

Knowledge of, and attitudes towards, adult vaccination among General Practitioners in Piedmont, Italy: results from a cross-sectional study

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Parole chiave: *Vaccinazione degli adulti, influenza, malattia invasiva da pneumococco, pertosse, herpes zoster, Italia.*

Abstract

Background. “Life-course immunization” is increasingly recognized as important. In Italy, adults are recommended to receive influenza; pneumococcal; tetanus toxoid, reduced diphtheria toxoid, acellular pertussis (Tdap); and herpes zoster (HZ) vaccines at various ages.

Study design. Cross-sectional study.

Methods. To study the knowledge and attitudes of Italian general practitioners (GPs) towards adult vaccination, we surveyed 335 GPs in Piedmont from December 2019 through March 2020; and compared the results by GPs’ age (≤ 50 vs > 50 years).

Results. The most common vaccination information source was the regional/local educational courses (72.8%), with older vs younger GPs more likely to attend (79.4% vs 64.4%; $p=0.002$). Approximately half felt that they needed further information on vaccine co-administration (55.5%), duration of protection (49.6%), and safety/tolerability (48.7%), with older vs younger GPs being more interested in safety/tolerability. Overall, most respondents (86.0%) felt that information for the patient would most engage them, and 68.1% planned to co-administer vaccines. Respondents felt most comfortable proposing influenza, but were also comfortable about pneumococcal/Tdap/HZ vaccination. However, younger vs older GPs were more comfortable about proposing Tdap and HZ. The most common ways to inform patients about influenza or pneumococcal/Tdap/HZ vaccination eligibility were personally during a visit (42.7% or 54.3%, respectively) or via an information poster (30.7% or 17.9%).

Conclusions. The surveyed GPs had favorable attitudes towards adult vaccination and were interested in ongoing education.

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Introduction

Vaccination has contributed to dramatic reductions in the burden of vaccine-preventable diseases (VPDs) and to increases in life expectancy (1, 2). However, many thousands of adults still die from VPDs (3, 4), particularly older adults (5, 6), who are at higher risk of infection due to immunosenescence (diminished humoral and cellular immune responses due to a progressive decline with age (7-9)). Given that the population is aging (1, 10), this problem is likely to increase.

Data on the burden of VPDs in Italy highlight the extent of the problem there. During the 2018-2019 influenza season, there were an estimated 8.1 million cases of influenza-like illness, with a peak incidence of 14.1 cases per 1,000 population (11). Further, influenza and its complications have been estimated to result in approximately 8,000 deaths each year (12), most of which are likely to be among those aged ≥ 65 years (5). In 2018, 1,555 cases of invasive pneumococcal disease (IPD) were reported, of which 911 (58.6%) were among those aged ≥ 65 years; with notification rates of 2.57/100,000 (overall) and 6.68/100,000 (≥ 65 years) (6). There were 212 deaths due to IPD, of which 162 (76.4%) were among those aged ≥ 65 years (6). In 2018, there were 962 reported cases of pertussis, of which 148 were among those aged ≥ 15 years; with notification rates of 1.59/100,000 (overall) and 0.28/100,000 (≥ 15 years) (6). However, this is likely a gross underestimation, as a seroprevalence study from 2012-2013 indicated that 5.0% of Italian adults had been infected with pertussis in the last year (13). Although pertussis in adulthood is not generally serious, approximately 7% of those aged ≥ 15 years with pertussis required hospital care in 2016 (14). Lastly, approximately 1 in every 3 to 4 people in Europe will develop herpes zoster (HZ) in their lifetime (15); and in Italy, the estimated

incidence rate of HZ among people aged ≥ 65 years is around 8.2 per 1,000 person-years (16).

In order to reduce the burden of these VPDs in Italian adults, influenza vaccination is recommended yearly for everyone aged ≥ 65 years, pneumococcal and HZ vaccines are recommended for everyone aged ≥ 65 years, and tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccine is recommended every 10 years for all adults (17). At-risk adults are recommended to receive various vaccinations (17-19).

In Italy, general practitioners (GPs) usually administer influenza vaccines, although pharmacists can also play a role (20, 21). In Piedmont (north-west Italy), GPs also usually administer pneumococcal and HZ vaccines. GPs play an important role in providing vaccination information to their patients (22-24), so their knowledge and involvement in adult vaccination are crucial for improving coverage and reducing vaccine hesitancy. Vaccine hesitancy is a global phenomenon that has increased in recent years and is considered to be a public health concern as it is responsible for an increasing risk of VPDs (25, 26). Healthcare professionals (including GPs and pharmacists) are the most trusted source of information on vaccination for most patients, so they can play an important role in increasing adherence to vaccination (21, 25, 26). For this reason, ongoing medical education is a key factor. Indeed, GPs in the Piedmont region organized a structured training event on adult vaccination in 2019. Another key factor is the national vaccination registry, which can be a useful tool for monitoring adult vaccination. In Piedmont and in other Italian regions, regional registries are available in 2021 (27, 28).

Although studies have examined Italian GP's attitudes to influenza vaccination (29-31), there is a paucity of reliable data on the knowledge, awareness, and behaviors of

Plain Language Summary

What is the context?

