

Potential questions/outcomes: What is the mission and objectives of the AIB? What is the operating procedure of the AIB? What is an AIB technical and country meeting? Who are the AIB advisors? How is the AIB funded?

Related articles:

Source: Proposed by AIB secretariat

1.1.1 Jade Pattyn, Marco Del Riccio, Angela Bechini, Greet Hendrickx, Sara Boccalini, Pierre Van Damme, Paolo Bonanni - **The Adult Immunization Board** (AIB): A new platform to provide multidisciplinary guidelines for the implementation and optimization of adult immunization in Europe -Submitted Open communication on start of AIB in Vaccine (accepted/ expected to be published in December 2023)

1.1.2 Pattyn Jade, Bonanni Paolo, on behalf of the Adult Immunization Board working group. <u>Assessing the health burden of vaccine-preventable</u> <u>infections in European adults: challenges and opportunities translated</u> <u>into action.</u> Euro Surveill. 2023;28(48)

Abstract: Background - Accurate information on the health burden of vaccinepreventable infections (VPIs) is needed to support evidence-based vaccine policy recommendations and programs. The first technical meeting of the Adult Immunization Board (AIB) was dedicated to the assessment of health burden evidence of VPIs in European adults. **Methods** - The AIB technical meeting, held in Antwerp, Belgium, in April 2023, convened international experts on health



burden of VPIs. Presentations by subject-matter experts and group discussions were held based on pre-defined meeting objectives, covering multiple topics on the availability and use of health burden evidence of adult VPIs in Europe. Results -Both opportunities and challenges were identified. Key points discussed included (1) the need for further harmonization of Burden of Disease (BoD) methodologies for cross-study and cross-country comparison, (2) the recognition that health burden studies require significant resources and high-quality data, and therefore improved infectious disease surveillance and collaborative efforts in Europe, (3) the important geographical differences and inequalities found at all levels of adult immunization in Europe that are to be considered when interpreting BoD results, and (4) the importance of tailored communication of VPI health burden data to each stakeholder for an effective translation into vaccine policy decisions. Conclusion - Several European initiatives promote health BoD harmonized methodologies and/or capacity building collaborations that are to be further built upon. Although VPI health burden data is available and is a key component in the evidence-based decision-making processes behind immunization strategies, data gaps remain, particularly for certain diseases and at-risk populations.

1.1.3 Adult Immunization Board website (link): <u>www.adultimmunizationboard.org</u>

All meeting materials (background document + slides + conclusions) are published on the AIB website. Summary meeting reports are published in peer-reviewed journals.



1.2 *Overview of the objectives of the meeting + Why is Italy* interesting in the context of adult immunization / from the AIB perspective

Potential questions/outcomes: What are the objectives of this AIB country meeting? Why Italy for the first AIB meeting? Explore future prospects and potential solutions to overcome barriers and enhance adult immunization efforts in Italy and other European countries.

1.2.1 AIFA-authorized adult vaccines in Italy



Figure 1: AIFA-authorized adult vaccines in Italy - this figure shows an overview of currently available adult vaccines in Italy approved by AIFA, the Italian Medicines Agency. The dates of approvals differ from implementation dates in the different Italian regions and some vaccines in the list may have been available before, but the types of these vaccines were withdrawn and replaced by new forms (e.g. rabies). This is a draft version and introduction dates, and additional details will be added to the final version.

1.2.2 Istituto Nazionale Di Statistica – 30th report: 2022 Annual Report

Abstract: In its 30th Report, the Italian National Institute of Statistics - Istat intends to provide a snapshot of **today's Italy**, in the light of its recent history, highlighting the steps forward and the obstacles still to be tackled, emphasizing the strong resilience and major vulnerabilities emerging with objective evidence from the most up-to-date statistical information.

8



Highlights:

- As of early 2022, residents aged 65 and over amounted to over 14 million, about 3 million more than 20 years ago; by 2042 they will be nearly 19 million. The great elderly, aged 80 and over, exceeded 4.5 million, and the population aged 100 and over reached 20,000, nearly four times more than in the past 20 years. In the following two decades, people aged 80 and over will increase by nearly 2 million, while those aged 100 and over will triple.
- Among the "young elderly" (aged 65-74), seven out of ten are fully independent, while after the age of 85 that share drops to 13 percent. In absolute terms, about 6.4 million people are unable to lead a fully independent life, having moderate or severe difficulties in personal care activities or home life. 3.8 million individuals have a severe reduction in independence. They are mostly women, with an average age of 82.
- Italy has long been among the European countries where the postponement of transition to adulthood is most pronounced. The share of 18-34-year-olds living with at least one parent, indeed, is around 70 percent, well above the European average of 50 percent.
- The labor market in Italy continues to be profoundly unequal. Young people aged 25-34 have not yet recovered the employment rate of 2007, 50 percent of women are not in work and are still at the bottom of the European ranking, and there is still a large gap in employment rates between the South and islands and the North.
- Over the past decade, absolute poverty has progressively increased and, in 2020-2021, has reached the highest value since 2005, affecting more than 5.5 million people. Similarly, the profile of households in absolute poverty has progressively changed. The incidence decreased among elderly singles, remained broadly stable among elderly couples, and increased significantly among couples with children, single-parent households, and other types of households.

1.2.3 OECD - Health at a Glance 2023: Country note Italy



	CD/health-at-a-glance	Find out more at OE.	٩
	OECD averages for quality of care are based on	Overall comparisons of health status, risk factors, access, quality and resources are unweighted and therefore not measures of performance; Iter 1 (and affire slightly from averages in Chapter 6 due to affirences in country coverage)	Note: Ove Chapter 1
	(Based on 29 indicators, data missing for 3 indicators)	3.7): and 6.2 practising nurses (OECD average 9.2). Italy has 3.1 hospital beds per 1,000 population, less than the OECD average of 4.3.	2
	Italy is above the OECD average on 34% of indicators	 They purchases Tay spents \$4291 per capita on health, less than the OECD average of \$4986 (USD PPP). This is equal to 9.0% of CDP, compared to 9.2% on average in the OECD. There are 4.1 practising doctors per 1,000 population (OECD average) 	
		alth system resources	Healt
	(Based on 16 indicators, data missing for 2 indicators)	health expenditure, was higher than the OECD average of 18%. 1.8% of the population reported unmet needs (OECD average 2.3%).	
	the OECD average on 38% of indicators	satisfied with the availability of quality healthcare (OECD average 67%). Financial coverage, with 75% of spending covered by mandatory prepayment, was similar to the OECD average of 76%. Out-of-pocket spending, at 22% of	را۔
	Italy perfoms better than	cess to care Key indicators: All of the population is covered for a core set of services 55% of people were	Acces
	(Based on 20 indicators, data missing for 8 indicators)	OECD average of 55%.	
	80% of indicators	aumissions per involvour population, ress main the OECD are prescribing: taby prescribed more antibiotics than on average in the OECD. Preventive care: 56% of women were screened for heast cancer similar to the	Į
	Italy perfoms better than the OECD average on	Acute care: 30-day mortality after stroke was 6.6% (OECD average 7.8%), and 5.3% after AMI (OECD average 6.8%). Primary care. There were 214 avoidable data and the other than the other stroke average 7.8% and the other stroke average 7.8% of the other stroke avera	<u>F</u>
-		ality of care Kev indicators:	Qualit
	missing for 1 indicator)		
	(Based on 12 indicators data	 versus o.c. cuesky prevarence was 12.0%, lower than the OECCD average of 18.4%. There were 40.8 deaths from air pollution per 100,000 population (OECD average 28.9). 	[
	Italy perfoms better than the OECD average on	Alcohol consumption was lower than the OECD average of 16.0%.	2
-		sk factors Key indicators:	Risk f
_	missing for 0 indicators)		
	(Based on 10 indicators data	of 79). 8.1% of people rated their health as bad or very bad (OECD average 7.9%). Diabetes prevalence was similar to the OECD average.	<
	the OECD average on 53% of indicators	Preventable mortality was 91 per 100,000 (lower than the OECD average of 158), with treatable mortality at 55 per 100,000 (lower than the OECD average	<u>ر</u> ک
	Italy perfoms better than	Key indicators: Life expectancy was 827 years 2.4 years above the OECD average.	
		wable for fray). alth status	availat Healti
	ant indicators (where data are	ow does Italy perform overall? is section shows key indicators, and also how often Italy is above the OECD average on relev	Hov This se
	ith system performance. This	ath at a Giance provides the latest comparable data and trends on population health and health and health and health with y Note shows how Italy compares to other OECD countries across indicators in the report unity.	Countr
Ħ	Italy		Ň
3 3			
	at a Glance 2023 Country Note	OECD Health a	•

On which indicators does Italy perfom well or badly? In graphs below show selected indicators from Health at a Glance 2023 where the performance of Italy deviates arkedly from the OECD on average. For more details on the data presented, please refer to the full report, using e graph references provided (e.g. g5.1).

gruph i nori nave promusi (v.g. gr. j. Italy: Platter Worse	Hinher I nwar
ealth status	
fe expectancy (g3.1)	73.1 • • • • • • • • • 80.3 • • • 82.7 • • 84.5
ng standing illness prevalence (g3.15)	18.6 • • • • • 35.4 • • • • • • • • 5 0.6
VR mortality rate (g3.10)	1.1
ementia prevalence (g10.8)	8.1 • • • • • • • • • 22.1 • • • 292 • • • 43.7
isk factors	
besity prevalence (self-reported) (g4.12)	4.3 • 120 • 18.4 • • • • • 33.5
aavy drinking prevalence (g4.5)	2.9 4.3
noking prevalence (g4.1)	7.2 • • • • • • • • 16.0 • • 19.1 • • • • • • 28.0
0 min of physical activity (g4.11)	5.4 • • • • • • • • • • • • • • • • • • •
uality of care	
voidable admissions: diabetes (g6.11)	10.5 31.0 - 102.4 - 230.9
nputation among diabetics (g6.13)	0.6 • 25 ••• 7.5 •• •• • • 33.4
lverse outcome within one year: CHF (g6.34)	32.3 • 50.5 • 57.3 • • • • • 70.2
ople 75+ taking 5+ medicines (g10.11)	22.1 • • • • • • • • • • • • • • • • • • •
ccess to care	
itisfaction with coverage (g5.2)	39.0 • • • • 55.0 • • 66.8 • • • • • • • • • • 94.0
nare of generics (% of volume) (g9.7)	17.6 • • • • • • • • • • • • • • • • • • •
aiting times: hip surgery (after specialist) (g5.34)	25.0
aiting times: knee surgery (after specialist) (g5.35)	66.8
ealth system resources	
alth expenditure as % of gov expenditure (g7.13)	9.9 •••• • 124 ••• 155 •••• ••• 21.8
ospital workforce (g8.18)	7.2 • • • • 11.0 • • • 15.4 • • • • • • • • • 26.6
edical graduates (g8.20)	6.8 ••• •• •• ••• 14.2 ••• 182 ••• •• 27.3
ırsing graduates (g8.22)	8.1 • 172 • • • 428 • • • • • • • • 115.7



Session 2: Current situation: Epidemiology, Burden of Disease and Surveillance of adult VPI in Italy

Session 2: Current situation: Epidemiology, Burden of Disease and Surveillance	2.1 Adult VPI in Italy: surveillance, epidemiology and burden of disease (focus on COVID-19, Influenza, Pneumococcus, RSV, Tdap,	Patrizio Pezzotti
of adult VPI in Italy	Zoster)	

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

Potential questions/outcomes: Provide a summary of the epidemiology and burden of disease of VPI in adults in Italy (focus on COVID-19, Influenza, Pneumococcus, RSV, Tdap, Zoster) and explain how surveillance and control programs work. Discuss challenges and opportunities and mid and long term projects to improve this area.

2.1.1 COVID-19/ Influenza: Epicentro - www.epicentro.iss.it

EpiCentro - was created in 2000 under the direction of the Epidemiology and Biostatistics Laboratory (Laboratorio di Epidemiologia e Biostatistica, LEB) of the Italian National Institute of Health (Istituto Superiore di Sanità, ISS) and is a tool for workers in public health to improve access to epidemiological information, derived from the National Health Service, via Internet. Its creation involved the participation of the departments and centers of the ISS in collaboration with Regional Health Authorities, Local Health Authorities, Research Institutes, Epidemiological Associations and individual workers in public health.

Population surveillances:

- The PASSI surveillance monitors health in the adult population across Italy.
- The Passi d'Argento surveillance monitors health in the elderly population across Italy.

COVID-19	https://www.epicentro.iss.it/en/coronavirus/sars-cov-2-dashboard
Influenza	https://www.epicentro.iss.it/en/influenza/

COVID-19: With 16 million infections and more than 160,000 SARS-CoV-2-related deaths recorded between March 2020 and April 2022, Italy was, along with Spain, one of the most pandemic-affected countries in the EU area, especially during its first phase. In comparison with the pre-pandemic five-year period 2015-2019, excess mortality was particularly high in 2020, especially among the elderly and frail population. As early as 2021, however, the launch of the vaccination campaign had a positive impact in counteracting the spread of the disease, and reducing associated mortality. During the most intense phases of the virus spread, mortality rates increased particularly amongst people with low levels of education and in more disadvantaged socio-economic situations, leading to an increase in mortality inequalities. Excess mortality in 2020 caused our country to lose its pre-pandemic leading position in terms of low mortality rates in the EU area, even though progressively recovering already in 2021, and even more so in 2022.

Influenza: <u>Example</u>: In the 17th week of 2023, it is stable compared to the previous week. The following is a summary of the available indicators:



- **Severe cases**: Data on severe and complicated forms of confirmed influenza will be published as soon as they are available.
- Mortality: during the 16^{at} Week of 2023 mortality (total, not just influenza*) mortality was in line with the expected figure, with a daily average of 231 deaths compared to 225 expected.
 * Note: indicator derived from the Daily Mortality Surveillance System (SISMG), based on the survey in 20 Italian sample cities that collect the number of deaths daily for those over 65 years of age for all causes (not just flu). This number is compared with the expected average number of deaths recorded in the previous five years.
- **InfluNet-Epi**: in the 17^{at} Week of 2023 The total incidence is about 4.3 cases per thousand assisted.
- **InfluWeb**: during the 17^{at} week of 2023, around the 89% of cases of flulike syndrome report that they have not been seen by a doctor in the National Health Service but have had a flu-like syndrome.
- **InfluNet-Vir**: During week 16/2023, the proportion of samples testing positive for influenza (4.5%) continues to decrease compared to the previous week (7.6%). Overall, 5,005 (80.2%) type A strains, predominantly belonging to the H3N2 subtype, and 1,239 (19.8%) type B strains, have been identified since the beginning of the season.

