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RESEARCH PAPER

## Strategies and actions of multi-purpose health communication on vaccine preventable infectious diseases in order to increase vaccination coverage in the population: The ESCULAPIO project

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### ABSTRACT

The ESCULAPIO Project aims at increasing awareness on vaccine preventable infectious diseases (VPID) and vaccinations in different target populations and to spread the culture of prevention. Information/training interventions on VPID have been developed and health promotion activities for the general population, students and their parents, teachers and health care workers (HCWs) were set up. In Tuscany, educational courses on VPID in high schools were organized and students were stimulated to prepare informative materials on VPID for lower grade school pupils. In Liguria, an educational card game (named 'Vaccine at the Fair') was presented to children of primary schools. Stands in shopping centers were used in Palermo to distribute the regional vaccination schedule and gadgets, also providing indications on reliable websites where to find correct information on vaccinations. A music video played by health care workers (HCWs) was created and used in the University Hospital of Cagliari to promote the anti-flu vaccination campaign in HCWs. In Apulia, meetings with the general population were organized to collect controversial issues about vaccinations and a national call center was launched to create a direct line from the general population to experts in vaccines and vaccination strategies. In Veneto, meetings in the birth centers and home visits for subjects refusing vaccination have been organized. All activities are useful and effective tools to increase knowledge about VPID and confidence in vaccination, which are crucial aspects in order to increase vaccine uptake.

The project was funded by the Italian Ministry of Health, Center for Disease Prevention and Control (CCM) in 2013.

### KEYWORDS

awareness; communication; general population; health care workers; infectious diseases; students; vaccine; vaccination coverage

### Introduction

The Italian National Plan for the Vaccination Prevention 2012–2014 suggested to design and realize actions for improving information and communication in order to promote the updating of health professionals and to spread the vaccine preventable culture as an aware and responsible choice for each citizen.<sup>1</sup> This approach was already included in the National Plan of Prevention 2010–2012.<sup>2</sup> Therefore, the planning of a proper and effective communication strategy on vaccine-preventable infectious diseases (VPID) and vaccinations appeared, then as today, an issue of crucial importance for public health in view of vaccination coverage increase. Indeed, the lack of an adequate knowledge on vaccines at the population level could result in failure to achieve high levels of vaccine coverage, thus, effective health communication strategies are needed to strengthen vaccination programs. Health communication can be effective only if implemented at different levels with specific languages and levels of deepening: general population, health

professionals, teachers, pupils and parents in the school environment.

The current work includes results achieved inside the activities of the ESCULAPIO Project, funded by the Center for Disease Prevention and Control (CCM) of the Italian Ministry of Health, for the program 2013.<sup>3</sup> The six Operative Units (OU) participating in the Project were located in six different Italian Regions belonging to the North, South and Central Italy: Apulia, Liguria, Sardinia, Sicily, Tuscany and Veneto. ESCULAPIO, the Latin name of the mythological Greek god of medicine and father of Igea the divinity from which Hygiene originated, was the Italian acronym chosen to synthesize the extensive title of the Project: “Elaborating strategies and actions of multi-purpose health communication on vaccine preventable infectious diseases in order to increase vaccination coverage in the population.”

The main aims of the Project were: i. to increase awareness on VPID and vaccinations in different target populations; ii. to

spread the culture of prevention; iii. to develop information/training interventions on VPID; iv. to contrast the spread of misinformation about vaccines through the Internet and social networks.

Different activities were performed by each OU in order to achieve the following specific objects.