- Thousands of adults die each year from vaccine-preventable diseases, and even more are hospitalized for treatment.
- In Italy, national health authorities recommend that adults receive the influenza (flu), pneumococcal, Tdap (tetanus, diphtheria, and whooping cough), and herpes zoster (shingles) vaccines.
- General practitioners (GPs) play an important role in counselling patients and are crucial for improving adult vaccination coverage.

What is new?

- We surveyed 335 GPs in Piedmont, Italy, from December 2019 to March 2020 to study their knowledge and attitudes about adult vaccination.
- We found that:
 - Educational courses were doctors' main source of information, and GPs over 50 years of age were more likely to attend;
 - Only half the GPs possessed accurate knowledge of the epidemiology of flu and pneumococcal diseases; this percentage was lower for whooping cough (27.5%) and shingles (19.7%);
 - Most GPs expressed interest in patient-focused information, and approximately half felt they needed more information on vaccine co-administration, duration of protection, and safety and tolerability;
 - GPs felt more comfortable proposing flu vaccination to their patients, but were also comfortable about pneumococcal, Tdap, and shingles vaccines;
 - Office visits were the most common way to inform patients about vaccination.

What is the impact?

- Overall, the GPs felt comfortable proposing vaccines to their patients.
- They showed strong interest in medical education about adult vaccination and they would like to further deepen their knowledge.

Figure 1 - Plain language summary

Italian GPs towards other adult vaccinations (32). The objective of the current cross-sectional study was to further assess the knowledge of, and attitudes towards, adult vaccination of GPs, with a specific focus on the Piedmont Region. This would provide useful information for the improvement of the role of GPs in adult vaccination. Figure 1 summarizes the context, outcomes, and impact of this study for healthcare professionals.

Methods

A cross-sectional study was carried out by the Piedmont section of the Federazione Italiana Medici di Medicina Generale (Italian Federation of General Practitioners) using the *SurveyMonkey* platform. The invitation to participate in this online study was sent by e-mail during December 2019

through March 2020 to the mailing list of the GPs working in Piedmont. Specific informed consent to participate in this study was not required as the mailing list only included GPs who had already provided their consent. Furthermore, any data collected were not sensitive personal data and a specific disclaimer was inserted to explain that any data collected were anonymized, hence ethical approval was not required. Participants did not receive any fee or gift to participate in the study.

The survey consisted of 17 questions (see Supplementary Text). The answers provided by the participants are displayed as anonymous, aggregated results. Only answers from participants who provided answers to all the questions were included. A descriptive analysis of the responses chosen by the GPs who filled out the questionnaire was conducted. We report frequencies and percentages for categorical questions and

means and standard deviations (SDs) for questions that required a score. For questions that had several answers, the frequencies were calculated for each answer.

Responses are compared by GP age (≤ 50 vs > 50 years) to evaluate whether there were any differences by level of experience. Statistical significance was evaluated using the χ^2 test for categorical variables and the Student's t-test for continuous variables. The statistical package STATA /IC 15.1 was used for the data analysis and the significance level was set at $p < 0.05$.

Results

Respondents

From around 3,000 GPs who were invited to participate, a total of 335 questionnaires were completed, representing approximately 9% of the region's GPs. Approximately half of the respondents (56.4%) were aged > 50 years, 61.5% had $> 1,000$ patients, and most (71.9%) were based in Turin (Table 1). Overall, 46.0% of respondents had attended a regional/local educational course on adult vaccination during September to November 2019, although this was less likely among the younger respondents (≤ 50 vs > 50 years: 34.9% vs 54.5%; $p < 0.001$). Among those who had not attended such a course, most (170/181 [93.9%]) responded that they were anyway interested in the topic.

Overall, the most commonly used vaccination information sources were the regional/local educational courses (72.8%) and the online continuing medical education (WebCME) (53.7%) (Figure 2). Younger GPs were less likely than older GPs to use regional/local educational courses to update their vaccination information (64.4% vs 79.4%; $p = 0.002$), but more likely to use WebCME (61.0% vs 48.1%; $p = 0.020$), national congresses (19.2% vs 10.1%; $p = 0.026$), or social networks (12.3% vs 3.2%; $p = 0.002$).

Knowledge of VPD epidemiology

Multiple-choice questions relating to the epidemiology of the VPDs indicated that respondents were most knowledgeable about IPD (55.2% correct), followed by influenza (44.2% correct), pertussis (27.5% correct), and then HZ (19.7% correct) (see questions 6 to 9 in Supplementary Text, with correct answers in bold). GPs who responded incorrectly were more likely to overestimate the rate of notified IPD cases (32.5%) and the number of notified pertussis cases (72.5%) but underestimate the number of influenza-related deaths (35.5%) and the lifetime risk of HZ (80.3%). Knowledge about VPD epidemiology was generally similar in the two age cohorts, although younger respondents were more likely to correctly answer that the lifetime risk of HZ was $\sim 1/3$ (24.7% vs 15.9%), with older GPs more likely to think the risk was only $\sim 1/100$ (28.0% vs 11.0%) ($p < 0.001$).