2.1.2 **Pneumonia**: Pezzotti P, Bellino S, Riccardo F, Lucaroni F, Cerquetti M, Pantosti A, Rezza G, Stefanelli P. <u>Vaccine preventable invasive bacterial</u> <u>diseases in Italy: A comparison between the national surveillance system</u> <u>and recorded hospitalizations</u>, 2007-2016. Vaccine. 2019 Jan 3;37(1):41-48.

Abstract - Background: Vaccine-preventable invasive bacterial diseases (IBDs) caused by Neisseria meningitidis (Nm), Streptococcus pneumoniae (Sp), and Haemophilus influenzae (Hi) have been notified in Italy since 2007 without assessing reporting completeness Methods: Our study compared the number of cases of IBDs identified from the Italian Hospital Discharge Records (HDRs), using specific diagnostic ICD-9-CM codes, with those notified to the National Surveillance System (NSS) from 2007 to 2016. A multinomial logistic regression model was used to impute the aetiology of all discharges with a diagnosis of unspecified bacterial meningitis. Results: Over a 10-year period, 14,243 hospital discharges with diagnosis of IBD were estimated in Italy (12,671 with specified aetiology and 1,572 with imputed aetiology). Among those, 2,513 (17.6%) were caused by Nm, 10,441 (73.3%) by Sp, and 1289 (9.1%) by Hi. Most invasive meningococcal diseases were coded as meningitis (72.3%), while Hi and Sp were more frequently coded as septicaemia (51.6% and 60.4%, respectively). The highest mean annual incidence rate was found for IBD caused by Sp (1.74 per 100,000), followed by Nm (0.42 per 100,000) and by Hi (0.21 per 100,000). Comparing NSS with HDR data, we found an initially high underreporting of all IBDs, and particularly for Hi. Data from the two systems overlapped in more recent years, due to an improved reporting completeness. The increasing IBD incidence observed in NSS data was not confirmed by HDR data trends, although with pathogen-related differences with Hi cases rising in both data sources, suggesting that is mainly due to an improved disease notification rather than to a true incidence increase. Conclusions: Comparing surveillance data with other data sources is useful to better interpret observed trends of notifiable disease

2.1.3 **RSV:** Osei-Yeboah R, Spreeuwenberg P, Del Riccio M, et al.; RESCEU investigators. Estimation of the number of RSV-associated hospitalisations in adults in the European Union. J Infect Dis. 2023 May 29:jiad189.



Abstract: Background: Respiratory syncytial virus (RSV) is a major cause of lower respiratory tract infections in adults that can result in hospitalisations. Estimating RSVassociated hospitalisation is critical for planning RSV-related healthcare across Europe. Methods: We gathered RSVassociated hospitalisation estimates from the RSV Consortium in Europe (RESCEU) for adults in Denmark, England, Finland, Norway, Netherlands, and Scotland from 2006-2017. We extrapolated these estimates to 28 EU countries using nearest-neighbor matching, multiple imputations, and two sets of 10 indicators. Results: On average, 158229 (95%CI:140865-175592) RSV-associated hospitalisations occur annually among adults in the EU (\geq 18years); 92% of these hospitalisations occur in adults \geq 65years. Among 75-84 years, the annual average is estimated at 74519 (69923-79115) at a rate of 2.24 (2.10-2.38) per 1000. Among \geq 85years, the annual average is estimated at

Table 4. Proportion (%) of Overall Respiratory Syncytial Virus–Associated Hospitalizations Occurring in Adults Aged 18–64 Years, 65–74 Years, 75–64 Years, and \geq 85 Years in the European Union and in Each Country

	Age Group				
Country	18–64 y	65–74 y	75–84 y	≥85 y	≥65
EU 28 ^a	8.3	20.7	47.1	24.0	91.7
Austria	7.9	22.9	45.2	24.0	92.1
Belgium	9.0	17.4	43.8	29.8	91.0
Bulgaria	8.7	20.9	53.0	17.4	91.3
Croatia	7.4	17.5	58.2	16.8	92.6
Cyprus	14.5	23.4	42.6	19.6	85.5
Czech Republic	10.8	26.1	44.4	18.7	89.2
Denmark	9.9	28.3	48.3	13.5	90.1
Estonia	9.0	16.0	53.4	21.6	91.0
Finland	2.5	5.4	77.5	14.6	97.5
France	8.4	21.8	39.4	30.3	91.6
Germany	5.5	21.4	55.1	18.0	94.5
Greece	6.4	13.6	55.0	25.0	93.6
Hungary	9.4	24.4	47.8	18.4	90.6
Ireland	17.6	26.4	37.7	18.4	82.4
Italy	6.8	18.1	52.9	22.2	93.2
Latvia	6.9	17.2	54.4	21.5	93.1
Lithuania	6.0	17.1	51.9	24.9	94.0
Luxembourg	13.0	26.5	36.4	24.1	87.0
Malta	9.4	29.1	45.7	15.7	90.6
Netherlands	11.0	25.7	36.6	26.7	89.0
Norway	9.2	37.9	30.0	22.9	90.8
Poland	9.8	22.7	44.8	22.7	90.2
Portugal	7.5	16.2	48.1	28.2	92.5
Romania	11.6	22.4	43.5	22.5	88.4
Slovakia	10.7	28.6	42.2	18.4	89.3
Slovenia	8.1	15.7	57.6	18.5	91.9
Spain	8.5	20.6	44.5	26.4	91.5
Sweden	10.0	23.9	42.9	23.2	90.0
United Kingdom	12.9	21.7	38.6	26.8	87.1

37904 (32444-43363) at a rate of 2.99 (2.56-3.42). **Conclusion**: Our estimates of RSV-associated hospitalisations in adults are the first analysis integrating available data to provide the disease burden across the EU. Importantly, for a condition considered in the past to be primarily a disease of young children, the average annual hospitalisation estimate in adults was lower but of a similar magnitude to the estimate in young children(0-4years): 158229 (140865-175592) versus 245244 (224688-265799).

2.1.4 **RSV**: Panatto D, Domnich A, et al. <u>Epidemiology and molecular</u> <u>characteristics of respiratory syncytial virus (RSV) among Italian</u> <u>community-dwelling adults, 2021/22 season</u>. BMC Infect Dis. 2023 Mar 7;23(1):134.

Abstract: Background: Respiratory syncytial virus (RSV) is a leading cause of acute respiratory infections worldwide. While historically RSV research has been focused on children, data on RSV infection in adults are limited. The goal of this study was to establish the prevalence of RSV in community-dwelling Italian adults and analyze its genetic variability during the 2021/22 winter season. Methods: In this cross-sectional study, a random sample of naso-/oropharyngeal specimens from symptomatic adults seeking for SARS-CoV-2 molecular testing between December 2021 and March 2022 were tested for RSV and other respiratory pathogens by means of reverse-transcription polymerase chain reaction. RSVpositive samples were further molecularly characterized by sequence analysis. Results: Of 1,213 samples tested, 1.6% (95% CI: 0.9-2.4%) were positive for RSV and subgroups A (44.4%) and B (55.6%) were identified in similar proportions. The epidemic peak occurred in December 2021, when the RSV prevalence was as high as 4.6% (95% CI: 2.2-8.3%). The prevalence of RSV detection was similar (p = 0.64) to that of influenza virus (1.9%). All RSV A and B strains belonged to the ON1 and BA genotypes, respectively. Most (72.2%) RSV-positive samples were also positive for other pathogens being SARS-CoV-2, Streptococcus pneumoniae and rhinovirus the most frequent. RSV load was significantly higher among monodetections than co-detections. **Conclusion**: During the 2021/22 winter season, characterized by the predominant circulation of SARS-CoV-2 and some non-



pharmaceutical containment measures still in place, a substantial proportion of Italian adults tested positive for genetically diversified strains of both RSV subtypes. In view of the upcoming registration of vaccines, establishment of the National RSV surveillance system is urgently needed.

2.1.5 **Tdap**

2.1.5.1 Whooping cough/ Pertussis: https://www.epicentro.iss.it/pertosse/epidemiologia

The Italian epidemiological picture of whooping cough from 1996 to 2018 shows a decreasing trend of the disease during the period considered, mainly due to the increase in vaccination coverage and that between 1999 and 2008. High vaccination rates have allowed the spread of Bordetella pertussis to be reduced. However, the decrease in immunity that occurs in vaccinated individuals means that adolescents and adults are a source of infection for unvaccinated individuals and newborns who have not completed the primary cycle. Moreover, whooping cough in adolescents and young adults is probably underestimated because of the atypical clinical picture that occurs in these individuals and the limited use of laboratory confirmation. Therefore, the true impact of whooping cough on the population is difficult to estimate and is poorly perceived by the population and health professionals. Therefore, it is important to maintain high vaccination coverage in children and carry out the boosters provided for in the vaccination calendar.



2.5.1.2 Whooping cough/ Pertussis: Wehlin L, Ljungman M, et al. <u>Pertussis</u> seroprevalence among adults of reproductive age (20-39 years) in fourteen European countries. APMIS. 2021 Sep;129(9):556-565. doi: 10.1111/apm.13165.

Abstract: The reported incidence of pertussis in European countries varies considerably. We aimed to study specific Bordetella pertussis seroprevalence in Europe by measuring serum IgG antibody levels to pertussis toxin (anti-PT IgG). Fourteen national laboratories participated in this study including Belgium, Denmark, Finland, Greece, Hungary, Italy, Lithuania, Malta, Norway, Poland, Portugal, Romania, Spain, and Sweden. Each country collected approximately 250 samples (N = 7903) from the age groups 20-29 years (N = 3976) and 30-39 years (N = 3927) during 2010-2013. Samples were anonymous residual sera from diagnostic laboratories and were analyzed at the national laboratories by a Swedish reference method, a commercial ELISA kit, or were sent to Sweden for analysis.



The median anti-PT IgG concentrations ranged from 4 to 13.6 IU/mL. The proportion of samples with anti-PT IgG \geq 100 IU/mL, indicating a recent infection ranged from 0.2% (Hungary) to 5.7% (Portugal). The highest proportion of sera with anti-PT IgG levels between 50 and <100 IU/mL, indicating an infection within the last few years, was found in Portugal (12.3%) and Italy (13.9%). This study shows that the circulation of B. pertussis is quite extensive in adults, aged 20-39 years, despite well-established vaccination programs in Europe.

2.1.5.3 **Tetanus** - <u>https://www.ecdc.europa.eu/en/publications-</u> data/tetanus-annual-epidemiological-report-2021

In 2021, 50 tetanus cases were reported in the EU/EEA, 10 of which were confirmed cases. The number of cases reported in 2021 was higher than that reported in 2020 (32 cases), but lower than the numbers reported in 2019 and 2018 (73 and 92 respectively). The use of the EU case definition for reporting was quite varied, with four countries using a different case definition for reporting; most often this definition corresponds to the national case definitions. Adults aged 65 years and above were the most affected age group, with women accounting for most cases. The current epidemiology in the EU/EEA may be explained by lower vaccination coverage or waning immunity in older populations. The average estimated vaccination coverage of DTP3 among one-year-olds in the EU/EEA remained high throughout the period 2017–2021 (2021: 94%, range 86–99%). Due to the severity of tetanus, there is a need to maintain high vaccination rates in all age groups, particularly the elderly, in countries with higher rates of disease.

2.1.5.4 **Tetanus** - Filia A, Bella A, von Hunolstein C, Pinto A, Alfarone G, Declich S, Rota MC. <u>Tetanus in Italy 2001-2010: a continuing threat in older</u> <u>adults. Vaccine.</u> 2014 Feb 3;32(6):639-44. doi: 10.1016/j.vaccine.2013.12.012. Epub 2013 Dec 25. PMID: 24370712.

Abstract: Despite being a completely preventable disease, tetanus cases continue to occur in Italy and notification and hospitalization rates have been reported to be higher with respect to European and other industrialized countries. We examined statutory notification, hospitalization, mortality and seroprevalence data to describe tetanus epidemiology in Italy from 2001 to 2010. A total of 594 tetanus cases were notified, with an average annual incidence of 1.0/1,000,000 population. Most cases were unvaccinated or incompletely vaccinated. Eighty percent of cases occurred in subjects aged >64 years and a higher proportion of females with respect to males were reported in this age group. The annual number of hospital admissions was 1.4-1.7 times greater than the number of notifications in the same year. The mean annual number of reported deaths was 21. Seroprevalence data show progressively higher susceptibility levels with increasing age. Over 50% of persons aged 45-64 years and over two thirds of subjects \geq 65 years had tetanus antibody levels <0.01 IU/ml. Results show that tetanus is a continuing problem in Italy and, as in other countries, most cases occur in older adults, especially elderly women. The observed differences in notification and hospitalization rates suggest underreporting by physicians. In recent years, Italy has accounted for most cases reported annually in the European Union (EU) but different case definitions are used. In Italy, a confirmed case is one that meets the clinical case definition while the EU case definition classifies confirmed cases as those with laboratory confirmation of disease. The incidence of clinical tetanus in Italy is ten-fold higher than in other industrialized countries, like Australia and Canada, likely due to higher susceptibility levels in Italy. In view of the low prevalence of tetanus antibodies in adults \geq 45 years, strategies to improve vaccine uptake in this population group need to be implemented.



2.1.5.5 **Diphtheria** <u>https://www.ecdc.europa.eu/en/news-</u> events/epidemiological-update-diphtheria-cases-europe

Since January 2022, and as of 11 August 2023, 281 confirmed diphtheria cases, as per the EU case definition (2022: 224 cases, 2023: 57 cases), and four deaths were reported in the EU/EEA through the European Surveillance System (TESSy), compared to an average of 55 cases reported annually between 2017 and 2021. During late summer 2022, intelligence data reported to ECDC indicated that the majority of cases in 2022 were diagnosed in migrant-related facilities, with onward transmission documented in a few instances in migrant-related-facilities (see Eurosurveillance article on cases in Germany and Switzerland. ECDC is not aware of any evidence indicating outbreaks in the broader EU/EEA population resulting from the cases identified in these settings. The 281 cases were reported by Germany (206), Belgium (37), Czechia (10), Slovakia (9), Netherlands (9), Sweden (5), Latvia (3), Norway (1) and Spain (1). The two deaths reported in 2023 occurred in Belgium and Latvia. In 2022, one death was reported in Germany and one in Slovakia. The age range of cases was between 0 and 92 years with 175 cases (62%) in the age group 15-5 years, with 240 (85%) being male. Overall, 228 cases were caused by Corynebacterium (C.) diphtheriae and 53 cases were caused by Corynebacterium (C.) ulcerans.