The school, for its privileged role and function for the education of people, seemed to be the best setting in which to develop correct and effective communication activities in order to clarify and increase knowledge on VPID. This is the reason why, the OU of Tuscany aimed at creating and implementing training and information packages for teachers and students of high schools (14–20 years of age), by means of peer education activities, in order to reach today adults (teachers and parents) and tomorrow adults or future parents (students). Educational games for school pupils were realized in Liguria, with the aim to increase awareness and knowledge of vaccination among primary school children (8–10 years of age), their families and teachers by means of meetings, the distribution of information material, including flyers, and educational games. The OUs of Sicily and Apulia aimed at increasing awareness on VPID and vaccinations of the general population and the media. The Sicilian OU had the main objectives of identifying determinants of vaccination uptake in the general population, developing and validating a questionnaire to collect data on the main factors influencing vaccine uptake in a population from Southern Italy and spreading information on vaccines to the general population. Aim of the activities performed in Apulia, was to collect, directly from the public, a set of issues to which people were more “sensitive,” in order to perceive the dimension of informative needs and the misinformation in the field of vaccinations. A toll-free telephone line to answer questions on VPID was also the aim of the Apulian activities. The objective of the OU of Sardinia was to increase knowledge on VPID and adherence to immunization campaigns in health care workers (HCW) by realizing traditional and e-learning training courses and initiatives of health promotion in healthcare and hospital setting. Interventions to promote vaccinations in maternal and child health services and outreach interventions in case of parental non-compliance with vaccination schedules were performed in the Veneto Region, with the aim to reach a particular subgroup of the general population: new or future parents. The activities of Veneto aimed also at realizing individual interviews with parents and / or home visit, if considered useful, for families not respondents to the active ordinary call.

## Results

### *Activities of the OU of Florence, Tuscany*

Between March 2015 and November 2015, 14 meetings were realized into 9 different high schools of Tuscany Region, in the province of Florence and Lucca. The initiative involved 37 classrooms for a total of 775 students and more than 50 teachers. Students were aged between 14 years and 20 years, the majority of the students were males (71.7%). A subgroup of students was invited to fill in a pre-test questionnaire before the participation to the lesson and a post-test questionnaire after the lesson. 223 pre-test and 217 post-test questionnaires were

analyzed. In general, students improved their knowledge on VPID during the lesson. Students showed a good attitude toward vaccines and 88% of them declared to have received some or all the vaccines offered by the health regional services. On the other hand, among the interviewed students 64.6% declared that adolescents are not sufficiently informed about vaccines. The principal sources to retrieve information on vaccinations for the participating students were family practitioners (74.4%), almost half of them (49%) would search for information on vaccinations directly from the Internet and social networks. For the final competition, 25 Project works were submitted for three categories: 5 for the HPV diseases (2 comics, 1 power point presentation, 1 video, 1 poster), 12 for meningococcal diseases (6 comics, 2 videos, 2 illustrated stories, 1 brochure, 1 educational game), 8 for exanthematic diseases (5 comics, 2 videos, 1 brochure). During the award ceremony, a seminar entitled “Myths and Reality on vaccines” was realized in order to offer another moment of education for the participating students. Representatives of the Ministry of Health and of the Communication office of the Tuscany Region attended the ceremony awards.

### *Activities of the OU of Genoa, Liguria*

The Genoa Unit implemented several activities to raise awareness of vaccine-preventable infectious diseases (VPID) and vaccination in primary schools. The interventions were aimed at teachers, children and families. The interventions were differently planned according to the population target. Specifically, the educational card game called “Vaccine at the Fair” (in Italian “Il vaccino in fiera”) was developed and used for schoolchildren together with educational material containing colourful images. The activities consisted of meetings featuring slide shows and the distribution of information material on VPID for parents and teachers.

The project involved 24 classrooms for a total of 505 schoolchildren (mean age 8.6 years; 54.7% females), their parents and 45 teachers (100% females).

The level of student satisfaction was also tested, 489 questionnaires being collected (non-responders = 3.2%). 98% of schoolchildren expressed satisfaction and were pleased with the educational game.

All teachers filled in a dedicated questionnaire on satisfaction. The results of the questionnaires revealed that the teachers felt motivated to take part in a health promotion project, but that they did not feel adequately trained to deal with these issues in the classroom.