Vaccination attitudes and practices

Approximately half of the respondents felt that they needed further information on vaccine co-administration (55.5%), duration of protection (49.6%), and safety and tolerability (48.7%) (Table 1). Vaccine safety and tolerability was more frequently cited by older vs younger GPs (55.6% vs 39.7%; $p = 0.004$), while interaction with other therapies was more frequently mentioned by younger vs older GPs (45.2% vs 25.4%; $p < 0.001$).

Overall, most respondents (86.0%) felt that information for the patient was the aspect that they thought would most engage them (Table 1). After this, more younger vs older GPs were interested in vaccine registration (30.1% vs 20.1%; $p = 0.040$), while more older vs younger GPs were interested in the management of adverse events (20.1% vs 11.0%; $p = 0.025$).

Most respondents (68.1%) said that they plan to co-administer multiple vaccines in the same session, with little difference by age (Table 1). The most important age groups

Table 1 – GPs' characteristics and responses, overall and by age

	Overall (N=335)	GP age		p-value
		≤50 years (n=146)	>50 years (n=189)	
What age group do you belong to? - n (%)				–
≤50 years	146 (43.6)	146 (100)	0	
>50 years	189 (56.4)	0	189 (100)	
How many patients do you have? - n (%)				<0.001
≤1,000	57 (17.0)	32 (21.9)	25 (13.2)	
>1,000	206 (61.5)	44 (30.1)	162 (85.7)	
I am a trainee doing primary care replacements	72 (21.5)	70 (47.9)	2 (1.1)	
What is your province? - n (%)				0.676
Turin	241 (71.9)	98 (67.1)	143 (75.7)	
Cuneo	44 (13.1)	22 (15.1)	22 (11.6)	
Alessandria	19 (5.7)	9 (6.2)	10 (5.3)	
Novara	11 (3.3)	7 (4.8)	4 (2.1)	
Asti	8 (2.4)	5 (3.4)	3 (1.6)	
Biella	5 (1.5)	2 (1.4)	3 (1.6)	
Vercelli	4 (1.2)	2 (1.4)	2 (1.1)	
Verbano-Cusio-Ossola	3 (0.9)	1 (0.7)	2 (1.1)	
During September to November 2019, did you attend any adult vaccination educational courses organized by regional or local institutions? - n (%)				<0.001
Yes	154 (46.0)	51 (34.9)	103 (54.5)	
No	181 (54.0)	95 (65.1)	86 (45.5)	
On which of these issues do you need further information to best carry out vaccination counseling with your patients? (>1 answer possible) - n (%)				
Co-administration of multiple vaccines	186 (55.5)	78 (53.4)	108 (57.1)	0.508
Duration of protection	166 (49.6)	79 (54.1)	87 (46.0)	0.087
Safety and tolerability of vaccines	163 (48.7)	58 (39.7)	105 (55.6)	0.004
Side effects related to multiple vaccines (e.g. Tdap)	127 (37.9)	54 (37.0)	73 (38.6)	0.424
Interaction with other therapies	114 (34.0)	66 (45.2)	48 (25.4)	<0.001
Usefulness of vaccines	60 (17.9)	24 (16.4)	36 (19.0)	0.319
Which of the following aspects do you think will engage you most? (>1 answer possible) - n (%)				
Information for the patient	288 (86.0)	125 (85.6)	163 (86.2)	0.875
Vaccine supply	86 (25.7)	39 (26.7)	47 (24.9)	0.706
Vaccine registration	82 (24.5)	44 (30.1)	38 (20.1)	0.040
Vaccine administration	57 (17.0)	22 (15.1)	35 (18.5)	0.464
Management of adverse events	54 (16.1)	16 (11.0)	38 (20.1)	0.025
Do you plan to co-administer two or more vaccines in one session? - n (%)				0.391
Yes	228 (68.1)	103 (70.5)	125 (66.1)	
No	107 (31.9)	43 (29.5)	64 (33.9)	
During the influenza campaign, which age groups of your patients do you plan to prioritize for vaccination? (≤2 options) - n (%)				
<50 years	6 (1.8)	1 (0.7)	5 (2.6)	0.238
50-65 years	27 (8.1)	8 (5.5)	19 (10.1)	0.113
66-75 years	306 (91.3)	130 (89.0)	176 (93.1)	0.223
>75 years	233 (69.6)	108 (74.0)	125 (66.1)	0.151

GP: general practitioner; n: number of participants in assigned group; N: total number of participants; Tdap: tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis. Sum of percentages may not equal 100.0% due to rounding.