2.1.6 **Herpes zoster**: Pan CX, Lee MS, Nambudiri VE. <u>Global herpes zoster</u> <u>incidence, burden of disease, and vaccine availability: a narrative review</u>. Ther Adv Vaccines Immunother. 2022 Mar 21;10:25151355221084535.

Abstract: Herpes zoster (HZ) is a neurocutaneous disease that causes significant morbidity worldwide. The disease is caused by the reactivation of the varicellazoster virus (VZV), which leads to the development of a painful, vesicular rash and can cause complications such as post-herpetic neuralgia and vision loss. Globally, the incidence of HZ is increasing, and it incurs billions in cost annually to the healthcare system and to society through loss of productivity. With the advent of effective vaccines such as the live attenuated vaccine, Zostavax®, in 2006, and more recently the adjuvant recombinant subunit vaccine, Shingrix®, in 2017, HZ has become a preventable disease. However, access to the vaccines remains mostly limited to countries with developed economies, such as the United States and Canada. Even among countries with developed economies that license the vaccine, few have implemented HZ vaccination into their national immunization schedules due to cost-effectiveness considerations. In this review, we discuss the currently available HZ vaccines, landscape of HZ vaccine guidelines, and economic burden of disease in countries with developed and developing economies, as well as barriers and considerations in HZ vaccine access on a global scale.



2.1.7 **Herpes zoster**: Gabutti G, Franco E, Bonanni P, Conversano M, Ferro A, Lazzari M, Maggi S, Rossi A, Scotti S, Vitale F, Volpi A, Greco D. <u>Reducing the</u> <u>burden of Herpes Zoster in Italy</u>. Hum Vaccin Immunother. 2015;11(1):101-7.

Abstract: Herpes Zoster (HZ) is a viral disease with painful neuro-dermatologic manifestations. Incidence increases with age. In Italy, the estimated incidence is 6.3 cases/1000 person/year; hospital admissions are less than 2%, 69% in patients aged over 65 years. The most frequent complication of HZ is Post-Herpetic Neuralgia (PHN) characterized by metameric pain, allodynia, and hyperalgesia. In Italy 20.6% and 9.2% of HZ patients experience PHN after 3 and 6 months, respectively. Available antiviral and analgesic treatments are relatively unsatisfactory in reducing pain and length of the disease. Prevention has recently become possible with the live attenuated vaccine Oka/Merck. Clinical studies show a reduction of 51% in the incidence of the disease, 61% of its burden and 67% of PHN in vaccinees. Protection seems to be long lasting and vaccine safety matches registration requirements. Available evidence suggests that the costs for QALY (less than € 20 000) and avoided cases is favorable. Due to the heavy burden of disease, it is time to offer this vaccination to elderly population.

2.1.8 **Herpes zoster**: Gialloreti LE, Merito M, Pezzotti P, Naldi L, Gatti A, Beillat M, Serradell L, di Marzo R, Volpi A. <u>Epidemiology and economic burden of herpes zoster and post-herpetic neuralgia in Italy: a retrospective, population-based study</u>. BMC Infect Dis. 2010 Aug 3;10:230.

Background: Data on the epidemiology and cost of herpes zoster (HZ) and postherpetic neuralgia (PHN) in Italy are limited. This retrospective, population-based study was designed to determine the incidence of HZ and the proportion developing PHN in Italy and the associated medical resource utilization and costs. It focused primarily on immunocompetent patients aged > or = 50 years who would be eligible for preventive vaccination. Method: Data were extracted from a primary-care database and national hospital-discharge records covering four major regions in Italy for 2003-2005. Cases of HZ and PHN (1 and 3 months' duration; PHN1 and PHN3) were identified by ICD9-CM codes and, additionally for PHN, prescription of neuropathic pain medication. Results: Over 3 years, 5675 incident cases of HZ were documented in adults, of which 3620 occurred in immunocompetent patients aged > or = 50 years (incidence of 6.31 per 1000 person-years [95% CI: 6.01-6.62]). Of the immunocompetent patients aged > or = 50 years with HZ, 9.4%(95% CI: 8.2-10.7) and 7.2% (95% CI: 6.2-8.2) developed PHN1 and PHN3, respectively. Increasing age, female sex, and being immunologically compromised conferred increased risk for both HZ and PHN. Overall, about 1.3% of HZ and almost 2% of PHN cases required inpatient care, with 16.9% of all HZ-related hospitalisations due specifically to PHN. In patients aged > or = 50 years, mean stay was 7.8 +/- 5.4 days for HZ and 10.2 +/- 8.6 days for PHN, and direct costs associated with inpatient care were more than 20 times outpatient costs per HZ case (mean +/- SD: euro2592 +/- euro1313 vs. euro122.68 +/- euro97.51) and over 5 times more per episode of PHN (mean +/- SD: euro2806 +/- euro2641 vs. euro446.10 +/- euro442.97). Total annual costs were euro41.2 million, of which euro28.2 million were direct costs and euro13.0 million indirect costs. **Conclusions**: This study, the largest to date on the epidemiology and economic impact of HZ and PHN in Italy, confirms the considerable disease and economic burden posed by HZ. As HZ and PHN disproportionately affect the elderly, without intervention this problem is likely to grow as the proportion of elderly in the Italian population continues to increase.

General ECDC documents on surveillance:



2.1.9 <u>https://www.ecdc.europa.eu/en/news-events/ecdc-and-who-</u> launch-new-surveillance-tool-respiratory-viruses-improve-early-<u>detection</u>

ECDC and World Health Organization (WHO) Regional Office for Europe have jointly developed the European Respiratory Virus Surveillance Summary (ERVISS), an interactive surveillance data dashboard for influenza, respiratory syncytial virus (RSV), and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that also features a weekly epidemiological summary. The primary aim of the platform is to serve as a tool for the early detection and communication of signals of respiratory virus circulation in the EU/EEA and WHO European region.

2.1.10 European Centre for Disease Prevention and Control. <u>Long-term</u> <u>surveillance framework 2021–2027</u>. April 2023. ECDC: Stockholm; 2023.

This long-term surveillance framework ties in with the overall ECDC strategy 2021– 2027. Aspirations for the coming seven years relevant to surveillance are to promote standards, help bridge the gap between science, policy and practice, provide tailored support to Member States, harness technological innovation, and collaborate with EU enlargement and other neighborhood countries as well as EU sister agencies, WHO, global centers for disease prevention and control (CDCs) and other relevant players.

Session 3: Healthcare System and the Adult Immunization Plan in Italy



References: based on: Ricciard W, Tarricone R. The evolution of the Italiam National Health Service. Lancet. 2021 Dec 11;389[10317]:2139-2206. doi: 10.1016/90140-6736[210/173-5. Epub 2021 Oct 22. PMID: 34605372] // European Observatory on Health Systems and Pallicies, Rechel, Bernd, Richardson, Erica & McKee, Martin. [2018]. The organization and delivery of vaccination services in the European Union: prepared for the European Commission. World Health Organization. Regional Office for Europe.



Session 3: Healthcare System and the Adult Immunization Plan in	3.1 The evolution of the Italian National Health Service (focus on prevention/immunization)	Walter Ricciardi
Italy	3.2 Vaccination strategies, systems and laws within the NHS	Francesco Paolo Maraglino
	3.3 Evaluation and authorization of adult vaccines in Europe/Italy	Marco Cavaleri (online)
	3.4 Lifetime Immunization Schedule	Paolo Bonanni
	3.5 National Immunization Plan 2023-2025 and annual updates of immunization schedule	Carlo Signorelli

3.1 The evolution of the Italian National Health Service (focus on prevention/immunization)

Potential questions/outcomes: What are the key principles and objectives of the Italian national healthcare system when it comes to prevention, and how have they evolved over time? What are the key milestones or policy changes that have shaped the integration of prevention, especially immunization, within the Italian healthcare system?

3.1.1 Ricciardi W, Tarricone R. <u>The evolution of the Italian National Health</u> <u>Service.</u> Lancet. 2021 Dec 11;398(10317):2193-2206.

Abstract: 40 years ago, Italy saw the birth of a national, universal health-care system (Servizio Sanitario Nazionale [SSN]), which provides a full range of healthcare services with a free choice of providers. The SSN is consistently rated within the Organisation for Economic Co-operation and Development among the highest countries for life expectancy and among the lowest in health-care spending as a proportion of gross domestic product. Italy appears to be in an envious position. However, a rapidly ageing population, increasing prevalence of chronic diseases, rising demand, and the COVID-19 pandemic have exposed weaknesses in the system. These weaknesses are linked to the often tumultuous history of the nation and the health-care system, in which innovation and initiative often lead to spiralling costs and difficulties, followed by austere cost-containment measures. We describe how the tenuous balance of centralised versus regional control has shifted over time to create not one, but 20 different health systems, exacerbating differences in access to care across regions. We explore how Italy can rise to the challenges ahead, providing recommendations for systemic change, with emphasis on data-driven planning, prevention, and research; integrated care and technology; and investments in personnel. The evolution of the SSN is characterised by an ongoing struggle to balance centralisation and decentralisation in a health-care system, a dilemma faced by many nations. If in times of emergency, planning, coordination, and control by the central government can guarantee uniformity of provider behaviour and access to care, during non-emergency times, we believe that a balance can be found provided that autonomy is paired with accountability



in achieving certain objectives, and that the central government develops the skills and, therefore, the legitimacy, to formulate health policies of a national nature. These processes would provide local governments with the strategic means to develop local plans and programs, and the knowledge and tools to coordinate local initiatives for eventual transfer to the larger system.

3.1.2 Odone A, Azzopardi-Muscat N. <u>Health and the effect of universal health</u> <u>coverage in Italy</u>. Lancet Public Health. 2019;4(12):e597-e598. doi:10.1016/S2468-2667(19)30206-3

Abstract: No abstract available

3.2 Vaccination strategies, systems and laws within the NHS

Potential questions/outcomes: What are the legal framework and regulations that govern vaccination practices within the Italian NHS, including aspects such as mandatory vaccinations and exemptions? How does Italy ensure compliance with vaccination laws and regulations? What strategies are used within the Italian NHS to maintain robust vaccine supply chains and storage systems to ensure vaccine availability?

3.2.1 Pirrotta L, Guidotti E, Tramontani C, Bignardelli E, Venturi G, De Rosis S. **COVID-19 vaccinations: An overview of the Italian national health system's online communication from a citizen perspective. Health Policy.** 2022;126(10):970-979.

Abstract: COVID-19 vaccine hesitancy is still widespread. During the pandemic, the internet has been the preferred channel for health-related information, especially for less-educated citizens who tend to be the most hesitant about vaccination. A well-structured web communication strategy could help both to overcome vaccine hesitancy and to ensure equity in healthcare service access. This study investigated how the various regional and local health authorities in Italy used their institutional websites to inform users about COVID-19 vaccinations between March and April 2021. We browsed 129 institutional websites, checking the availability, quality and quantity, actionability and readability of information using a literature-based common grid. Descriptive statistics and statistical tests were performed. The online public dissemination of COVID-19 vaccination information in Italy was fragmented, both across and within regions. The side effects of vaccinations, were often not reported on the websites, thus missing an opportunity to enhance vaccination uptake. More focus should also be placed on readability, since readability indexes showed that they were difficult to understand. Our research revealed that several actions could be implemented to enhance online communication on COVID-19 vaccination. For instance, simplifying texts can make them more understandable and the information reported actionable.

3.2.2 Signorelli C. <u>Quarant'anni (1978-2018) di politiche vaccinali in Italia</u> [Forty years (1978-2018) of vaccination policies in Italy]. Acta Biomed. 2019;90(1):127-133. Published 2019 Jan 9.

Abstract: The paper traces the evolution of vaccination policies in Italy in the first 40 years of the National Health Service. Four phases have been identified: the first (1978-98) characterized by the eradication of smallpox, the hopes of further eradications and the introduction of hepatitis B and acellular antipertussis vaccines; the second (1999-2008) coincided with the first national vaccination plans and with the hypothesis of a progressive transition from mandatory vaccinations to nudging initiatives with the relevant experimentation in the Veneto Region; the third phase (2009-14) was characterized by the spread of health information on the web and



social networks, by anti-scientific judgments and by an increasingly vaccines hesitancy that led to incorrect perceptions, falls in coverage rates and re-ignition of some epidemics; in the last phase (2015-18) there was a strong political commitment that led to the approval of the National Plan (PNPV) 2017-19, to the extension of the mandatory vaccinations and to the sanctions against the anti-vaxxers doctors. This has led to a rapid rise in coverage, but also to a heated political and media debate on the ethical and social aspects linked to the admission bans and sanctions of unvaccinated children in schools.

3.2.3 Signorelli C, Odone A. Four Italian experiences on vaccination policies: results and lessons. Ann Ig. 2019;31(2 Supple 1):36-44.

Abstract: Introduction: In 2018 the Council of Europe adopted a Recommendation on strengthened cooperation against vaccine preventable diseases. Among EU Member States, Italy has a long-lasting tradition of immunization policies implemented in the context of the National Health Service over the last forty years. Methods: We identify, report and critically appraise four immunization strategies implemented in Italy in recent years and quantitatively assess their impact on coverage rates and other selected indicators. **Results**: First: the regional law that suspended mandatory vaccination in the Veneto Region in 2007 to stimulate a proactive approach to vaccine uptake was not successful. Second: a strengthened political commitment started in 2014 brought to the release of an innovative and updated National Immunization Prevention Plan and to encouraging increase in vaccine confidence and vaccination uptake. Third: the success of social media influencers is exemplified by the case of Roberto Burioni, professor of microbiology, who in 2015 started a personal social media campaign to contrast anti-vaccinists. Fourth: The new 2017 Italian law extending mandatory vaccinations has successfully impacted on vaccine coverage which increased by more than 1% and 4% for polio and MMR vaccines, respectively, in the first six months since its entering into force, and has continued to raise in 2018. **Conclusion**: Our data and real-life case studies offer to the broader European public health community a solid basis for discussion and ground to evaluate similar polices implemented in different European settings, with the common goal to share best practices and promote the culture of immunization

3.2.4 Crenna S, Osculati A, Visonà SD. <u>Vaccination policy in Italy: An update</u>. J Public Health Res. 2018;7(3):1523. Published 2018 Dec 20.