### *Activities of the OU of Palermo, Sicily*

Results of the SLRs and meta-analyses evidenced different determinants of vaccine uptake, depending on the type of disease. The main classes considered were knowledge, beliefs and perceptions both on vaccines and diseases (KBPvd); attitudes/behaviors; demographics, including ethnicity, mother’s age, child’ age, gender, geographic location; socio-economic status (SES), including education level, employment, house tenure, income, marital status, no. of children in the household;

information source/advice; influence/trust of other people, institutions, media; practical reasons.

Concerning Measles-Mumps-Rubella (MMR) vaccine, it was suggested that interventions to increase compliance should be focused on the best communication strategies to spread messages on vaccine efficacy, safety, adverse reactions to vaccinations, health protection, information gaps, and mainly addressed to people of ethnic minorities living in Southern Europe and toward low educated and deprived families, with higher number of children and non-married status.<sup>4</sup>

For meningococcus an increased compliance was related with sociodemographics (race, ethnicity, religion, residence, accommodation type, no. of children, parent's age) and cultural/economic factors (education level of the parents, family income, cost of the vaccine, employment type).<sup>5</sup>

Finally, for pneumococcus, the factors associated with vaccination adherence were principally psychosocial (perceptions, attitudes and behaviors), sociodemographic and related to the vaccination strategies adopted (vaccine free of charge or administered in pediatric contexts).<sup>5</sup>

A total of 632 questionnaires were collected in the shopping centers of Palermo. The sample had a mean age of 42,6 years (SD  $\pm$ 13.5), was composed mainly by women (62% vs 38% males), came from big towns (27% were from small towns), and almost all had a medium/high education.

A general framework that emerged from the interviews was characterized by a frequent need of the population to receive homogeneous and correct information on vaccines; complaining and hesitancy were often observed in the sample population. Despite an increased use of the Internet and social networks, people knowing the VaccinarSi website are still very few (6%). The geo-referenced analysis showed a significant increase in the number of connections (+15%), the number of pages per session (+3%) and the session length (+7%), in the three months after our intervention in Western Sicily, especially if compared with the Sicilian Eastern Area not involved in the public health intervention (+4%, -9%, -24% respectively).

### **Activities of the OU of Foggia, Apulia**

The OU of Foggia, organized a Vaccine Open Day, a meeting with the public to collect opinions, feelings and information gaps about vaccinations. In total, 72 people have approached to the listening point; of these, 75% were female, 62% were parents of children/adolescents under 15 years, 19% were young adults and sixties. Half of respondents said they were favorable to vaccination, 35% had doubts and 15% were contrary. Among parents, 43% were in favor of immunization practices, 36% had doubts, 21% expressed himself contrarily. Clarifications on the link between vaccines and diseases such as autism, multiple sclerosis, diabetes and celiac disease were required by 26% of passers (32% parents, 21% of seniors and 14% of young adults). Moreover, 14% of subjects reported that their health care provider does not recommend or provide adequate information on vaccinations. In addition, 7% of interviewed passers believe that economic interests of the manufacturing companies influenced decisions concerning vaccinations. A report with the main results of the Vaccine Open Day in Apulia was also

published in December 2015 in "Epicentro," the national portal of the Italian National Institute of Health.<sup>6</sup>

### **Activities of the OU of Cagliari, Sardinia**

A music video played by HCWs was created and used in the University Hospital of Cagliari to promote the anti-flu vaccination campaign in HCWs in the seasonal vaccination campaign in 2015–2016. The video, as well as being mentioned during the regional news and on the main newspaper of Sardinia, was loaded on YouTube web platform and on the website University Hospital of Cagliari, recording thousands of views. It was shown during the 47th National Congress of Hygiene and Preventive Medicina Society (Riccione, 1–4 October 2014) and it was also shown at the Course on Vaccines held at the School of Epidemiology at Erice (Sicily). It was also brought to the attention of some members of the WHO European Region in Copenhagen, experts in issues about communication, who expressed a positive opinion. This has ensured a high visibility of the work done raising interest and approval by the scientific community and the general population.