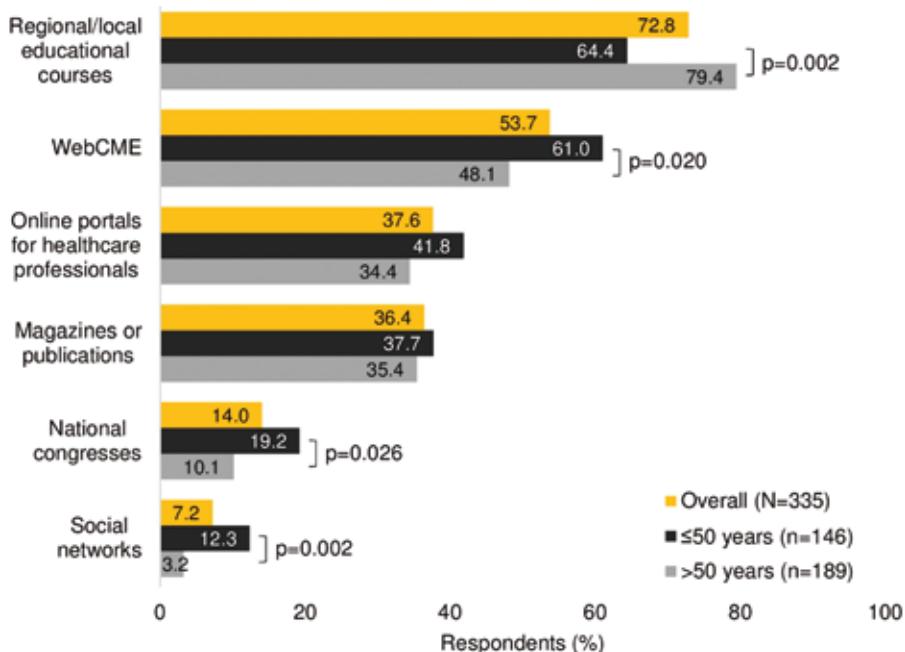


Figure 2 – GPs' responses to "What sources of information do you most use to update yourself about vaccinations? (>1 answer possible)", overall and by age

CME: continuing medical education; GPs: general practitioners; n: number of participants in assigned group; N: total number of participants.

to target for influenza vaccination (which is recommended for everyone aged ≥ 65 years) were felt to be 66–75 years (91.3%) and >75 years (69.6%), with little difference by GP age.

Respondents felt most comfortable about proposing influenza vaccination (mean [SD]: 3.79 [0.46] on a scale of 1 [not] to 4 [completely]), but were also comfortable proposing pneumococcal (3.54 [0.63]), Tdap (3.51 [0.73]), and HZ (3.19 [0.81]) vaccines (Figure 3). Overall, the proportions of respondents who responded 4 & 3, respectively, were 80.6% & 18.5% for influenza, 60.5% & 34.4% for pneumococcal, 63.7% & 25.5% for Tdap, and 41.2% & 39.1% for HZ vaccination. Younger GPs were more comfortable than older GPs at proposing Tdap (3.62 [0.64] vs 3.42 [0.78]; p=0.007) and HZ (3.31 [0.76] vs 3.09 [0.84]; p=0.008) vaccines.

Respondents felt that patients would be most accepting of influenza vaccines (85.1%), followed by pneumococcal (50.7%), Tdap (43.0%), and HZ (29.9%) vaccines. However, more older vs younger GPs felt that patients would be accepting of influenza (93.1% vs 74.7%; p<0.001) and pneumococcal (58.7% vs 40.4%; p=0.001) vaccination, while more younger vs older GPs felt that patients would accept Tdap vaccination (52.1% vs 36.0%; p=0.028).

The most common ways to inform patients that they were eligible for influenza vaccination were personally during a visit (42.7%) or via an information poster in the office (30.7%) (Figure 4a). For the other three vaccinations, more GPs responded that they would inform patients during a visit (54.3%), with less using a poster (17.9%) (Figure 4b). Vaccination organization differed little by GP age.

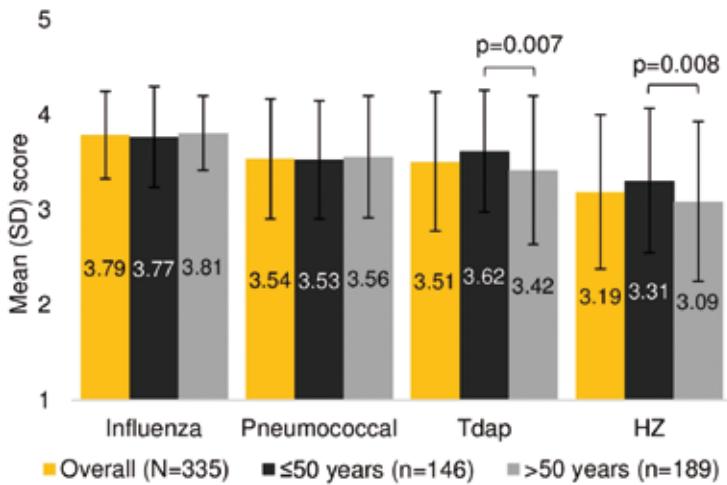


Figure 3 – GPs' responses to "Could you rate how comfortable you feel about proposing the following vaccinations to those eligible on a scale of 1 (not at all comfortable) to 4 (completely comfortable)?", overall and by age
 GPs: general practitioners; HZ: herpes zoster; n: number of participants in assigned group; N: total number of participants; SD: standard deviation; Tdap: tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis.