Abstract: The effective control of vaccine-preventable diseases generally requires indefinite maintenance of extremely high rates of timely vaccination. Therefore, vaccine hesitancy is of paramount importance and needs to be addressed. In Italy, regulations about vaccinations are controversial and, to some extent, inconsistent. Even though the childhood vaccinations are mandatory by law (Italian Law n. 891/1939, n. 292/1963, n.51/1966 and n. 165/1991), the limited deterrent effectiveness of the sanctioning system, and the changes introduced by the Italian Constitutional Law n. 3/2001 (devolution of almost all the competences and responsibilities in health matters to the Regions and the Autonomous Provinces), were the fertile ground in which new vaccine policies were generated and developed, radically different from the existing ones: many Regions, based on what was decided in 2005 - on an experimental basis - by the State-Regions Conference, decided to abolish the vaccination obligation and/or to stop the imposition of administrative sanctions on non-compliant parents. In addition, since then, there is a worrying tendency to decline vaccinations due to the parents' mistrust in pharmaceutical companies and health policies. Therefore, recently, the Italian government decided to deploy an emergency ordinance (Italian Decree Law n. 73/2017). In this article, the authors are going to illustrate the current situation in Italy concerning vaccination policy, from a legislative and social point of view.



3.3 Evaluation and authorization of adult vaccines in Europe/Italy

Potential questions/outcomes: What is the process for evaluating and authorizing adult vaccines in Italy and the broader European context, including the role of regulatory agencies and public health authorities? How does the evaluation and authorization of adult vaccines in Italy ensure safety and efficacy, and what are the key criteria and evidence required for approval? How does Italy's approach to evaluating and authorizing adult vaccines align with European Union regulations, and are there specific considerations or adaptations made at the European/ national level?

3.3.1 AIFA Website: <u>https://www.aifa.gov.it/en/vaccini</u> (last access Oct'23)

Abstract: In the European Union vaccines are authorized on the basis of quality, safety and efficacy requirements defined by European and international guidelines for all medicines, taking into account the specific characteristics of these products. The scientific data submitted by the pharmaceutical companies are subjected to a scrupulous technical and regulatory evaluation ending with either a positive opinion (leading to approval) or a negative one (non-approval) on the relationship between the benefits and risks associated with the use of the vaccine in human beings. From a regulatory point of view there are two procedures: the Community and the National procedures. The Community procedure can be centralized (with the involvement of all EU Member States coordinated by the Committee for Medicinal Products for Human Use (CHMP) of the European Medicines Agency (EMA), pursuant to Reg. 726/2004), or of mutual recognition and decentralized (whereby a Member State acts as Reference Member State, pursuant to Legislative Decree 219/2006). A National procedure occurs when the authorization involves only one country (Legislative Decree 219/2006). Biotechnological vaccines (for example, recombinant DNA vaccines) can only be authorized through a centralized procedure (EMA). In any case, any vaccine and medicinal product must be granted a Marketing Authorization (MA) from AIFA before they can be marketed in Italy.

3.3.2 EMA Website https://www.ema.europa.eu/en

3.4 Lifetime Immunization Schedule

Potential questions/outcomes: What does the comprehensive "Calendario Vaccinale per la Vita" in Italy encompass, including vaccines for different age groups from young adulthood to older age, and how has it evolved historically? What strategies are implemented to promote adherence to the "Calendario Vaccinale per la Vita" in Italy, and how are healthcare providers and the general public educated about its significance? How is the "Calendario Vaccinale per la Vita" integrated with the National Immunization Plan?

3.4.1 Bonanni P, Villani A, Scotti S, et al. <u>The recommended lifetime</u> <u>immunization schedule from the board of vaccination calendar for life in</u> <u>Italy: A continuing example of impact on public health policies</u>. Vaccine. 2021;39(8):1183-1186.

Abstract: The Vaccination Calendar for Life is an alliance of scientific and professional societies of public health physicians, paediatricians and general practitioners in Italy which provides a periodical update on the ideal, scientifically driven vaccination calendar throughout lifetime. Since 2012, the Lifetime



Immunization Schedule has represented a benchmark for Regional and National Authorities to set up the updated list of vaccines provided actively and free of charge to infants, children, adolescents, adults and the elderly by inclusion in the Triennial National Vaccination Plan (TNVP), and in the Essential Levels of Care (LEA). The impact of the different editions of the Lifetime Immunization Schedule on the TNVP was deep, representing the inspiring source for the present vaccination policy. The 2019 edition called for more attention to pregnant women immunization; risk groups vaccination; uniform high coverage with the MMRV vaccine; extension of Meningococcal B vaccination also at adolescent age; use of quadrivalent conjugate meningococcal vaccine also at 1 year of life; progressive decrease of the age of free-of-charge offer of influenza to \geq 60 and then to \geq 50 year-old population; implementation of flu immunization ages 6 months-6 years; HPV vaccination also offered to 25-year old women at the time of the first screening (gender neutral immunization already offered); sequential PCV13-PPV23 pneumococcal vaccination in 65 year-old subjects; increased coverage with rotavirus vaccine in infants and zoster vaccine in the elderly.

3.4.2 Bonanni P, Angelillo IF, Villani A, et al. <u>Maintain and increase</u> vaccination coverage in children, adolescents, adults and elderly people: Let's avoid adding epidemics to the pandemic: Appeal from the Board of the Vaccination Calendar for Life in Italy: Maintain and increase coverage also by re-organizing vaccination services and reassuring the population. Vaccine. 2021;39(8):1187-1189.

Abstract: The Board of the Vaccination Calendar for Life (Bonanni et al., 2014, 2017) [1,2]), a coalition of four major scientific and professional societies of public health physicians, pediatricians and general practitioners in Italy, made an appeal to health authorities in order to sustain vaccination in COVID-19 times. The five pillars to maintain and increase vaccination coverage at all ages are described as follows: 1) Guarantee paediatric vaccination coverage to all newborns and paediatric boosters and adolescent immunizations, not interrupting active calls and scheduled sessions. 2) Re-organise the way paediatric and adolescent vaccinations are offered. 3) Set-up recovery programs for vaccinations not carried out after the start of the COVID-19 emergency. 4) Provide the preparation of tenders for the supply of flu vaccines with suitable quantities to increase coverage in all Regions and Autonomous Provinces with extreme urgency. 5) Prepare plans to increase coverage for influenza, pneumococcal, tetanus diphtheria and shingles. The Board of the Calendar for Life appeals to the National and Local Health Authorities for a strong and coordinated commitment in favor of the widest offer and acceptance of vaccinations, whose vital importance for collective health is now even more evident to all, in order to avoid that delays in the necessary initiatives should add damage from other epidemics to those suffered by our population due to the COVID-19 pandemic.

3.4.3 Calendario Vaccinale per la Vita [Vaccination Calendar for Life], 4th Edition, 2019 <u>https://bit.ly/VaccinationCalendarForLife</u>

Abstract: No abstract available

3.5 National Immunization Plan 2023-2025

Potential questions/outcomes: What is the comprehensive lifetime immunization schedule in Italy, covering vaccines from young adulthood through older age, and how has it evolved over time? How does Italy ensure the integration of vaccines across different life stages, and what are the key immunization milestones for various age groups within the population? What strategies are in place to promote adherence to the lifetime immunization schedule in Italy, and how



are healthcare providers and the public informed about its importance? What are the main differences (innovations/successes or challenges) compared to the other European countries?

3.5.1 Piano Nazionale Prevenzione Vaccinale (PNPV) 2023-2025, https://bit.ly/PNPV2023-25

Abstract: No abstract available

3.5.2 Silenzi A, Siddu A, D'Amelio AC, et al. <u>The new Italian National</u> <u>Immunization Technical Advisory Group (NITAG) and its commitment to</u> <u>endorse a new efficient National Immunization Plan in COVID-19 times</u>. Ann Ist Super Sanita. 2023;59(1):26-30. doi:10.4415/ANN_23_01_04

Abstract: Among the objectives of the WHO Global Vaccination Action Plan 2020-2025, there is the establishment, in all countries, of a National Immunization Technical Advisory Group (NITAG), an independent body with the aim of supporting and harmonising vaccination policies. Italy firstly established a NITAG in 2017; it contributed to the nation's immunization policies but fell short of its goal of becoming a true reference group. The newly appointed NITAG, made up of 28 independent experts, has the ambitious goal to promote the new National Immunization Prevention Plan (PNPV), to harmonise the current vaccination schedule with the anti-COVID-19 campaign, and to recover the vaccination coverage decline that occurred during the pandemic. The contact with the ECDC EU/EEA, the WHO Global NITAG networks, and all the national stakeholders needs to be reinforced in order to accomplish these aims. This paper describes the structure, organisation, and strategy of the new Italian NITAG.

Session 4: The implementation, organization, delivery, monitoring and evaluation of adult vaccination

Session 4: The implementation, organization, delivery, monitoring and evaluation of adult vaccination	4.1 Procurement, distribution, financing, organization and delivery of adult vaccination services in different regions of Italy, highlighting the challenges and opportunities	Vezzosi Luigi Barbara Porchia Emanuela Balocchini Pierluigi Lopalco
	4.2 Discuss the recording and reporting of vaccination data in Italy, including coverage rate monitoring and the national registry, vaccine impact monitoring and vigilance practices	Martina Del Manso Alberto Tozzi Alfredo Vannacci
	4.3 Analyse the population's vaccination demand and acceptance, addressing issues such as vaccine confidence and mandatory vaccination policies	Rachel Eagan Caterina Rizzo Fortunato 'Paolo' D'Ancona

4.1 Procurement, distribution, financing, organization and delivery of adult vaccination services in different regions of Italy, highlighting the challenges and opportunities



Potential questions/outcomes: What are the substantial differences between vaccines and other pharmaceutical products in terms of both health and economics? Is vaccine funding sustainable across Europe? What is the current financing model for adult vaccines in Italy? How is the purchase and distribution of adult vaccines organized in Italy, with a focus on procurement strategies and supply chain management? How does Italy effectively address the financial challenges associated with maintaining a comprehensive portfolio of adult vaccines, and what strategies are in place to secure funding for vaccination programs for different age groups? How is the organization and delivery of adult vaccination services structured differently across various regions of Italy, and what are the key factors contributing to this variation? What challenges do healthcare providers and regional authorities face in ensuring equitable access to adult vaccination services, and are there innovative approaches that have been successful in overcoming these challenges? What are opportunities and best practices in the organization and delivery of adult vaccination services within different regions of Italy, with a focus on promoting public health and vaccine coverage?

4.1.2 Lawlor R, Wilsdon T, Rémy-Blanc V, Nogal AÁ, Pana A. <u>A review of the</u> sustainability of vaccine funding across Europe and implications for post-<u>COVID policymaking</u>. Health Policy. 2022;126(10):956-969.

Abstract: Approaches to routine vaccine funding and the underlying budgetsetting process vary greatly across European countries. The ongoing COVID-19 pandemic has put enormous pressure on healthcare systems, affecting resilience of the overall vaccine ecosystem. This article reviews how vaccine budgets are structured across 8 European countries (England, Finland, France, Germany, Italy, Norway, Romania, and Spain). First a literature review of the landscape was undertaken, followed by expert interviews to review the findings and consider policy principles to secure prioritisation and sustainability of routine vaccination budgets post-COVID. The organisation of budgets and vaccine spending varies greatly across Europe. In 2/8 countries (France and Germany) vaccine spending is subsumed into a wider healthcare budget. In 2/8 countries (Italy and Romania) the budget differentiates public health and prevention spending from other areas of healthcare, though there is no standalone vaccine budget. In 4/8 countries (England, Finland, Norway and Spain) there is a standalone vaccine budget, however this may not cover all elements needed for immunisation delivery and is not always transparent. Ensuring adequate and dynamic country vaccine budgets, with horizon scanning approaches like in England and Finland, or flexible vaccines expenditures like Germany, would greatly help the timely availability of public funding for new vaccines and strengthen vaccines supply security in Europe through a more virtuous European vaccine ecosystem.

4.1.3 Rechel B et al. The organization and delivery of vaccination services in the European Union - prepared for the European Commission. Available online: <u>https://bit.ly/OrganizationDeliveryEU</u>

Abstract: In recent years, the European Union has been facing serious outbreaks of vaccine-preventable diseases, with an increasing number of cases and deaths. This study, undertaken at the request of the European Commission, collates information on the organization and delivery of vaccination services in the EU, with a focus on childhood vaccinations against measles and adult vaccinations against influenza. It provides a systematic review of health system related factors, a comparative analysis of country experiences and a suite of fiches that describe the organization and delivery of vaccination programmes in EU member states. The report finds that there are substantial differences in the governance, provision and financing of vaccination services across EU member states. This includes

25

differences in the types of health care providers involved, with, for example, an increasing role for pharmacies in providing adult vaccinations against influenza. The report also notes that childhood vaccination against measles is mandatory in nine EU member states but free at the point of delivery in all EU member states, whilst adult vaccination against influenza is voluntary in almost all EU member states, but in seven countries adults targeted by influenza vaccinations have to pay at least part of the costs of vaccination. The report calls attention to the fact that, despite some challenges in the governance, provision and financing of vaccination services, vaccine hesitancy and lack of awareness are the greatest barriers to improving vaccination coverage.

4.2 The recording and reporting of vaccination data in Italy, including coverage rate monitoring and the national registry, vaccine impact monitoring and vigilance practices

Potential questions/outcomes: How are adult vaccine coverage rates monitored in Italy at both the national and regional levels? What strategies are in place to address low coverage rates and improve vaccination uptake among adults? What pharmacovigilance practices are in place to monitor the safety of adult vaccines in Italy? How is AE reporting and investigation carried out for adult vaccines?

4.3.1 Odone A, Gianfredi V, Sorbello S, Capraro M, Frascella B, Vigezzi GP, Signorelli C. <u>The Use of Digital Technologies to Support Vaccination</u> <u>Programmes in Europe: State of the Art and Best Practices from Experts'</u> <u>Interviews</u>. Vaccines (Basel). 2021 Oct 3;9(10):1126.

Abstract: Digitalisation offers great potential to improve vaccine uptake, supporting the need for effective life-course immunisation services. We conducted semi-structured in-depth interviews with public health experts from 10 Western European countries (Germany, Greece, Italy, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, and the United Kingdom) to assess the current level of digitalisation in immunisation programmes and retrieve data on interventions and best practices. Interviews were performed using an ad hoc questionnaire, piloted on a sample of national experts. We report a mixed level of digital technologies deployment within vaccination services across Europe: Some countries are currently developing eHealth strategies, while others have already put in place robust programmes. Institutional websites, educational videos, and electronic immunisation records are the most frequently adopted digital tools. Webinars and dashboards represent valuable resources to train and support healthcare professionals in immunisation services organisation. Text messages, email-based communication, and smartphone apps use is scattered across Europe. The main reported barrier to the implementation of digital-based programmes is the lack of resources and shared standards. Our study offers a comprehensive picture of the European context and shows the need for robust collaboration between states and international institutions to share best practices and inform the planning of digital intervention models with the aim of countering vaccine hesitancy and increasing vaccine uptake.