Different slide sets were created aimed at educating general populations on VPID. Information packages on influenza and measles diseases were realized. They included general information and epidemiological data in order to raise awareness and increase vaccine coverage as provided by the National Vaccination Prevention Plan 2012–2014.<sup>1</sup>

Moreover, in collaboration with the OUs of Florence, Foggia, Genoa, a course for the Distance Learning of health personnel aimed at increasing knowledge and immunization coverage in HCW was realized and launched in September 2016. Among the 500 HCWs registered the majority of subscribers were nurses (388,77.6%), biologists (35, 7%), medical doctors (32, 6.4%). Sicily has recorded the highest number of registrations (89, 17.8%), followed by Apulia (49, 9.8%) and Lombardy (43, 8.6%).

### **Activities of the OU of Veneto**

Interventions for the promotion of immunization and vaccination culture in the child- maternal care settings were planned and events have been organized in the infantile maternal health care settings and in the population. Twenty-one meetings were organized with the new parents to discuss pediatric vaccines, in some of these have been discussed also the prevention of injury and the promotion of reading; moreover, were realized 66 meetings in the birth path, 10 meetings within courses for massage of the newborns. More than 100 interviews were performed with parents by means of individual counseling. As a result of this activity, 18 parents have decided to undertake the vaccination series, 8 refused to vaccinate their newborns and 2 decided to postpone the vaccination course after the first year of the child's life. Eight home visits were also realized: one of this was successful in the acceptance of the vaccination, in the other 7 cases, instead, children were untraceable or returned to their country of origin, if foreigners.

In order to support the health personnel of the 5 Local Health Units (LHU) of Veneto who have collaborated in the realization of the home visiting, on December 2015, a training course addressed to 32 HCWs was realized to introduce to the

home visiting as a tool for the promotion of children's health and prevention of infectious diseases (including vaccination), with the participation of speakers experts in this methodological approach.

## Discussion

Health education can be defined as a set of intentional activities designed to transfer or construct knowledge about health to or for a person, a social group, or a community, and the school has proved to be an ideal setting where to carry out health promotion interventions, especially when young children are targeted. Indeed, the current Italian National Plan for Prevention recommends involving schools closely in health promotion activities.<sup>1</sup>

In order to increase knowledge and awareness of VPID, the transversal population approach, which includes the involvement of schools and healthcare personnel, is advocated in the scientific literature. This approach is also indicated in Institutional Strategic Plans, since it is able to promote acquisition of the skills needed to encourage both individuals and groups to make appropriate health choices. At the population level, this will yield medium- and long-term health benefits.

The experience of a "cascade" communication strategy used in Tuscany, starting from the students of the high schools and addressing younger pupils (including children in kindergarten) was fully appreciated by all the participating schools. The high quality and originality of the project works submitted for the competition confirmed the potential of this approach to encourage students to become themselves promoters of the culture of prevention. High school students generally have a positive attitude toward vaccinations but they highlighted their need to be more informed. This critical point should encourage the dissemination of the culture of prevention at school level and the inclusion of training program on immunization in all Italian high schools in collaboration with the Ministry of health and the Ministry of education.

The educational game "Vaccine at the Fair" proved to be an efficacious health promotion tool, owing to the keen interest it aroused among the children. Moreover, the general findings of the study and the results of the questionnaires indicated that we had chosen an appropriate communication strategy, as the children were encouraged to ask for more information on VPID. In this regard, the aim of the study was fully achieved and the project was appreciated by almost all participants. Communicating information on infectious diseases and their prevention can guide parents and children in their health choices and also helps to create a culture of health by involving schoolteachers. Indeed, if teachers were adequately trained, they could play a key role in spreading knowledge of VPID among students. It is therefore advisable to offer teachers regular training courses on VPID.