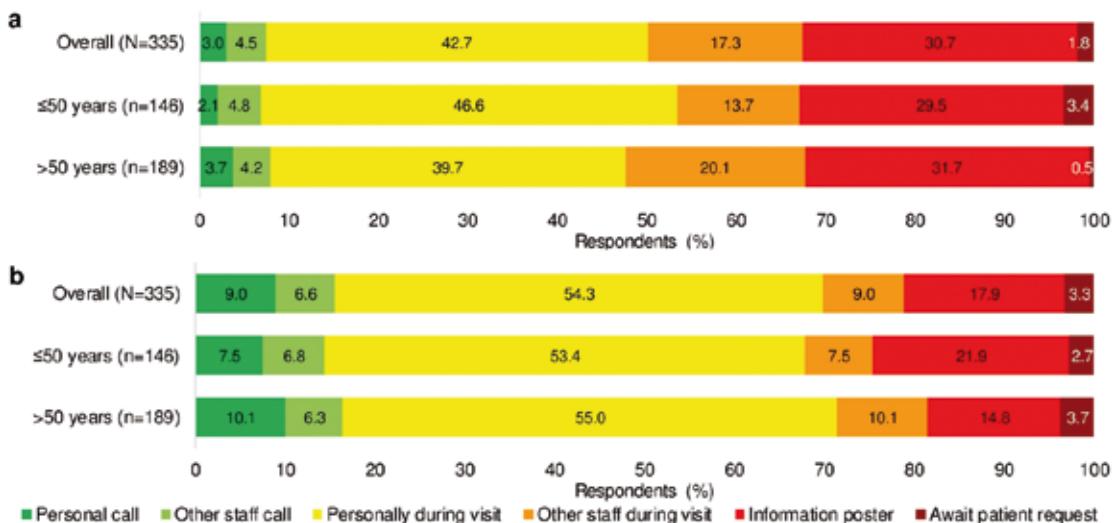


Figure 4 – GPs' responses to (a) "What is the main way in which you organize influenza vaccination?" and (b) "What is the main way in which you organize/plan to organize the other vaccinations (pneumococcal/Tdap/HZ)?", overall and by age. Please see Supplementary Text for full responses
 GPs: general practitioners; HZ: herpes zoster; n: number of participants in assigned group; N: total number of participants; Tdap: tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis.
 Sum of percentages may not equal 100.0% due to rounding.

Discussion

In this cross-sectional study of the knowledge of, and attitudes towards, adult vaccination among 335 GPs from Piedmont, Italy, 46.0% had attended a regional/local educational course on adult vaccination during September to November 2019, with 72.8% reporting that such courses were their main source of information on this topic. Knowledge of the epidemiology of the VPDs was generally poor but was better for IPD and influenza than for pertussis and HZ.

Most GPs felt that information for the patient was the aspect that they thought would most engage them; and around half of the respondents felt that they needed further information on vaccine co-administration, duration of protection, and safety and tolerability. Similarly, in a small study of 73 GPs from Parma, Italy, GPs had knowledge gaps relating to vaccine co-administration, and pneumococcal and HZ vaccines in general (32). Hence, future educational courses should focus on these aspects. In Italy, GPs are the main source of vaccine information (22), so their role is crucial for the success of adult vaccination. Interestingly, a study of Italian adults with school-aged children found that only 16.0% knew which vaccinations were recommended for adults aged 19-64 years, and only 16.9% reported having received at least one of these (33). Both of these were significantly improved among people with chronic condition(s) and those who were healthcare professionals (33).

GPs were most comfortable about proposing influenza vaccine. They also felt that this was the vaccine that patients would be most accepting of. Similarly, the small study of GPs from Parma found that GPs were more likely to recommend influenza vs pneumococcal or HZ vaccines (98.6% vs 84.9% and 65.6%, respectively) (32). This is likely because yearly influenza vaccination has been recommended in Italy

for those aged ≥ 65 years since 1999 (34). However, the GPs in the current study were also comfortable proposing the other adult vaccinations, namely pneumococcal and HZ (for those aged ≥ 65 years and for at-risk adults) and Tdap (every 10 years), which were first included in the Italian National Immunization Program (NIP) in 2017 (17). This is in line with a European study of healthcare professionals' perspectives on life-course immunization, which found that most participants (86.2%) valued life-course immunization; two thirds (67.3%) were ready to discuss and recommend life-course immunization (with a further 19.9% being ready but requiring support); and 97.4% were willing to engage with other healthcare professionals to spread knowledge about the importance of vaccination for all ages (although four out of ten of them felt that there was too little interdisciplinary contact or they needed support to achieve this) (35).

GPs felt that the most important age groups to target for influenza vaccination were 66-75 and >75 years, which is in line with the recommendation at the time of the study to vaccinate all older adults (≥ 65 years) (17), due to immunosenescence (9). However, nearly 10% felt that younger adults were a priority, presumably those with risk factors, who are also recommended for vaccination (17-19).

The Italian NIP advises that adult vaccinations should be actively offered (17). In the current study, the most common way for GPs to inform their patients that they were eligible for vaccination was personally during a visit, with other active methods including advice from other staff during a visit or a telephone call (by the GP or other staff). However, 30.7% and 17.9% of respondents said they only put up an information poster about influenza and other vaccinations, respectively. In a study of 1,245 Italian GPs, the initiatives used to encourage influenza vaccination included

opportunistic vaccination at the clinic (68.6%), counselling (44.6%), home visits (34.3%), and telephone calls (20.6%) (30).