4.3.2 D'Ancona F, Gianfredi V, Riccardo F, Iannazzo S. Immunisation <u>Registries</u> <u>at regional level in Italy and the roadmap for a future Italian National</u> <u>Registry</u>. Ann Ig. 2018 Mar-Apr; 30(2):77-85

Abstract: Background: Immunization Information Systems, or Immunisation registries (IRs), are essential to monitor and evaluate the accessibility, quality and outcomes of immunisation programmes both at local and national level.

Study design: We conducted a cross-sectional survey in order to investigate and map the level of IRs implementation obtained by the 21 Italian Regional Health Authorities. On this basis we defined a roadmap towards implementing an Italian



National IR. Methods: We designed an online questionnaire. Data were collected from July to September 2016 from all the 21 Regional Health Authorities in charge of infectious diseases control and immunization management. **Results:** 18/21 Italian Regions have fully implemented an IR, out of them, 11 use the same software for all Local Health Units. Two Regions have partially implemented their IRs and one Region is not yet computerised. **Conclusion:** The decentralization of the Italian Health System is reflected also on the IRs characteristics and functionalities in terms of fragmented implementation of IRs and diversity in the software systems and data flows in place. Future efforts should not only aim not only to clarify the functionalities of Regional IRs but should also aim to define how aggregation of data at national level can be optimised.

4.3.3 Tozzi, A. E., Gesualdo, F., D'Ambrosio, A., Pandolfi, E., Agricola, E., & Lopalco, P. (2016). <u>Can Digital Tools Be Used for Improving Immunization</u> <u>Programs?</u>. Frontiers in public health, 4, 36.

Abstract: In order to successfully control and eliminate vaccine-preventable infectious diseases, an appropriate vaccine coverage has to be achieved and maintained. This task requires a high level of effort as it may be compromised by a number of barriers. Public health agencies have issued specific recommendations to address these barriers and therefore improve immunization programs. In the present review, we characterize issues and challenges of immunization programs for which digital tools are a potential solution. In particular, we explore previously published research on the use of digital tools in the following vaccine-related areas: immunization registries, dose tracking, and decision support systems; vaccine-preventable diseases surveillance; surveillance of adverse events following immunizations; vaccine confidence monitoring; and delivery of information on vaccines to the public. Subsequently, we analyze the limits of the use of digital tools in such contexts and envision future possibilities and challenges.

4.3.4 https://www.istat.it/

Istat is contributing to the digital transition as the implementing party of a strategically important project under the National Recovery and Resilience Plan (PNRR): the creation of a **National Data Catalogue**. This initiative will facilitate the exchange, harmonisation and understanding of information among public administrations as part of the National Digital Data Platform. Istat will undertake the mapping of databases and information flows, documentation of data schemas, and distribution of the catalogue. It will also provide training and support services for Public Administrations on their path to digital transition.

4.3 Analyze the population's vaccination demand and acceptance, addressing issues such as vaccine confidence and mandatory vaccination policies

Potential questions/outcomes: Provide an overview of the recent findings from the Vaccine Confidence Project in EU/Italy. What are the key factors influencing vaccine confidence among the Italian population? Are there regional variations in vaccine confidence within Italy? How do these findings inform public health strategies to address vaccine hesitancy? What specific recommendations has the Italian Society of Public Health proposed to counteract vaccine hesitancy? Can you share examples of successful interventions or campaigns that have been implemented based on these recommendations? How are these recommendations tailored to address different adult population groups with varying vaccine concerns? What are the key provisions of the compulsory vaccination law in Italy? Have there been any challenges or controversies surrounding the enforcement of



compulsory vaccination? How is the law evaluated in terms of its effectiveness in achieving public health goals?

4.4.1 State of Vaccine Confidence in the EU (2022)

Vaccine confidence among the public and healthcare professionals is high across most populations, with some exceptions and caveats. Between 2018 and 2020, there was a large increase in public perception towards vaccines across the EU, particularly towards the seasonal influenza vaccine. Many of these 2020 gains have since been reversed. Perceptions towards the importance, safety, and effectiveness of vaccines have declined across the EU between 2020 and 2022. Across the EU, the view that vaccines are safe remains higher than 2018 levels. Yet, EU-wide changes in public perceptions towards the importance and safety of vaccines shows that strong vaccine-dependence and variability in vaccine confidence exist between countries and within sociodemographic characteristics.

An evaluation into the differences in public confidence between over 65-year-olds and 18-34-year-olds reveals key insights into an increasing 'vaccine confidence gap', which needs to be addressed. The difference in vaccine confidence between 65-year-olds and 18-34-year-olds appears to be widening over time across many EU member states, with 18-34-year-olds becoming less confident between 2018 and 2022.

4.4.2 Alasmari A, Larson HJ, Karafillakis E. <u>A mixed methods study of health</u> <u>care professionals' attitudes towards vaccination in 15 countries</u>. Vaccine X. 2022 Sep 21;12:100219

Abstract: Background: Health care professionals are widely considered to be the most trusted source of information on vaccine-related topics. However, several are reporting their own hesitancy around certain vaccines, influencing their intention to vaccinate themselves as well as influencing their recommendations to their patients and target population. Methods: A mixed-methods approach was used including an online survey (n = 1,504) in 15 countries which aimed to determine drivers of HCPs vaccine confidence and examine how these drivers vary across nations. Thirty in-depth semi-structured interviews were conducted with 10 HCPs in a subset of three countries (France, Greece and Hungry) to explore barriers to HCPs vaccine uptake and their role in addressing vaccine hesitancy among patients. The survey's regression analysis identified that nurses/midwives and HCPs from Hungary, Italy, Romania and Switzerland were less confident in the safety, importance or effectiveness of vaccines in general. Morocco (35%), Turkey (53%) and Greece (69%) reported the lowest influenza vaccination coverage among HCPs. Morocco also reported the lowest rates of HCPs who were "highly likely" to recommend MMR vaccine (34%), HPV vaccine (31%) and Covid-19 vaccines (29%). More than third of HCPs reported a lack of trust in health authorities and in the information they provide. Thematic analysis revealed that concerns over the risk of side-effects associated with vaccines, preference for natural immunity, whether it was necessary to be vaccinated against influenza every year, not having any chronic disease risk factors, and vaccines mandates as the key barriers to HCPs vaccination against influenza and Covid-19. Conclusion: HCPs have an important role in vaccination and their confidence in vaccination and health authorities must be improved as this may affect their uptake of vaccines and influence their recommendations to their patients. Investigating the impact of political, socioeconomic and cultural contexts on concerns about vaccination among HCPs is also necessary.

4.4.3 Costantino C, Rizzo C, Rosselli R, et al. <u>Ten Actions to Counteract</u> Vaccine Hesitancy Suggested by the Italian Society of Hygiene,





Preventive Medicine, and Public Health. Vaccines (Basel). 2022;10(7):1030. Published 2022 Jun 27. doi:10.3390/vaccines10071030

Abstract: Vaccine hesitancy (VH) is one of the main causes of the widespread decline in vaccination coverage and has become the subject of ongoing debate among public health professionals. The present commentary is a "decalogue" of strategic actions to counteract vaccine hesitancy for public health professionals that comes from the cognitive and formative path put in place by the "Communication in Public Health" working group (WG) of the Italian Society of Hygiene, Preventive Medicine, and Public Health. From the establishment of a national, multidisciplinary WG on VH to the activation of a national monitoring/surveillance system on vaccine hesitancy, several proposals are discussed. The identification and dissemination of good practices and tools to counteract and understand vaccine hesitancy, interdisciplinary training on vaccine hesitancy and on risk communication, community engagement and infodemiology, the inclusion of effective interventions to counteract vaccine hesitancy within the National Immunization Plan (NIP), the promotion and growth of a community of practice and research in the field of vaccine hesitancy, collaborations between scientific societies, and knowledge from the behavioral sciences represent other actions recommended in the present commentary. The present document suggests ten undeferrable strategies that could be implemented at the national and local levels in Italy, and that could be borrowed by other European countries in order to counteract vaccines hesitancy with a systematic and organic approach.

4.4.4 Kummervold PE, Martin S, Dada S, Kilich E, Denny C, Paterson P, Larson HJ, <u>Categorizing Vaccine Confidence With a Transformer-Based Machine</u> <u>Learning Model: Analysis of Nuances of Vaccine Sentiment in Twitter</u> <u>Discourse</u>, JMIR Med Inform 2021;9(10):e29584

Abstract: Background: Social media has become an established platform for individuals to discuss and debate various subjects, including vaccination. With growing conversations on the web and less than desired maternal vaccination uptake rates, these conversations could provide useful insights to inform future interventions. However, owing to the volume of web-based posts, manual annotation and analysis are difficult and time consuming. Automated processes for this type of analysis, such as natural language processing, have faced challenges in extracting complex stances such as attitudes toward vaccination from large amounts of text. Objective: The aim of this study is to build upon recent advances in transposer-based machine learning methods and test whether transformerbased machine learning could be used as a tool to assess the stance expressed in social media posts toward vaccination during pregnancy. Methods: A total of 16,604 tweets posted between November 1, 2018, and April 30, 2019, were selected using keyword searches related to maternal vaccination. After excluding irrelevant tweets, the remaining tweets were coded by 3 individual researchers into the categories Promotional, Discouraging, Ambiguous, and Neutral or No Stance. After creating a final data set of 2722 unique tweets, multiple machine learning techniques were trained on a part of this data set and then tested and compared with the human annotators. Results: We found the accuracy of the machine learning techniques to be 81.8% (F score=0.78) compared with the agreed score among the 3 annotators. For comparison, the accuracies of the individual annotators compared with the final score were 83.3%, 77.9%, and 77.5%. Conclusions: This study demonstrates that we are able to achieve close to the same accuracy in categorizing tweets using our machine learning models as could be expected from a single human coder. The potential to use this automated process, which is reliable and accurate, could free valuable time and resources for conducting this analysis, in addition to informing potentially effective and necessary interventions.

4.4.5 D'Ancona F, D'Amario C, Maraglino F, Rezza G, Iannazzo S. <u>The law on</u> <u>compulsory vaccination in Italy: an update 2 years after the introduction</u>. *Euro Surveill.* 2019 Jun;24(26):1900371.

Abstract: Italy introduced a national law extending the number of compulsory vaccines from four to 10 in July 2017. The implementation placed a further burden on immunisation centres as they were required to cover the increased demand of vaccination by the parents of unvaccinated children. Vaccine coverage (VC) estimated 6 months and 1 year later, at 24 and 30 months (same birth cohort), had increased for all vaccines. At 24 months of age, measles VC increased from 87.3% in 2016 to 91.8% in 2017 and 94.1% at 30 months of age as at June 2018. In six of 21 regions and autonomous provinces, VC for measles was >95%. Despite the implementation of this law, vaccine hesitancy is still a problem in Italy and the political and social debate on mandatory vaccination is ongoing. Regardless of the policy to be adopted in the future, strategies to maintain high vaccination rates and the related herd immunity should be considered, including adequate communication to the population and the implementation of electronic immunisation registries.

4.4.6 D'Ancona F, D'Amario C, Maraglino F, Rezza G, Ricciardi W, Iannazzo S. <u>Introduction of new and reinforcement of existing compulsory</u> <u>vaccinations in Italy: first evaluation of the impact on vaccination</u> <u>coverage in 2017.</u> Euro Surveill. 2018 May;23(22):1800238.

Abstract: In June 2017, a decree-law to increase the number of mandatory vaccinations from 4 to 10 for minors up to 16-years-old was issued in Italy. The vaccination coverage for 2017 showed a positive impact for all the vaccines, particularly for the measles, mumps and rubella vaccine at 91.6% for the year 2017, showing a 4.4% increase compared with 2016 (87.2%). Continued monitoring is needed to evaluate the medium to long-term effects of the law.

Session 5: Adult vaccination in Italy in specific population groups

Session 5: Adult	Specific population groups:	Stefania Maggi
vaccination in Italy	older adults, HCW, pregnant	Claudio Costantino
in specific population	women, immunocompromised,	Angela Bechini
groups	migrants, young adults,	Laura Sticchi
	travellers	Silvia Declich
		Alessandro Ghelardi
		Andrea Rossanese

Questions/outcomes: What are specific vaccine recommendations or schedules (if any) for these population groups in Italy? If applicable, how have these recommendations changed over time? What strategies and services are in place to ensure that these groups receive the necessary vaccinations? How is Italy coordinating efforts with local health departments and community organizations to improve vaccination efforts for these groups? What support is provided to address the unique needs of these groups? What can be improved? What is the current vaccination rate among the target groups? Are vaccination rates increasing or decreasing? What are the key challenges in vaccinating these population groups in Italy? Are there notable successes or best practices in this populations that have improved vaccination rates or delivery? What are the future goals and initiatives to improve vaccination in these target groups?

5.1 Older Adults



In 2020, Europe's aging population became more pronounced, with 21% of the EU's population aged 65 or older, up from 16% in 2001. Italy, Greece, Finland, Portugal, Germany, and Bulgaria had the highest proportions of elderly citizens at 22-23%, while Ireland and Luxembourg had the lowest at 14-15%. The percentage of those over 80 almost doubled, from 3.4% to nearly 6% (from 4.2% to 7.4% in Italy).



Source: Italian National Institute of Statistics – Istat (<u>www.istat.it</u>), and Eurostat (<u>https://ec.europa.eu/eurostat).</u>

5.1.1 Veronese N, Vassallo G, Armata M, et al. <u>Multidimensional Frailty and</u> <u>Vaccinations in Older People: A Cross-Sectional Study.</u> Vaccines (Basel). 2022;10(4):555. Published 2022 Apr 3.

Abstract: It is known that influenza, herpes zoster, pneumococcal and pertussis infections may increase morbidity and mortality in older people. Vaccinations against these pathogens are effective in older adults. Frailty seems to be an important determinant of vaccination rates, yet data supporting this association are still missing. Therefore, we aimed to investigate the prevalence of four recommended vaccinations (influenza, herpes zoster, pneumococcal and diphtheria-tetanus-pertussis) and the association with multidimensional frailty assessed using a self-reported comprehensive geriatric assessment tool, i.e., the multidimensional prognostic index (SELFY-MPI). Older participants visiting the outpatient clinic of Azienda Ospedaliera Universitaria, Palermo, Italy were included. The SELFY-MPI questionnaire score was calculated based on eight different domains, while the vaccination status was determined using self-reported information. We included 319 participants from the 500 initially considered (63.8%). Vaccination against influenza was observed in 70.5% of the cases, whilst only 1.3% received the vaccination against diphtheria-tetanus-pertussis. Participants with higher SELFY-MPI scores were more likely to report vaccination against pneumococcus (45.6 vs. 28.3%, p = 0.01), whilst no significant differences were observed for the other vaccinations. In conclusion, the coverage of recommended vaccinations is low. Higher SELFY-MPI scores and vaccination status, particularly anti-pneumococcus, appear to be associated, but future studies are urgently needed for confirming that frailty is associated with vaccination status in older people.