Communication strategies addressed to the general population in the supermarkets showed some critical points. In particular, colleagues of the OU of Palermo encountered some difficulties in the questionnaire development. It was first administered to a smaller population sample, but since some questions were not well formulated or the questionnaire was

too long, the proper modifications were done with the collaboration of different experts in the field, and the potential emerged weaknesses were revised and removed, in order to obtain the final version. Sometime, the approach to the population for the questionnaire administration was challenging due to their vaccine hesitancy or their lacking of interest or time, but the use of gadgets (like the reproduction of the Sicilian Regional Immunization schedule) and wearing the white jacket with an appropriate identification card, frequently allowed a change of mind in the population willingness.

The percentage distribution of the main indicators of the meeting with the population in Apulia follows the "continuum model of vaccine hesitancy" defined by the Strategic Advisory Group of Experts (SAGE) on Vaccine hesitancy of the World Health Organization.<sup>7</sup> Among those who accept all vaccinations without any doubt (complete acceptance: corresponds to the highest proportion in the Apulian activity 50%) and those who completely refuse without uncertainty (total rejection: the lowest percentage, 15%), a heterogeneous group of uncertain people is also individuated. People belonging to this group nourish certainties toward some vaccinations and doubts about others and, consequently, decide to delay the vaccination uptake (35%). People allocated to this group constitute the area known as "gray area" that deserves to be better investigated with the purpose of recovering confidence. The experience of the Vaccine Open Day in Apulia allowed to evaluate, through a point of local listening, the public needs to receive clear and convincing information on vaccinations. The test activity was useful to orient, in October 2015, the activation of a toll-free national telephone line, designed as a direct consulting point freely accessible and addressed to a wide audience.<sup>8, 9</sup> The main limitation of this type of interventions, as many other valuable and public-oriented initiatives for the promotion of immunization implemented in Italy, lies in the measurement, and how to measure, the outcome of any changes triggered. In this direction,  $\beta$  tests on a sample of users of the call-center line are under investigations for the qualitative and quantitative evaluation of the effectiveness of the services offered, whose results will be published in the future. The days dedicated to questionnaires' administration in Palermo were also an important occasion for addressing correct vaccine messages and information to the general population, including the knowledge of the national VaccinarSì website, a project created by the Italian Society of Hygiene, Preventive Medicine and Public Health (S. It.I.) in order to communicate and educate the general population and the healthcare community about vaccines.<sup>10</sup>

As a matter of fact, the current trend to a wide involvement of the healthcare assistants and community nurses, in a sort of task sharing, for many preventive services and primary care is justified by evidence of effectiveness of the intervention. Skills required to HCWs for the activity of Home Visiting (HV) to parents refusing vaccinations for their children should comprehend actions to strengthen the expertise essential for home visiting, actions to increase competences concerning counselling and interventions to promote the whole culture of prevention. Besides, HCWs should be the first witnesses of the deliberate choice for the vaccination, while still the vaccine coverage of this particular risk group is still too low and unsatisfactory.

## Conclusions

The rise of conflicting information and the ease with which misinformation can spread — via old and new media channels — provide a confusing context for parents and for the general population seeking assistance from health workers, religious leaders, family members, or other trusted sources, many of whom may not be completely aware about the risks and benefits of vaccines. In this context, it is not surprising that some caregivers have become “hesitant” about decisions to vaccinate.<sup>11</sup> It seems nowadays unavoidable and essential for all healthcare workers involved into the “vaccinations system” to tailor instruments and informative contents taking into account opinions, feelings and gaps of knowledge on vaccinations of different targets of people. In fact, opposition to the contra-information and misinformation performed by anti-vaccinist movements require skills and communicative actions based on direct communication with the general population, even with people without access to PC or social media. Prevention of infectious diseases is based on the achievement of vaccination coverage goals in the target populations of the vaccination programs.

The activities implemented under the ESCULAPIO Project in some Italian regions, the excellent methodologies employed and the high quality of communication tools realized provide a starting point for the realization of capillary interventions aiming at increasing knowledge and awareness on VPID and vaccinations at different levels. Now is the time to make these communications’ instruments available and to begin to disseminate them widely throughout the national territory.