Unfortunately, adult vaccine coverage in Italy is suboptimal. Only 54.6% of adults aged ≥ 65 years received influenza vaccination in Italy in 2019-2020 (36), compared to 69.8% of United States adults of the same age (37). Also, annual adult coverage data are only available for influenza in Italy (36). Some data for the other vaccines recommended in Italy exist, but they refer only to special groups and only come from occasional surveys or scientific studies. For example, in a 2018 cross-sectional study of Italian healthcare workers, vaccination coverage among this population was low (e.g. pertussis 29.5%; influenza 14.0%) (38). In another 2018 Italian study – of critical care staff – self-reported vaccination coverage among these healthcare workers was high for Tdap (93.7%) but low for influenza (35.8%); and only 13.2% of respondents knew exactly which vaccines they should have received (39). In a 2011 study of 80 GP trainees in Sicily, 77.5% said that they would recommend influenza vaccination for their eligible patients, but only 18.7% had been vaccinated themselves in the 2010-2011 influenza season (31). In a 2015 study of 1,245 Italian GPs, most reported receiving seasonal influenza vaccination in the past 10 years (72.3%), but only 21.8%, 8.1%, and 3.0% reported receiving tetanus-diphtheria, pneumococcal, and Tdap vaccines, respectively, in the past 10 years (30). Lastly, in a 2016 study of 229 GPs from Taranto, Italy, 76.4% reported receiving influenza vaccination for the 2015-2016 season (29).

Several factors could potentially improve adult vaccination coverage, including standing orders, automatic reminders for GPs and patients, public education campaigns, and vaccine administration outside the clinic (e.g. in the workplace or retail stores) (40). The interaction between

patients and GPs is, however, the basis for maintaining confidence in vaccination (26). For this reason, GPs should be encouraged to periodically participate in educational events about adult vaccination. Studies that periodically investigate the level of knowledge and information gaps could help to improve educational events.

Adult vaccination is currently very much in the spotlight, with a worldwide mass vaccination campaign against coronavirus disease 2019 (COVID-19), which is ongoing in Italy (41). Recent reports from the International Council on Adult Immunization (42), the Italian Board of the Vaccination Calendar for Life (43), and Antonelli-Incalzi et al. (44) have highlighted the current importance of adult vaccinations and the importance of collaboration to promote adult vaccination. In Italy, recommendations for influenza immunization have been expanded for the 2020-2021 and 2021-2022 seasons to include people aged 60-64 years in order to reduce complications and hospitalizations, as co-circulation of influenza and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) viruses cannot be excluded (45, 46). Furthermore, the Italian Board of the Vaccination Calendar for Life recently appealed the health authorities *to sustain vaccination in COVID-19 times*, and more particularly to increase coverage of influenza, pneumococcal, Tdap, and HZ vaccination (43).

Limitations of the present study include the fact that the participating GPs were not selected through a randomized method, there was no control group, and all GPs were from one Italian Region (Piedmont), mainly from Turin, hence the sample is not necessarily representative of Italy. Also, the response rate was low (~9%), possibly limiting the representativeness of the sample, and we have no information about the GPs who declined to participate. There is also the potential for selection, social desirability, and recall biases. The questionnaire was not

tested in a pilot study, nor was its internal consistency tested. Further, the survey was mainly completed before the COVID-19 pandemic (72.5% of answers were collected before the end of January 2020), and attitudes towards adult vaccination may now be different.

Conclusions

Italian GPs have a crucial role in providing information about, recommending, and providing adult vaccinations, both now and in the future. This is particularly important for older adults, who are more susceptible

to infections due to immunosenescence. Results from this study in north-west Italy show that GPs have a favorable attitude towards adult vaccination (including the most recently added recommendations) and perceive that patients are generally accepting them. The interest in medical education about adult vaccination is high, but further education is still required. Future studies – in other regions or countries and in the post-pandemic COVID-19 era – could provide a more complete picture of the potential role of GPs in the context of adult vaccination and of their knowledge gaps and needs. Such information may help to improve the uptake of adult vaccinations.

Supplementary Text

Questionnaire [bold indicates correct answers]

1. A quale fascia di età appartieni? [What age group do you belong to?]
 - <40 anni [<40 years]
 - Fra 40 e 50 anni [40-50 years]
 - >50 anni [>50 years]
2. Qual è il numero dei tuoi assistiti? [How many patients do you have?]
 - <500 [<500]
 - Fra 500 e 1.000 [500-1,000]
 - >1.000 [>1,000]
 - Sono un medico in formazione che effettua sostituzioni di assistenza primaria [I am a trainee doing primary care replacements]
3. Qual è la tua provincia? [What is your province?]
 - AL [Alessandria]
 - AT [Asti]
 - BI [Biella]
 - CN [Cuneo]
 - NO [Novara]
 - TO [Turin]
 - VC [Vercelli]
 - VCO [Verbano-Cusio-Ossola]
4. Quali fonti di informazioni utilizzi maggiormente per informarti sul tema vaccinazioni? (più di una risposta possibile) [What sources of information do you most use to update yourself about vaccinations? (>1 answer possible)]
 - Congressi nazionali [National congresses]
 - Corsi di formazione regionali/aziendali [Regional/local educational courses]
 - FAD [WebCME]

- Portali on-line per professionisti sanitari [Online portals for healthcare professionals]
- Riviste o pubblicazioni [Magazines or publications]
- Social network [Social networks]

5. Durante la campagna anti-influenzale, quali fasce di età dei tuoi assistiti pensi di vaccinare maggiormente? (massimo due opzioni) [During the influenza campaign, which age groups of your patients do you plan to prioritize for vaccination? (<=2 options)]

- <50 anni [<50 years]
- 50-65 anni [50-65 years]
- 66-75 anni [66-75 years]
- >75 anni [>75 years]

6. Sapresti indicare quanti decessi correlati all'influenza sono stimati ogni anno in Italia (media delle ultime stagioni influenzali)? [Could you indicate how many influenza-related deaths are estimated each year in Italy (average of recent influenza seasons)?]