5.1.2 Antonelli-Incalzi R, Blasi F, Conversano M, et al. <u>Manifesto on the Value</u> of Adult Immunization: "We Know, We Intend, We Advocate". Vaccines (Basel). 2021;9(11):1232. Published 2021 Oct 22.

Abstract: Immunization through vaccination is a milestone achievement that has made a tremendous contribution to public health. Historically, immunization programs aimed firstly to protect children, who were disproportionally affected by infectious diseases. However, vaccine-preventable diseases can have significant impacts on adult mortality, health, and quality of life. Despite this, adult vaccinations have historically been overlooked in favor of other health priorities, because their benefits to society were not well recognized. As the general population is aging, the issue of vaccination in older adults is gaining importance. In high-income countries, recommendations for the routine vaccination of older adults have been gradually introduced. The Italian National Immunization Plan is considered to be among the most advanced adult vaccination plans in Europe. However, available data indicate there is low adherence to vaccination recommendations in Italy. The COVID-19 pandemic has exposed the damage that can be caused by an infectious disease, especially among adults and individuals with comorbidities. The aim of this "Manifesto", therefore, is to provide an overview of the existing evidence on the value of adult vaccination, in the Italian context, with a call to action to healthcare providers and health authorities.

5.1.3 Contoli B, Possenti V, Minardi V, et al. <u>What Is the Willingness to</u> <u>Receive Vaccination Against COVID-19 Among the Elderly in Italy?</u> Data From the PASSI d'Argento Surveillance System. Front Public Health. 2021;9:736976. Published 2021 Nov 5.

Abstract: Introduction: Italy was one of the earliest countries to experience a severe COVID-19 epidemic and vaccinating the elderly, who constitute 23% of the population and have experienced the highest mortality rates, is a top priority. Estimating prevalences and understanding risk factors for COVID-19 vaccine hesitancy or refusal are important for development of targeted interventions. Methods: We used data from a specially developed COVID-19 module of PASSI D'Argento, an ongoing surveillance system of residents 65+ years of age to measure the prevalence and identify risk factors for hesitancy and refusal to receive the COVID-19 vaccine. We calculated multinomial regression relative risk ratios to examine the association between demographic characteristics, health status, COVID-19 attitudes and experiences and likely vaccine hesitancy and refusal. Results: Of the 1876 respondents, 55% reported they would accept vaccination and 16% would likely refuse; the remaining 29% were categorized as hesitant. Compared with the acceptance group, we identified several risk factors in common between the hesitancy group and the refusal group, including not having received vaccination against influenza during the previous flu season (hesitancy: RRR = 2.0; 95% CI 1.4-2.9; refusal: RRR = 12.1; 95%CI 7.6-19.4) and lower risk of having had a death from COVID-19 among family or friends (hesitancy: RRR = 4.8; 95%CI 2.0-11.4; refusal: RRR = 15.4; 95%CI 3.7-64.5). The hesitancy group was significantly more likely being worried and they did not know if consequences of the disease would be serious for them. Conclusion: Our findings show the importance of establishing and maintaining active contact between the preventive services, primary care providers and the population because trust is difficult to establish during an emergency like the COVID-19 pandemic. Italian public health is based on a capillary network of general practitioners and having them reach out to their patients who have not previously received influenza vaccine may be a useful strategy for targeting efforts to further encourage uptake of COVID-19 vaccination.



5.1.4 Calabrò GE, Tognetto A, Carini E, et al. <u>Strategies to Improve</u> <u>Vaccination among At-Risk Adults and the Elderly in Italy.</u> Vaccines (Basel). 2020;8(3):358. Published 2020 Jul 4.

Abstract: The World Health Organization (WHO), the United States (US) Centers for Disease Control and Prevention (CDC), the European Center for Disease Control (ECDC), and the immunization guidelines of many countries issue vaccination recommendations for adults and the elderly. However, the uptake of vaccination in these groups is generally low due to several reasons. The present study aimed to identify strategies implemented in Italy in unconventional settings to promote vaccination against influenza, pneumococcal, and herpes zoster virus (HZV) infections among these subjects, i.e., the at-risk adult population and the elderly. We conducted a literature review and a survey of experts. The literature search yielded seven strategies; all of these concerned influenza vaccination, while three also addressed pneumococcal and HZV vaccination. The survey of experts identified 15 strategies; 10 regarded influenza vaccination, while four regarded pneumococcal vaccination and one regarded HZV vaccination. Most of the strategies were implemented in hospital clinics and rest homes. Regarding influenza and pneumococcal vaccinations, the target population mainly comprised at-risk adults, while the elderly represented the main target population for HZV vaccination. Our results show that, in Italy, there are initiatives aimed at promoting vaccination in unconventional settings, but further efforts are required to assess their effectiveness and to further extend them.

5.2 Healthcare workers

5.2.1 Bianchi FP, Stefanizzi P, Di Lorenzo A, et al. <u>Attitudes toward influenza</u> vaccination in healthcare workers in Italy: A systematic review and <u>meta-analysis.</u> Hum Vaccin Immunother. 2023;19(3):2265587.

Abstract: Healthcare workers (HCWs) are among the at-risk groups for whom influenza vaccination is strongly recommended. To assess the proportion of Italian HCWs with positive attitudes toward influenza vaccination, we conducted a systematic review of relevant literature and a meta-analysis. Our focus was on the influenza seasons from 2017/18 to 2021/22. The prevalence of favorable attitudes toward vaccination varied, ranging from 12% during the 2017/18 influenza season to 59% in the 2020/21 season. The significant increase in the 2020/21 season can be attributed to adaptations necessitated by the COVID-19 pandemic. During the 2021/22 influenza season, there was a decline in vaccination coverage (37%), likely due to the absence of a robust preventive culture. Various strategies have been employed to enhance HCWs' attitudes to achieve higher vaccination rates, but none of them have demonstrated satisfactory results. Policymakers should consider implementing a policy of mandatory vaccination to ensure elevated vaccination coverage among HCWs.

5.2.2 Barchitta M, Basile G, Lopalco PL, Agodi A. <u>Vaccine-preventable diseases</u> and vaccination among Italian healthcare workers: a review of current <u>literature</u>. Future Microbiol. 2019;14:15-19.

Abstract: Protection of healthcare workers (HCWs) from biological hazards in the workplace has the added benefit of contributing to the quality of patient care and patient safety. Vaccinated HCWs act as a barrier against the spread of infections and maintain essential healthcare delivery during outbreaks. In Italy, specific recommendations for vaccination of HCWs are issued by the Ministry of Health within the framework of the National Immunization Prevention Plan. These recommendations provide advice regarding HCW vaccination for hepatitis B, influenza, pertussis, measles, mumps, rubella, varicella and tuberculosis. This

paper summarizes the current literature on vaccine-preventable diseases and vaccination among Italian HCWs.

5.2.3 Genovese C, Picerno IAM, Trimarchi G, et al. <u>Vaccination coverage in</u> <u>healthcare workers: a multicenter cross-sectional study in Italy</u>. J Prev Med Hyg. 2019;60(1):E12-E17. Published 2019 Mar 29.

Abstract: Introduction: In recent years, a phenomenon known as "vaccine hesitancy" has spread throughout the world, even among health workers, determining a reduction in vaccination coverage (VC). A study aimed at evaluating VC among healthcare workers (HCWs) in 10 Italian cities (L'Aquila, Genoa, Milan, Palermo, Sassari, Catanzaro, Ferrara, Catania, Naples, Messina) was performed. Materials and methods: Annex 3 of the Presidential Decree n. 445 of 28 December 2000 was used to collect information on the vaccination status of HCWs. The mean and standard deviation (SD) were calculated with regard to the quantitative variable (age), while absolute and relative frequencies were obtained for categorical data (sex, professional profile, working sector, vaccination status). The connection between VC and the categorical variables was evaluated by chi-square method (statistical significance at p < 0.05). The statistical analyses were performed by SPSS and Stata software. Results: A total of 3,454 HCWs participated in the project: 1,236 males and 2,218 females. The sample comprised: physicians (26.9%), trainee physicians (16.1%), nurses (17.2%) and other professional categories (9.8%). Low VC was generally recorded. Higher VC was found with regard to polio, hepatitis B, tetanus and diphtheria, while coverage was very low for measles, mumps, rubella, pertussis, chickenpox and influenza (20-30%). Conclusions: This study revealed low VC rates among HCWs for all the vaccinations. Measures to increase VC are therefore necessary in order to prevent HCWs from becoming a source of transmission of infections with high morbidity and/or mortality both within hospitals and outside.

5.2.4 Sassano M, Barbara A, Grossi A, et al. <u>La vaccinazione negli operatori</u> <u>sanitari in Italia: una revisione narrativa di letteratura [Vaccination</u> <u>among healthcare workers in Italy: a narrative review].</u> Ig Sanita Pubbl. 2019 Mar-Apr; 75(2):158-173.

Abstract: Vaccination of healthcare workers (HCWs) is a public health tool of the utmost importance and the Italian National Vaccine Prevention Plan (PNPV) 2017-2019 recommends several vaccinations in this population group. Nevertheless, vaccine hesitancy is influencing HCWs' attitude towards vaccination. Moreover, a large number of measles cases have been reported in Italy among HCWs in 2017 and 2018. In Italy there is no national registry for vaccinations, so data on vaccine coverage among HCWs are not readily accessible. The aim of this literature review is to describe the most recent data about vaccination coverage among HCWs in Italy. We also report studies that evaluated the effectiveness of strategies to increase influenza vaccine uptake. We included all studies conducted in Italy and published between 2008 and 2018, regarding vaccines recommended by the PNPV 2017-2019 (hepatitis B, influenza, pertussis, measles, mumps, rubella, varicella, and tuberculosis). Our findings confirm that low vaccination coverage levels among HCWs exist in several Italian regions and cities, highlighting a relevant gap towards targets set by the PNPV. Studies that evaluated the effectiveness of multicomponent interventions to increase vaccination coverage found only minimal to moderate increases in uptake levels. It is therefore crucial to tackle vaccine hesitancy in HCWs, by identifying effective strategies able to significantly increase vaccine coverage, in order to decrease the risk of nosocomial infections, prevent transmission of preventable diseases to patients, and reduce indirect costs related to HCW absenteeism due to illness.

5.3 Pregnant women

5.3.1 Brillo E, Tosto V, Buonomo E. <u>Interventions to increase uptake of</u> <u>influenza vaccination in pregnancy: A systematic review and meta-</u> <u>analysis.</u> Int J Gynaecol Obstet. 2023 Feb 6. doi: 10.1002/ijgo.14714. Epub ahead of print. PMID: 36748179.

Abstract: Background: Maternal influenza vaccination has been introduced in several countries to prevent influenza-related morbidity and mortality in pregnant women, fetuses, and infants too young to be vaccinated. Objectives: To analyze the available randomized controlled trials (RCTs) on the effectiveness of pregnant women-focused interventions to increase influenza vaccination uptake during pregnancy. Selection criteria: RCTs assessing the effectiveness of pregnant women-focused interventions in increasing influenza vaccination among pregnant women were included. Data collection and analysis: Two independent reviewers extracted data. A random-effects meta-analysis was conducted to estimate pooled odds ratios (ORs). Main results: Seven RCTs were selected. Overall, the interventions had a significant effect in increasing influenza vaccination during pregnancy compared with standard care (OR 1.78, 95% confidence interval [CI] 1.25-2.54; P = 0.001; I2 = 67%). However, subgroup analysis suggested that influenza vaccination uptake only was associated with educational interventions (OR 2.71, 95% CI 1.93-3.81; P < 0.001; I2 = 0%). Conclusions: We found that several educational interventions for pregnant women can effectively increase influenza vaccination uptake in this population. Specifically, pamphlets, websites, and brief one-to-one education can be effective tools.

5.3.2 Ferrari A, Moretti G, Corazza I, Mannella P, Simoncini T, Bonciani M. **Pregnancy vaccination predictive factors and uptake profiles among Italian women: A cross-sectional survey study on a large population.** Int J Gynaecol Obstet. 2023;162(1):105-115

Abstract: Objectives: To assess influenza and Tdap (tetanus, diphtheria, pertussis) vaccine coverage during pregnancy, explore key socioeconomic and maternity pathway-related predictors of vaccination, and detect specific patterns of vaccination uptake. Methods: The authors cross-sectionally analyzed selfreported data obtained from the systematic survey on the maternity pathways of Tuscany. They selected all pregnant women that completed from March 2019 to June 2022 the third-trimester questionnaire (n = 25 160), which included two dichotomous items on influenza and Tdap vaccination, as well as socioeconomic and pathway-related questions. Multilevel logistic models were performed to assess vaccination predictors and cluster analysis to identify vaccination patterns. Results: Vaccination coverage was higher for pertussis (56.5%) than for influenza (18.9%). The main predictors of vaccination were high socioeconomic status, attending private gynecologists, and receiving vaccine information. Three clusters were identified: cluster 1 included women receiving both Tdap and influenza vaccines; cluster 2 included women receiving no vaccinations; and cluster 3 included women receiving only the pertussis vaccine. Although women from cluster 3 were of middle to low education status, vaccine information was the main adherence determinant also in this group. **Conclusions**: Health workers and policymakers should focus on groups of pregnant women less prone to vaccination to promote vaccination information and encourage wider uptake and coverage.