## Material and methods

### *Health education interventions in high schools in Tuscany*

Between March 2015 and November 2015, the OU of Florence realized health communication meetings in some Tuscan high schools (students aged 14–20 years). Interactive lessons to encourage students’ curiosity were performed and, after the lessons, a competition with final prizes was launched to stimulate the realization of peer education projects. Training packages on VPID (HPV diseases, exanthematic diseases and meningococcal diseases) and prevention measures to avoid transmission were realized: the first addressed to students, simple and rich of images, including quiz to assess the students’ knowledge; the second addressed to teachers, a deeper and more extensive package in order to help them to answer possible further questions of the students. Moreover, a list of institutional websites, where to find correct information on all VPIDs, was also provided.

### *Assessment of student knowledge and satisfaction with the intervention*

A pre-test and post-test questionnaire was also provided to a subgroup of the participating students in order to assess the students’ knowledge on VPID and to measure the comprehension of lesson contents.

A competition with final prizes was organized in order to encourage the students to create informative materials (illustrated stories, comic books on VPID and vaccinations) for the

promotion of immunization for pupils in lower grade schools (kindergartens and primary schools). Each school, within three months from the meeting, might subscribe its participation and send to the responsible of the OU of Florence by email or by postal mail the projects works of the students (participating to the competition as student alone, as groups of students or as a whole class). An assessment committee, comprising representatives of each OU of the ESCULAPIO Project, has determined the winners for each category of infectious disease (3 categories: HPV diseases, exanthematic diseases and meningococcal diseases) on the basis of 4 criteria: 1. Correctness and completeness of the content of the project; 2. Relevance and appropriateness of the project toward the target population (language and images); 3. Communicative effectiveness; 4. Originality.

### *Activities in the Ligurian schools*

The activity was carried out between October 2014 and November 2016 (school years 2014–2015, 2015–2016 and 2016–2017). The project was included in the training Plan of the Ligurian Regional Office, which meant that the criteria of equity required for interventions on vaccine promotion could be met, as every primary school was able to participate in the study. 65% of school boards agreed to the project. As it was not possible to satisfy all requests, the first 24 primary school classes that agreed to take part and met the inclusion criteria were enrolled. As the schools participating in the project were located in different parts of Genoa, every district of the city was covered by the study.

### *Tools for vaccine promotion in the primary schools*

The educational game called “Vaccine at the Fair” (in Italian “Il vaccino in fiera”) was developed on the basis of a well-known Italian game and with the support of a qualified team; it was used during the meetings with students in the presence of teachers. The educational game utilised cards, each of which bore an educational message about VPID or about a vaccine. Every participant received a prize consisting of pencils and rubbers bearing the logo “Vaccine at the Fair;” pencil cases were awarded to the winners of the game. Trained personnel were available for explanation. Information material, including flyers on VPID, was distributed. Furthermore, dedicated slides on VPID and vaccination were shown to students during the school interventions.

### *Assessment of Satisfaction with the intervention*

Teachers filled in an anonymous questionnaire which measured their degree of interest in the study and assessed whether they felt adequately trained on health issues such as VPID. A dedicated questionnaire for students was also developed.

### *Activities of the Sicilian operative unit*

#### *Determinants of vaccination uptake*

The identification of the principal determinants of vaccination uptake was carried out through systematic reviews and meta-

analyses on vaccinations against the most common preventable diseases, due to meningococcus and pneumococcus, MMR, human papilloma virus (HPV) and influenza.<sup>4,5</sup>

