



HProImmune
PROMOTION OF IMMUNIZATION
FOR HEALTH PROFESSIONALS IN EUROPE
STATE OF THE ART REPORT
OVERVIEW OF HEALTH-CARE WORKERS IMMUNIZATION STATUS IN EUROPE

Valeria Alfonsi¹, Carmen Montaña^{1,2}, Maria Cristina Rota¹, Silvia Declich¹

¹Italian National Institute of Health (ISS) - Rome, Italy

² European Programme for Intervention Epidemiology Training (EPIET), European Centre for Disease Prevention and Control (ECDC), Sweden



SEPTEMBER 2012

SUMMARY

	Pages
INTRODUCTION	3
METHODOLOGY	3
RESULTS	6
DISCUSSION AND CONCLUSIONS	16
BIBLIOGRAPHY	17

INTRODUCTION

Immunization of healthcare workers (HCWs) is a major issue for infection control in healthcare facilities. Many institutions recommend vaccination for HCWs to protect them from transmissible agents, but also to prevent nosocomial transmission of pathogens and its consequences ⁽¹⁾. Because of their contact with patients or infective material from patients, many healthcare workers (e.g., physicians, nurses, emergency medical personnel, dental professionals, medical and nursing students, laboratory technicians, hospital volunteers, and administrative staff) are at risk for exposure to and possible transmission of vaccine-preventable diseases (VPD). Maintenance of immunity is therefore an essential part of prevention and infection control programs for HCWs. Optimal use of immunizing agents safeguards the health of workers and protects patients from becoming infected through exposure to infected workers ⁽²⁾.

Relevant EU legislation ⁽³⁾ reads “*Effective vaccines must be made available free of charge for workers not already immune to the biological agent to which they are (or are likely to be) exposed*”. Despite the relevant EU directive since 2000 that has already been transposed into national legislation in most of European countries, no significant increase in vaccination coverage has been recorded. In Europe no uniform recommendations exist for the particular vaccinations needed for HCWs who may not know or be proactive and look for vaccination themselves.

We aimed to provide a comprehensive picture of the immunization status of health professionals in Europe in order to summarize the available information into the HProImmune database.

METHODOLOGY

Following the agreement on the list of vaccines of particular concern for health professionals in health-care setting: Hepatitis B, Influenza, MMR, Tuberculosis, Tdap and Varicella (for more details see www.hproimmune.eu), we performed an extensive literature review in all EU Member States (MS), to collect as much information as possible on policies and on immunization status in the healthcare workers in Europe.

We performed the review on **HCWs vaccination** paying special attention to documents describing risk perception, vaccination coverage, nosocomial outbreaks and incidence of diseases of interest in the population of health professionals. In addition we also searched and reviewed legal framework, policy, and existing statistics, guidelines, existing health education programs, interventions and communication campaigns (including literature and information on the evaluation of such activities) on immunization of health professionals.

We adopted a keyword searching technique. We first defined and refined topics assessing different sets of key words (MeSH) and evaluating specificity and sensitivity of these sets of words selected. The search period was from 2000 to present. The technique provides search for keywords in title and/or abstract.

The primary vehicle, concerning scientific sources used for the literature review, was journal articles and published literature in scientific databases (mainly PubMed) and by cross-references (related

articles)*. Other bibliographic indexes included: National technical reports, international bodies technical reports, government documents and other gray literature and related projects.

If information was not available, we directly inquired the country specific health authorities (ministries of health, PH institutes, and professional associations). In addition, articles and reports were searched and accessed based on relevant citations.

We collected all relevant documents in a unique database (available at: www.hproimmune.eu).

SCIENTIFIC ARTICLES

We determined the selection criteria by the keywords used (Table 1). We selected articles if they were written in English, if they were pertinent to HCWs and focused on vaccination.