5.3.3 Bruno S, Nachira L, Villani L, et al. <u>Knowledge and beliefs about</u> vaccination in pregnant women before and during the COVID-19 pandemic. Front Public Health. 2022;10:903557. Published 2022 Aug 4. doi:10.3389/fpubh.2022.903557 Abstract: Introduction: Vaccine hesitancy threatens the health of populations and challenges Public Health professionals. Strategies to reduce it aim to improve people's risk perception about vaccine-preventable diseases, fill knowledge gaps about vaccines and increase trust in healthcare providers. During pregnancy, educational interventions can provide a proper knowledge about safety and efficacy of maternal and childhood vaccinations. Fighting hesitancy and clarifying doubts is fundamental during the COVID-19 pandemic, which may have affected people's knowledge and beliefs toward vaccination. This study aimed at assessing if the advent of the pandemic was associated with changes in pregnant women's knowledge and beliefs toward vaccination, and trust in healthcare services. Methods: A repeated cross-sectional study was conducted through self-reported questionnaires in a Roman teaching hospital, where educational classes about vaccinations are routinely held as part of a birthing preparation course. Data were collected on a sample of pregnant women before and during the pandemic. Freeof-charge flu vaccinations were offered to all course participants and adherence to flu vaccination was assessed. Results: The proportion of pregnant women reporting that vaccines have mild side effects and that are sufficiently tested increased from 78.6 to 92.0% (p = 0.001) and from 79.4 to 93.2% (p = 0.001), respectively. There was a reduction from 33.0 to 23.3% (p = 0.065) in the proportion of those declaring that healthcare workers (HCWs) give information only on the benefits and not on the risks of vaccines, and a reduction from 27.3 to 12.1% (p = 0.001) in those reporting that vaccines are an imposition and not a free choice of mothers. Trust in National Health Service (NHS) operators slightly decreased. Among participants, the monthly flu vaccination adherence ranged from 50.0% in November to 29.2% January for 2019-20 flu season, and from 56.3% in September to 14.5% in January for 2020-21 flu season, showing a higher vaccination acceptance in the earlier months of 2020-21 flu season. Conclusions: The pandemic may have positively affected pregnant women's knowledge and opinions about vaccinations and trust in HCWs, despite a possible negative impact on their perceptions about NHS operators. This should inspire Public Health professionals to rethink their role as health communicators.

5.3.4 Scatigna M, Appetiti A, Pasanisi M, D'Eugenio S, Fabiani L, Giuliani AR. **Experience and attitudes on vaccinations recommended during pregnancy: survey on an Italian sample of women and consultant gynecologists.** Hum Vaccin Immunother. 2022;18(1):1-8.

Abstract: Active immunization in pregnancy is recommended for the influenza and the tetanus, diphtheria, and acellular pertussis (Tdap) vaccines. Evidence indicates vaccine effectiveness in preventing influenza-related hospitalizations and pertussis in early infancy. We investigate vaccine uptake in pregnant and non-pregnant women through a sample of young women and consultant gynecologists, along with the potential predisposing and/or enabling factors affecting attitudes to vaccination (knowledge, beliefs, barriers). A cross-sectional study was conducted between June and September 2019, with a sample of 251 women and 14 consultant gynecologists at the Local Health Authority (ASL01) of the Abruzzo Region (Italy), using an anonymous, self-report questionnaire survey. Among the participants, 5.6% of women had received influenza vaccination, 16.4% had received Tdap during pregnancy and only 1.2% had received both vaccines. The assessment of the psychometric attitudinal variables has suggested a more positive willingness to receive Tdap than influenza vaccine among women, as the former is considered more important for the maternal and neonatal health. Health care workers have reported vaccine safety concerns, lack of information, and misconceptions about the need for vaccination as barriers to immunization in pregnant women. The results of this study will contribute to defining the goals and strategies to increase vaccine uptake under the current recommendations, through promoting effective training programs for all health care workers involved (gynecologists, obstetricians, public health physicians).



5.3.5 Gabutti G, Cetin I, Conversano M, Costantino C, Durando P, Giuffrida S. **Experts' Opinion for Improving Pertussis Vaccination Rates in Adolescents and Adults: A Call to Action.** Int J Environ Res Public Health. 2022 Apr 6;19(7):4412.

Abstract: This article highlights the importance of diphtheria-tetanus-acellular pertussis (with reduced antigen content, dTap) vaccination in preventing pertussis, a respiratory infection that is still widespread and easily transmitted. In particular, it highlights the need to receive a booster vaccination throughout life to maintain high antibody levels, which decrease through time. This document collects the opinions that emerged from the comparison between major Italian experts in the field of vaccination. This working group was created to promote a "call to action", aimed at raising awareness among all institutions, public health authorities, and health workers involved in the vaccination process, about the importance of dTap vaccine administration and with the mindset of implementing the strategic vaccination plan provided by the National Vaccine Plan (NVP). In fact, despite this vaccine being included in the NVP, there are some issues attributable to the practice of vaccination (local health authorities, vaccination centers, occupational health services, gynecology centers, societies of work). Therefore, it is necessary that the Ministry defines the vaccination coverage objectives, identifies the groups of subjects who should receive the booster vaccine (subjects exposed to greater risk of infection, subjects over 60, pregnant women), and applies all the necessary measures to encourage the implementation of this practice.

5.3.6 Bonito B, Balzi D, Boccalini S, Bonanni P, Mereu G, Santini MG, Bechini A. Descriptive Observational Study of Tdap Vaccination Adhesion in Pregnant Women in the Florentine Area (Tuscany, Italy) in 2019 and 2020. Vaccines (Basel). 2021 Aug 26;9(9):955.

Abstract - Background: Tdap (Tetanus-Diphtheria-acellular Pertussis) vaccination is nowadays a worldwide-recommended practice to immunize pregnant women. The vaccine administration at the third trimester of pregnancy (as recommended by the WHO) would ensure antibody protection to both the mother and the newborn and has contributed to the significant drop of pertussis cases in infants. The aim of this observational study was to describe for the first time the socio-demographic characteristics and determinants of Tdap vaccination adhesion of pregnant women in the Florentine area. Methods: Information about parents' vaccination status, their citizenship, employment type and mothers' previous pregnancies and/or abortions were collected at the time of birth through the assistance birth certificates (CedAP) both for the years 2019 and 2020. This archive and the regional SISPC (Collective Prevention Healthcare Information System) linked using an anonymous unique personal identifier to retrieve the mother's vaccination status. Results: We found an overall Tdap vaccination adhesion of 43% in 2019 and 47.3% in 2020. Several socio-demographic parameters would determine an increased vaccination adhesion, including parents' geographical origin, mothers' age and educational background, as well as the number of previous deliveries, abortions or voluntary termination of pregnancy. Conclusions: Since not much data are available on this topic in Italy, this study may constitute the baseline information for Tdap vaccination adhesion in pregnant women in the Florentine area (Italy). Thus, future successful vaccination strategies may be designed accordingly.

5.3.7 Costantino C, Mazzucco W, Bonaccorso N, Cimino L, Conforto A, Sciortino M, Catalano G, D'Anna MR, Maiorana A, Venezia R, Corsello G, Vitale F. <u>Educational</u> <u>Interventions on Pregnancy Vaccinations during Childbirth Classes</u> <u>Improves Vaccine Coverages among Pregnant Women in Palermo's</u> <u>Province.</u> Vaccines (Basel). 2021 Dec 8;9(12):1455. **Abstract** - Maternal immunization is considered the best intervention in order to prevent influenza infection of pregnant women and influenza and pertussis infection of newborns. Despite the existing recommendations, vaccination coverage rates in Italy remain very low. Starting from August 2018, maternal immunization against influenza and diphtheria-tetanus-pertussis were strongly recommended by the Italian Ministry of Health. We conducted a cross sectional study to estimate the effectiveness of an educational intervention, conducted during childbirth classes in three general hospitals in the Palermo metropolitan area, Italy, on vaccination adherence during pregnancy. To this end, a questionnaire on knowledge, attitudes, and immunization practices was structured and self-administered to a sample of pregnant women attending childbirth classes. Then, an educational intervention on maternal immunization, followed by a counseling, was conducted by a Public Health medical doctor. After 30 days following the interventions, the adherence to the recommended vaccinations (influenza and pertussis) was evaluated. At the end of the study 326 women were enrolled and 201 responded to the follow-up survey. After the intervention, among the responding pregnant women 47.8% received influenza vaccination (+44.8%), 57.7% diphtheria-tetanus-pertussis vaccination (+50.7%) and 64.2% both the recommended vaccinations (+54.8%). A significant association was found between pregnant women that received at least one vaccination during pregnancy and higher educational level (graduation degree/master's degree), employment status (employed part/full-time) and influenza vaccination adherence during past seasons (at least one during last five years). The implementation of vaccination educational interventions, including counseling by healthcare professionals (HCPs), on maternal immunization during childbirth courses improved considerably the vaccination adherence during pregnancy.

5.3.8 Mazzilli S, Tavoschi L, Lopalco PL. <u>Tdap vaccination during pregnancy to</u> protect newborns from pertussis infection. Ann Ig. 2018 Jul-Aug; 30(4): 346-363.

Abstract: Background: Nowadays whooping cough (pertussis) represents one of the most prevalent vaccine-preventable diseases in Western countries; even more, it is currently on rise. In many countries, the use of acellular pertussis adult vaccine in combination with tetanus and diphtheria toxoids (Tdap) is recommended for women during pregnancy to protect newborns in the first months of life, when they are too young to be vaccinated. In Italy, vaccination of women during the third trimester of pregnancy is included in the national immunization programme (PNPV 2017-2019), though up to now, this vaccination strategy has not been efficiently implemented. Objective: In view of the public health importance of pertussis, particularly in young infants, we undertook this review to summarise the existing evidence on immunogenicity, effectiveness, safety and uptake of pertussis vaccine in expectant mothers to protect newborns from pertussis. Conclusion: There is an increasing evidence that supports the safety, immunogenicity and effectiveness of Triaxis® e Boostrix® pertussis vaccination during pregnancy to protect infants before they receive their primary immunisations. In particular, both vaccines showed 90% effectiveness in the reduction of pertussis disease and hospitalization in newborns, with 95% effectiveness in the reduction of deaths. In Italy, the implementation of antenatal vaccination against pertussis is needed to narrow the gap between the recommendation of the PNPV and the prevention strategies actually offered by the public health system. To reach a good level of vaccine coverage, providers' recommendations are critical. Hence, extensive education of vaccine givers and all primary and secondary healthcare professionals who have any contact with pregnant women is needed.



5.4 Immunocompromised

5.4.1 Martire B, Azzari C, Badolato R, et al. <u>Vaccination in</u> <u>immunocompromised host: Recommendations of Italian Primary</u> <u>Immunodeficiency Network Centers (IPINET) [published correction</u> <u>appears in Vaccine</u>. 2018 Nov 29;36(50):7753]. Vaccine. 2018;36(24):3541-3554.

Abstract: Infectious complications are a major cause of morbidity and mortality in patients with primary or secondary immunodeficiency. Prevention of infectious diseases by vaccines is among the most effective healthcare measures mainly for these subjects. However immunocompromised people vary in their degree of immunosuppression and susceptibility to infection and, therefore, represent a heterogeneous population with regard to immunization. To date there is no well-established evidence for use of vaccines in immunodeficient patients, and indications are not clearly defined even in high-quality reviews and in most of the guidelines prepared to provide recommendations for the active vaccination of immuno-compromised hosts. The aim of this document is to issue recommendations based on published literature and the collective experience of the Italian primary immunodeficiency centers, about how and when vac- cines can be used in immunocompromised patients, in order to facilitate physician decisions and to ensure the best immune protection with the lowest risk to the health of the patient.

5.5 Migrants

As of 1 st January 2022, the foreign population in Italy was 5 million 194 thousand. In four years, it increased by less than 200 thousand units. This slowdown was underpinned by both the reduction of incoming migration flows and the long-time lack of those regularisation measures that in the past had led to peaks in the registration of migrants. In order to fully understand the real dynamics of migration over the past few years, however, another aspect must be considered that has become relevant in our country, as it already did in other countries with a longer history of immigration: the acquisition of citizenship. Between 2011 and 2020, more than 1.25 million people obtained Italian citizenship, and it can be estimated that as of 1st January 2021, new citizens by acquisition of citizenship residing in Italy amounted to about 1.6 million. The population with migration background (foreigners and Italians by acquisition of citizenship), has continued to grow, although not at the same pace as in the past, reaching nearly 6.8 million residents as of 1st January 2021. In 2021, households with at least one foreigner are estimated to be 2.4 millions, 9.5 percent of total households: nearly three out of four have all foreign members, and just over one in four is mixed, that is, with foreign and Italian members. Over half of the households with at least one foreign member live in the North, about a quarter in the Centre and the remaining part in the South.

Source: Istituto Nazionale di Statistica (Italian national statistical institute)

5.5.1 Marchetti G, Russo ML, Scarso S, et al. <u>From vaccines to vaccinations</u> ...listen to the professionals involved on the vaccination of newly arrived migrants in Italy. Population Medicine. 2023;5(Supplement):A2041..

Abstract: Background: Provide equitable access to vaccination for all migrants, regardless of their nationality and migration status is essential to making progress towards universal health coverage. Access to Vaccination for Newly Arrived Migrants (AcToVx4NAM) is a project (Grant n 101018349, 3rd EU Health Programme) that aims at improving the vaccine literacy of the health system and

making access to vaccinations for migrants more equitable and guaranteed. Methods: Qualitative research has been carried out to identify barriers of italian vaccination system and possible solutions to overcome them. Focus groups and interviews were conducted with 17 professionals: vaccination planning experts, health, social professionals engaged in the topic of migrant vaccination. The results were analyzed using a thematic analysis linked to the framework produced by the project, which divided the vaccination process into five conceptual hubs: entitlement, reachability, adherence, achievement and evaluation. **Results**: In Italy, migrants are entitled to vaccinations, regardless of their legal status. Nevertheless, some differences in age, gender and migratory route directly influence the interception of migrants by Italian vaccination system. The compulsory vaccines for schooling and the pathways of the reception system are key opportunities offering the recommended vaccinations. Beyond these, the capability of the vaccination offers to reach migrants is very limited. The main strategies, that can be adopted to improve the vaccination offer, are the transversal promotion of vaccinations by all those who encounter migrants; building relationships of trust between service providers and the target population, especially through partnerships with NGO active on the issue. Conclusion: Vaccinations should be a multi-step process of protecting and promoting individual and community health, not just a single vaccine shot. Multi-sectoral alliances with multiple stakeholders are needed. Moreover, it seems that are not migrants who hard to reach, but the vaccination system that is unable to reach them.

5.5.2 Dalla Zuanna T, Del Manso M, Giambi C, Riccardo F, Bella A, Caporali MG, Dente MG, Declich S; <u>Italian Survey CARE Working Group. Immunization</u> <u>Offer Targeting Migrants: Policies and Practices in Italy</u>. Int J Environ Res Public Health. 2018 May 12;15(5):968.