The findings from these reviews allowed the development and validation of a questionnaire aimed at assessing the main factors influencing vaccination uptake in a population sample from Southern Italy. The questionnaire consists in 6 sections and 47 items collecting information on socio-demographic characteristics, lifestyle, behaviors and attitudes, vaccine anamnesis, knowledge and perceptions on vaccines and vaccine preventable diseases, information sources and influences on vaccination choices. The questionnaire was administered to the adult general population between April and June 2015, and four shopping centers of Palermo's area were chosen as administration location, in order to obtain subjects of different socio-economic level. An information sheet and consent were prepared and provided to participants, together with some gadgets and a reproduction of the Sicilian Regional Immunization Schedule useful to remind vaccinations recommended for all ages for the lifetime.<sup>12</sup> All collected data were then transferred into an excel file and analyzed through the software STATA/MP 12.1 (StataCorp LP, College Station, TX, USA). A general description of the whole population sample was carried out and shown as percentage frequencies. Univariate and multivariate logistic regression analyses were then performed to explore a wide set of associations of the different variables considered.

### **Assessment of the intervention impact**

To examine whether the intervention was effective in disseminating the knowledge of the VaccinarSì website, a geo-referenced analysis was performed using Google Analytics system, which tracks and reports website traffic.

The last intervention by the Sicilian Unit is currently being performed and consists of spreading information on vaccines to the general population through flyers and providing pediatricians, general practitioners, vaccine center operators and other health care workers with the simplified and clarified reproduction of Sicilian Regional Immunization Schedule provided by the working group.

### **Activities in the Apulian region**

In June 2014 was realized in Bari (Apulia), a Vaccine Open Day. In the central street of the city, a gazebo was set up with information materials and gadgets with which a medical team of hygienists and pediatricians offered to passers an opportunity for orientation in the vaccinations world. The opinions and questions from the audience were faithfully transcribed, after obtainment of the interviewed people consent. From October 2015 to September 2015 a national call center was active to create a direct line from the general population to experts in vaccines and vaccination strategies.

### **Activities in the Sardinia region**

A music video was realized with the participation of HCW of the Cagliari Hospital, students of the Medical School of

Specialization in Hygiene. Besides, multimedia platforms for the promotion of the HCW immunization were placed and the music video was played through the monitors of the hospitals. Set of slides, targeted to the information and the awareness on HCW of influenza, measles and varicella were also created. Flyers and posters for general population and health professionals were realized and training courses on VPID were created. Mobile vaccination units for the administration of flu vaccination in the 2015/2016 season were also established. An e-learning course (Distance Learning) for HCWs was realized and offered free of charge to 500 HCWs of the Italian territory. It comprised 7 Units on different infectious diseases (Measles, Varicella, Pneumococcal diseases, Meningococcal diseases, Influenza, Pertussis, Rubella). The course was realized with the cooperation of the OU of Tuscany, Apulia, Liguria and Sardinia. Slides were presented by a professional speaker. Each unit addressed the following issues: etiology, epidemiology, mode of transmission, pathogenesis, symptoms, complications, diagnosis and treatment, prophylaxis, prevention, burden of disease, direct and indirect costs. Moreover, 9 questions were prepared for each unit. Questions were administered at the end of each unit and, at every access, questions underwent a double randomization (questions and answers order).

### **Activities in the Veneto Region**

Interventions for the promotion of immunization and vaccination culture in mother and child care settings were realized with a pilot phase on implementation and application of a formal procedure for the catch-up of nonrespondents to vaccination invitation. Moreover, realization of individual interviews with parents and/or home visit, if considered useful, for families not responding to the active ordinary call for the vaccination offer were also planned. The target population to be reached with the interview and/or home visits, was identified in parents of newborns belonging to the birth cohorts from July 2014 to June 2015.

### **Abbreviations**

HCW	Health Care Workers
KBPvd	Knowledge, Beliefs, Perceptions on vaccines and diseases
MMR	Measles-Mumps-Rubella vaccine
OU	Operative Unit
SES	socio-economic status
SLR	Systematic Literature Review
VPID	vaccine-preventable infectious diseases

### **Disclosure of potential conflicts of interest**

No potential conflicts of interest were disclosed.

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