- Circa 3.000 [About 3,000]
- Circa 8.000 [About 8,000]**
- Circa 15.000 [About 15,000]

7. Sapresti indicare quanti soggetti nella popolazione adulta sono a rischio di sviluppare Herpes Zoster nel corso della loro vita? [Could you indicate how many people in the adult population are at risk of developing herpes zoster in their lifetime?]

- Circa 1 su 3 [About 1 in 3]**
- Circa 1 su 10 [About 1 in 10]
- Circa 1 su 100 [About 1 in 100]

8. In Germania, UK e Spagna nel 2017 sono stati notificati circa 24.500 casi di pertosse. In Italia la pertosse è sottostimata. Sapresti indicare quanti sono i casi di pertosse notificati in un anno a livello Nazionale? [Around 24,500 cases of pertussis were reported in Germany, the UK, and Spain in 2017. In Italy, whooping cough is underestimated. Could you indicate how many cases of pertussis are notified in a year at a national level?]

- Circa 5.000 [About 5,000]
- Circa 3.000 [About 3,000]
- Circa 1.000 [About 1,000]**

9. Sapresti indicare quanti sono i casi di malattia invasiva da pneumococco in un anno in Italia nella popolazione >64 anni? [Could you indicate how many cases of invasive pneumococcal disease are notified in 1 year in Italy in the population aged >64 years?]

- Fra 1,2 e 1,6 su 100.000 [1.2-1.6 per 100,000]
- Fra 5,2 e 6,7 su 100.000 [5.2-6.7 per 100,000]**
- Fra 13 e 15 su 100.000 [13-15 per 100,000]

10. Su quali fra queste tematiche avresti bisogno di un ulteriore approfondimento per poter svolgere al meglio il counseling vaccinale con il tuo assistito/paziente? (più di una risposta possibile) [On which of these issues do you need further information to best carry out vaccination counseling with your patients? (>1 answer possible)]

- Sicurezza e tollerabilità dei vaccini [Safety and tolerability of vaccines]
- Utilità dei vaccini [Usefulness of vaccines]
- Interazione con altre terapie [Interaction with other therapies]
- Effetti collaterali legati a vaccini multipli (es: dTpa) [Side effects related to multiple vaccines (e.g. Tdap)]
- Durata della protezione [Duration of protection]
- Co-somministrazione di più vaccini [Co-administration of multiple vaccines]

11. Quali vaccini pensi che i tuoi assistiti/pazienti accetteranno di più? (più di una risposta possibile) [Which vaccines do you think your patients will be most accepting of? (>1 answer possible)]

- Anti-pneumococcico [Pneumococcal]
- Anti-herpes zoster [Herpes zoster]

- Anti difterite-tetano-pertosse [Diphtheria-tetanus-pertussis]
- Anti-influenzale [Influenza]

12. Quali aspetti pensi che ti impegnereanno di più tra i seguenti: (più di una risposta possibile) [Which of the following aspects do you think will engage you most? (>1 answer possible)]

- Informazione al paziente/assistito [Information for the patient]
- Approvvigionamento del Vaccino [Vaccine supply]
- Atto vaccinale [Vaccine administration]
- Registrazione della vaccinazione [Vaccine registration]
- Gestione degli eventi avversi [Management of adverse events]

13. Pensi di co-somministrare due o più vaccini in una sola seduta? [Do you plan to co-administer two or more vaccines in one session?]

- Sì [Yes]
- No [No]

14. Potresti valutare quanto ti senti a tuo agio a proporre agli aventi diritto le seguenti vaccinazioni con una scala che va da 1 (per niente a mio agio) a 4 (completamente a mio agio)? [Could you rate how comfortable you feel about proposing the following vaccinations to those eligible on a scale of 1 (not at all comfortable) to 4 (completely comfortable)?]

- Anti-pneumococcica [Pneumococcal]
- Anti-Herpes Zoster [Herpes zoster]
- Anti difterite-tetano-pertosse [Diphtheria-tetanus-pertussis]
- Anti-influenzale [Influenza]

15. Qual è la modalità prevalente con cui organizzi la vaccinazione antiinfluenzale? [What is the main way in which you organize influenza vaccination?]