Abstract: The unprecedented flow of migrants over the last three years places Italy in front of new issues regarding medical care from the rescue phase up to the integration into the national health services, including preventive actions. We used online questionnaires to investigate the Italian national and regional policies for immunization offer targeting asylum seekers, refugees, irregular migrants and unaccompanied minors. Another questionnaire was used to assess how these policies are translated into practice in migrant reception centres and community health services. Questionnaires were filled out at the national level, in 14 out of 21 Regions/Autonomous Provinces, and in 36 community health services and 28 migrant reception centres. Almost all responders stated that all vaccinations included in the National Immunization Plan are offered to migrant children and adolescents. The situation concerning adults is fragmented, with most of the Regions and local centres offering more vaccines than the national offer-which include polio, tetanus and measles-mumps-rubella. Data on immunized immigrants is archived at the regional/local level with different methods and not available at the national level. Further efforts to ensure consistency in vaccine provision and adequate mechanisms of exchanging data are needed to guarantee a complete vaccination offer and avoid unnecessary health actions, including unnecessary revaccination.

5.6 Young adults

5.6.1 Bogani G, Ghelardi A, Sopracordevole F, et al. <u>Human papillomavirus</u> (HPV) vaccination: a call for action in Italy [published online ahead of print, 2023 Mar 14]. Int J Gynecol Cancer. 2023;ijgc-2023-004275.

Abstract: Human papillomavirus (HPV) is the most common sexually transmitted infection. The implementation of primary prevention aims to reduce the burden of HPV infection and HPV-related disease. However, HPV-related diseases are still a



concern, even in high-income countries. Approximately 570 000 new cervical cancer cases are diagnosed in Italy every year. Prophylactic HPV vaccines have been developed to minimize the spread of HPV. Growing evidence supports the administration of HPV vaccines (even just one dose) in reducing the prevalence of HPV infection and HPV-related disease including cancers. HPV vaccines are characterized by a high level of efficacy (>95%) in women who are naïve to HPV; however, they do not increase clearance in patients with ongoing HPV infection. With more than 200 million doses administered to date, HPV vaccines are considered to be safe and effective at preventing HPV-related infections and cancers. In this review we aim to review the current evidence regarding HPV vaccination and to describe trends in HPV vaccination coverage in Italy. In Italy, vaccination against HPV has been included in the National Immunization Plan (NIP) since 2007-2008. Using data abstracted from the Italian Ministry of Health, we analyzed changes in HPV vaccination coverage. We observed that HPV vaccines are underutilized and coverage rates are decreasing. Looking at the target population (females and males aged 11-12 years) in Italy, a decrease in coverage rates was observed. A call for action, improved HPV awareness, and education are the key elements to enhance the widespread adoption of HPV vaccination.

5.6.2 Gabutti G, d'Anchera E, De Motoli F, Savio M, Stefanati A. <u>Human</u> <u>Papilloma Virus Vaccination: Focus on the Italian Situation.</u> Vaccines (Basel). 2021 Nov 23;9(12):1374.

Abstract: Human papilloma virus (HPV) is a viral agent whose transmission occurs mainly by sexual means. It causes different pathological conditions in both males and females, ranging from benign pathologies up to cancers. The introduction of vaccination has certainly had a major impact in terms of reducing the incidence of both HPV infections and diseases but in the European Union and the European Economic Area (EU/EEA) there are still about more than 13,000 deaths due to cervical cancer each year. To date in Europe and in Italy there are three vaccines available (bi-, tetra-, and nonvalent vaccines). The vaccination campaign started irregularly in Europe and Italy in 2007, with pre-adolescent girls as the primary target. Later, other cohorts were introduced such as 12-year-old boys, additional cohorts of >25-year-old women, women who already underwent cervical surgery and other subjects entitled to free vaccination. The COVID-19 pandemic has strongly impacted on public health services, particularly on vaccinations that, especially during the first pandemic phase, have been often delayed and/or canceled. The most affected vaccinations by the pandemic have been the nonmandatory ones, particularly those addressing the adolescent and adult population, such as immunization against papillomavirus. To date the achievement of the coverage target set by the Italian National Immunization Plan (NIP) has not yet been achieved. The aim of this work is to summarize the current situation in Italy and to discuss the strategies that have been implemented to increase overall vaccination coverage rates.

5.6.3 Trucchi C, Amicizia D, Tafuri S, et al. <u>Assessment of Knowledge,</u> <u>Attitudes, and Propensity towards HPV Vaccine of Young Adult Students</u> <u>in Italy.</u> Vaccines (Basel). 2020;8(1):74. Published 2020 Feb 7.

Abstract: Background: Human Papillomavirus (HPV) is a common sexually transmitted infection (STI), representing the main cause of genital warts and cervical cancer. This cross-sectional study evaluated knowledge and attitudes about HPV infection, related diseases, and prevention and propensity towards HPV vaccine among undergraduate students. Methods: An online and written survey about HPV and its prevention, targeted to young adults of both genders, was addressed to students attending health sciences and other schools at Universities of Genoa and Bari. Results: The overall median knowledge and attitude scores were 56.3% (25-75 p = 40-68.8%) and four out of five (25-75 p = 4-5), respectively.

In the multivariate analysis, attending a health sciences university, using social networks ≤ 2 h a day, a history of STI, having heard about HPV and HPV vaccine previously resulted as predictors of higher knowledge scores. Having heard about HPV previously also predicted a high attitude score, together with a perceived economic status as good. Having Italian and healthcare worker parents, being employed, and following a specific diet, instead, predicted lower attitude score. Conclusions: Poor knowledge and good attitudes were found among undergraduates about HPV. In order to increase HPV vaccine compliance and the counselling skills of future healthcare workers, the improvement of training on HPV is needed.

5.7 Travelers

5.7.1 Ecarnot F, Maggi S, Michel JP, Veronese N, Rossanese A. <u>Vaccines and</u> <u>Senior Travellers.</u> Front Aging. 2021 Jul 9;2:677907.

Abstract: The World Tourism Organization estimated the number of international tourist arrivals to be 1.2 billion in 2016, an increase of 46 million over the previous year, a figure that has been rising constantly for 7 consecutive years. In this context, a long list of vaccines are dispensed and administered in travel clinics around the world. There are two main steps in immunizing travelers, namely, to update routine vaccinations and, second, to provide travel-specific immunization. For the first step, knowledge of a patient's previous immunizations and personal medical history is necessary. For the second step, considerably more issues must be covered, including obtaining information about the patient's projected itinerary, mode of travel, planned living conditions during the stay, and purpose of travel. This review focuses on three major and common travel vaccines, namely, yellow fever, dengue, and rabies. It should be remembered that vaccines exist both to protect the visited populations and the travelers, plus those the travelers come in contact with on their return from endemic areas. Travel should be used as a good opportunity to update routine vaccines.

Keynote 1: New platforms and technologies to develop adult vaccines

Keynote lecture New tech	New platforms and technologies to develop adult	Rino Rappuoli
	vaccines	

Questions/outcomes: What innovative platforms or technologies are being explored for the development and delivery of adult vaccines? Are there advancements in vaccine formulation, delivery methods, or production techniques? How do these new approaches contribute to improving the effectiveness and accessibility of adult vaccines? What challenges need to be overcome in adopting and scaling up technologies for adult vaccination? Are there promising adult vaccines in the development pipeline that leverage novel platforms or technologies?

KN1.1 Koff WC, Rappuoli R, Plotkin SA. <u>Historical Advances in Structural and</u> <u>Molecular Biology and How They Impacted Vaccine Development.</u> J Mol Biol. 2023 Jul 1;435(13):168113.

Vaccines are among the greatest tools for prevention and control of disease. They have eliminated smallpox from the planet, decreased morbidity and mortality for major infectious diseases like polio, measles, mumps, and rubella, significantly blunted the impact of the COVID-19 pandemic, and prevented viral induced cancers



such as cervical cancer caused by human papillomavirus. Recent technological advances, in genomics, structural biology, and human immunology have transformed vaccine development, enabling new technologies such as mRNA vaccines to greatly accelerate development of new and improved vaccines. In this review, we briefly highlight the history of vaccine development, and provide examples of where advances in genomics and structural biology, paved the way for development of vaccines for bacterial and viral diseases.

KN1.2 Verma SK, Mahajan P, Singh NK, Gupta A, Aggarwal R, Rappuoli R, Johri AK. **New-age vaccine adjuvants, their development, and future perspective**. Front Immunol. 2023 Feb 24;14:1043109.

In the present scenario, immunization is of utmost importance as it keeps us safe and protects us from infectious agents. Despite the great success in the field of vaccinology, there is a need to not only develop safe and ideal vaccines to fight deadly infections but also improve the quality of existing vaccines in terms of partial or inconsistent protection. Generally, subunit vaccines are known to be safe in nature, but they are mostly found to be incapable of generating the optimum immune response. Hence, there is a great possibility of improving the potential of a vaccine in formulation with novel adjuvants, which can effectively impart superior immunity. The vaccine(s) in formulation with novel adjuvants may also be helpful in fighting pathogens of high antigenic diversity. However, due to the limitations of safety and toxicity, very few human-compatible adjuvants have been approved. In this review, we mainly focus on the need for new and improved vaccines; the definition of and the need for adjuvants; the characteristics and mechanisms of human-compatible adjuvants; the current status of vaccine adjuvants, mucosal vaccine adjuvants, and adjuvants in clinical development; and future directions.

KN1.3 Romano MR, Berti F, Rappuoli R. <u>Classical- and bioconjugate vaccines:</u> <u>comparison of the structural properties and immunological response</u>. Curr Opin Immunol. 2022 Oct;78:102235.

Glycoconjugate vaccines have been effectively used in humans for about 40 years. The glycoconjugates have substituted plain polysaccharide vaccines that have many limitations, especially in infants. The covalent linking of protein to carbohydrates has allowed to overcome T-cell-dependent type-2 response of sugars. Glycoconjugates can show improved responses (over plain saccharides) also in elderly and immunocompromised (and depending on the endpoint also in immunocompetent adults), but infants represent the main target of these vaccines because of their unique immune system. Differently from the plain polysaccharide vaccines, the glycoconjugates are also able to induce Immunoglobulin G (IgG) response in infants. Recently, vaccines containing conjugates directly expressed in Escherichia coli (bioconjugates) have been tested in the clinic against Shigella dysenteriae type 1, uropathogenic E. coli, and Streptococcus pneumoniae. Here, we report an overall comparison of classical- and bioconjugate vaccines in terms of the structural properties and the immunological response elicited.

KN 1.4 Black S, De Gregorio E, Rappuoli R. <u>Developing vaccines for an aging</u> population. Sci Transl Med. 2015 Apr 1;7(281):281ps8.

The demographics of the world's population are changing, with many adults now surviving into their 80s. With this change comes the need to protect the aging and other underserved populations not only against infectious diseases but also against cancer and other chronic conditions. New technologies derived from recent advances in the fields of immunology, structural biology, synthetic biology, and genomics have brought a revolution in the vaccine field. Among them, vaccine adjuvants have the potential to harness the immune system to provide protection



against new types of diseases, improve protection in young children, and expand this protection to adults and the elderly. However, in order to do so we need also to overcome the nontechnical challenges that could limit the implementation of innovative vaccines, including controversies regarding the safety of adjuvants, increasing regulatory complexity, the inadequate methods used to assess the value of novel vaccines, and the resulting industry alienation from future investment. This Perspective summarizes the outcome of a recent multidisciplinary symposium entitled "Enhancing Vaccine Immunity and Value," held in Siena, Italy, in July 2014, that addressed two related questions: how to improve vaccine efficacy by using breakthrough technologies and how to capture the full potential of novel vaccines.

Keynote 2: Pricing vaccines and drugs in Europe: worth differentiating?

Keynote lecture	Pricing vaccines and drugs in Europe: worth differentiating?	Livio Garattini
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KN2.1 Garattini L, Padula A, Freemantle N. **Pricing vaccines and drugs in Europe: worth differentiating?** Eur J Health Econ. 2021 Dec;22(9):1345-1348.

Abstract: The COVID-19 pandemic has recently brought to the forefront the vital importance of vaccines, of which Europe is the world leader in both development and manufacturing. Although vaccines are considered pharmaceuticals from a regulatory viewpoint, there are substantial differences between vaccines and other pharmaceutical products in terms of both health and economics. In this paper, the authors compare drugs and vaccines using a sort of '6P scheme', adding Patient and Patent to the well-known 4P (Product, Place, Promotion, Price) business tool for casting light on the major differences between the two types of products. The final aim is to put forward an original proposal for pricing vaccines in European countries.

Keynote 2.2 Curto A, van de Vooren K, Garattini L. <u>Market approval for drugs</u> <u>in the EU: time to change direction?</u> Eur J Health Econ. 2017 Nov;18(8):933-936.

Abstract: Since 1995, the European Medicines Agency (EMA) has been the European Union (EU) authority responsible for assessing the efficacy, safety and quality of all medicines on the entire European market (around 500 million inhabitants). Set up in London to harmonise the work of the national regulatory authorities (NRAs) for pharmaceuticals, the EMA serves 28 EU Member States at present, as well as the three countries (Iceland, Liechtenstein and Norway) included in the European Economic Area (EEA). Since by law the EMA can only be based in a EU Member State, the result of the recent British referendum to leave the Union creates an unprecedented situation. Although the EMA recently claimed that this will not affect its procedures and work-streams at all, given the current political and economic crisis in the EU, it is hard to imagine that any such move will merely change only the EMA's postcode. In this paper, the author analyse the present organisation of the EMA and its network of NRAs to explore future prospects for a new European pharmaceutical regulatory policy. Since it has become common practice for EU public authorities to publish annual reports online for the sake of transparency, we conducted a web-based search to summarise the main features of the EMA and the NRAs of the five major Western EU countries: Germany, France, Italy, Spain and the Netherlands.



Keynote 2.3 Curto A, Duranti S, Van de Vooren K, Garattini L. <u>Vaccination</u> <u>planning and vaccine prices in a decentralizing country - Italy.</u> Expert Rev Pharmacoecon Outcomes Res. 2014 Apr;14(2):195-202.

Abstract: This paper gives an overview, in the era of regionalization, of vaccination planning and vaccine price management in the Italian National Health Service. In particular, we analyse the current National Vaccination Plan (NVP) and end with two "case studies" of the latest entries in the Italian vaccination calendar, comparing HPV and PCV vaccines, the most expensive ones in Italy at present. The present NVP put an end to the long period without official documents for vaccination planning, mainly reflecting the controversial relationships between the national and regional tiers. However, this document is not really useful for planning from the health professionals' point of view, lacking epidemiological information. Thorough systematic assessment of the new, expensive vaccines is becoming a real priority in the light of current financial difficulties. In this perspective, the two examples discussed have given different results so far, starting from a heterogeneous situation of potential market competition.