- Affiggo un cartello in studio per informare gli assistiti/pazienti della possibilità di effettuare le vaccinazioni [I put up an information poster in the office to inform patients of the possibility of vaccinations]
- Effettuo personalmente la chiamata degli assistiti/pazienti che abbiano diritto alle vaccinazioni in base ad un elenco [I personally call patients who are eligible to vaccinations based on a list]
- Faccio effettuare la chiamata da personale di studio (segretaria/infermiere) degli assistiti/pazienti che abbiano diritto alle vaccinazioni in base ad un elenco da me fornito [I ask the other staff members (secretary/nurse) to call the patients who are eligible to vaccinations based on a list provided by me]
- Informo personalmente i miei assistiti/pazienti durante la visita [I personally inform my patients during the visit]
- Mi avvalgo dell'eventuale personale di studio (segretaria/infermiere) per informare gli assistiti/pazienti che vengono in studio [I ask the other staff members (secretary/nurse) to inform patients who come to the office]
- Non faccio nulla a meno che non ci sia una richiesta specifica di un assistito/paziente [I do nothing unless there is a specific request from a patient]

16. Qual è la modalità prevalente con cui organizzi/pensi di organizzare le altre vaccinazioni (Herpes Zoster, pneumococcica, difterite-tetano-pertosse)? [What is the main way in which you organize/plan to organize the other vaccinations (pneumococcal/Tdap/HZ)?]

- Affiggo un cartello in studio per informare gli assistiti/pazienti della possibilità di effettuare le vaccinazioni [I put up an information poster in the office to inform patients of the possibility of vaccinations]
- Effettuo personalmente la chiamata degli assistiti/pazienti che abbiano diritto alle vaccinazioni in base ad un elenco [I personally call patients who are eligible to vaccinations based on a list]
- Faccio effettuare la chiamata da personale di studio (segretaria/infermiere) degli assistiti/pazienti che abbiano diritto alle vaccinazioni in base ad un elenco da me fornito [I ask the other staff members (secretary/nurse) to call the patients who are eligible to vaccinations based on a list provided by me]
- Informo personalmente i miei assistiti/pazienti durante la visita [I personally inform my patients during the visit]

- Mi avvalgo dell'eventuale personale di studio (segretaria/infermiere) per informare gli assistiti/pazienti che vengono in studio [I ask the other staff members (secretary/nurse) to inform patients who come to the office]
- Non faccio nulla a meno che non ci sia una richiesta specifica di un assistito/paziente [I do nothing unless there is a specific request from a patient]

17. Nel periodo settembre-novembre 2019 sono stati organizzati corsi sulle vaccinazioni dell'adulto dalla regione e dalle ASL. Rispetto a questi corsi: [During September to November 2019, there were adult vaccination educational courses organized by regional and local institutions. Regarding these courses:]

- Ho partecipato [I participated]
- Non ho partecipato, ma sono interessato all'argomento [I did not participate, but I am interested in the topic]
- Non ho partecipato e non sono interessato all'argomento [I did not participate, and I am not interested in the topic]

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Riassunto

Conoscenza ed atteggiamenti nei confronti delle vaccinazioni degli adulti tra i Medici di Medicina Generale in Piemonte, Italia: risultati di uno studio trasversale

Contesto. L'importanza della "vaccinazione durante tutto il corso della vita" è sempre più riconosciuta. In Italia si raccomanda agli adulti di sottoporsi alle vaccinazioni contro l'influenza, la malattia invasiva da pneumococco, la difterite, il tetano e la pertosse (dTpa), nonché l'herpes zoster.

Disegno dello studio. Studio trasversale.

Metodi. Per studiare il livello di conoscenza e l'attitudine dei medici di medicina generale italiani nei confronti della vaccinazione degli adulti, sono state raccolte le risposte di una survey da parte di 335 medici di medicina generale piemontesi da dicembre 2019 a marzo 2020; I risultati sono stati comparati per età dei detti medici (≤ 50 vs > 50 anni).

Risultati. La fonte di informazioni sulla vaccinazione più comune erano i corsi di formazione regionali/locali (72,8%), con una maggior preferenza dei medici più anziani rispetto a quelli più giovani (79,4% vs 64,4%; $p=0,002$). Circa la metà dei medici di medicina generale ha ritenuto di aver bisogno di ulteriori informazioni sulla co-somministrazione del vaccino (55,5%), sulla durata della protezione (49,6%) e sulla sicurezza/tollerabilità (48,7%), con i medici più anziani più interessati ad approfondire il tema della sicurezza/tollerabilità rispetto a quelli più giovani. Nel complesso, la maggior parte

(86,0%) ha ritenuto che l'aspetto riguardante l'informazione al paziente li avrebbe maggiormente coinvolti e il 68,1% ha pianificato di co-somministrare più vaccini. Gli intervistati si sentivano più a loro agio nel proporre la vaccinazione contro l'influenza, pur essendo a loro agio anche riguardo alle vaccinazioni pneumococcica, dTpa e herpes zoster.

Tuttavia, è emerso come i medici più giovani rispetto a quelli più anziani fossero più a loro agio nel proporre le vaccinazioni dTpa e herpes zoster. I modi più utilizzati per informare i pazienti sull'offerta vaccinale per l'antinfluenzale e per le vaccinazioni pneumococcica, dTpa e herpes zoster erano personalmente durante una visita (42,7% o 54,3%, rispettivamente) o tramite un cartello informativo (30,7% o 17,9%).

Conclusioni. I medici di medicina generale oggetto dell'indagine hanno mostrato un atteggiamento favorevole verso la vaccinazione degli adulti ed erano interessati ad un percorso formativo sul tema.

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