A first screening for relevance was based on titles and abstracts. Then we downloaded potentially relevant articles or them requested through the ISS library and analysed the full text version looking for aspects related to HCWs vaccination. We analysed each article for evidence of the following parameters:

- HCWs vaccination policies
- Vaccination coverage data for HCWs
- Incidence data for specific VPD and outbreak in healthcare setting
- Health promotion in terms of educational programs in HCWs and/or knowledge, attitude and practice (KAP) studies
- Social impact (perception of the risk for the population, for the health workers themselves and for the patients) and economic impact (i.e. cost/benefit studies).

We performed a frequency analysis and identified main data for each parameter.

TECHNICAL REPORTS

We analysed, and selected if appropriate, all HCWs vaccination related technical reports published by National and International bodies (WHO, CDC, ECDC).

If information was not available, we sent a request directly to health authorities (ministries, PH institutes, professional associations).

Each project's partner was in charge of reviewing information from his/her own country as well as of a number of other EU MS in order to cover the entire EU. Representatives from public authorities, agencies, Ministries and hospitals were contacted in order to collect comprehensive information on existing policies. Results from other EU related projects on going or completed (e.g. VENICE and others projects that may have relevant information available), as well as "Council recommendations

* Related articles were defined either those suggested by the database where the search was done/ the journal database to which an identified article pointed, or those that emerged when general searches were performed on Google to access full text papers not directly available through the previous means. They have been listed in a separate search category.

on seasonal influenza vaccination” adopted in December 2009 and “Conclusions of the Conference on lessons learned from the H1N1 pandemic in 2009 (held by the Belgium presidency on 1-2 July 2010)” were also taken into consideration.

Table 1. Search criteria

KEY WORDS	SEARCH STRING/ DETAILS	Database
Hepatitis B	(((((Hepatitis B [Mesh]) AND "2000/01/01"[Date - Publication] : "3000"[Date - Publication]) AND "0"[Date - Publication] : "3000"[Date - Publication])	PubMed
Influenza, Human	("Influenza, Human"[Majr])	PubMed
Tuberculosis	OR "Tuberculosis"[Majr])	PubMed
Measles-Mumps-Rubella	OR "Measles-Mumps-Rubella Vaccine"[Majr])	PubMed
Chickenpox/varicella	OR "Chickenpox"[Majr]) OR "varicella	PubMed
Diphtheria-Tetanus-Pertussis	Diphtheria-Tetanus-Pertussis Vaccine"[Majr])	PubMed
Vaccine, Immunization, Vaccination	AND ("Immunization"[Majr] OR "Vaccination"[Majr]) AND	PubMed
Health care workers	((("delivery of health care"[MeSH Terms] OR ("delivery"[All Fields] AND "health"[All Fields] AND "care"[All Fields]) OR "delivery of health care"[All Fields] OR ("health"[All Fields] AND "care"[All Fields]) OR "health care"[All Fields]) AND ("manpower"[Subheading] OR "manpower"[All Fields] OR "workers"[All Fields]))	PubMed

RESULTS

We obtained 365 documents from 26 (86.67%) countries that have been requested documentation. (Table 2).

Table 2. Documents available by country and category

	Legal framework	Official guidance	Vaccination coverage	Publications
Austria		1		
Belgium	3	1		3
Bulgaria				1
Cyprus	2			
Czech Republic	3	3		
Denmark	1	3	1	
Estonia	3	1	3	2
Finland	-	-	-	-
France	3	1	1	28
Germany	2	5		49
Greece	3	4		13
Hungary	-	-	-	-
Iceland	-	-	-	-
Ireland	3	4		2
Italy	6	3	2	12
Latvia	4	1		1
Lithuania	8	1		2
Luxembourg	-	-	-	-
Malta		2		
Netherlands	1	6		11
Norway	5	2	1	1
Poland	6	2	1	12
Portugal	2	2		3
Romania	3	3		
Slovakia				1
Slovenia	1			1
Spain	2	9	1	36
Sweden	2	2		4
Switzerland	3	1		2
United Kingdom	2	5	1	16
Europe	3		9	12
TOTAL	71	62	20	212

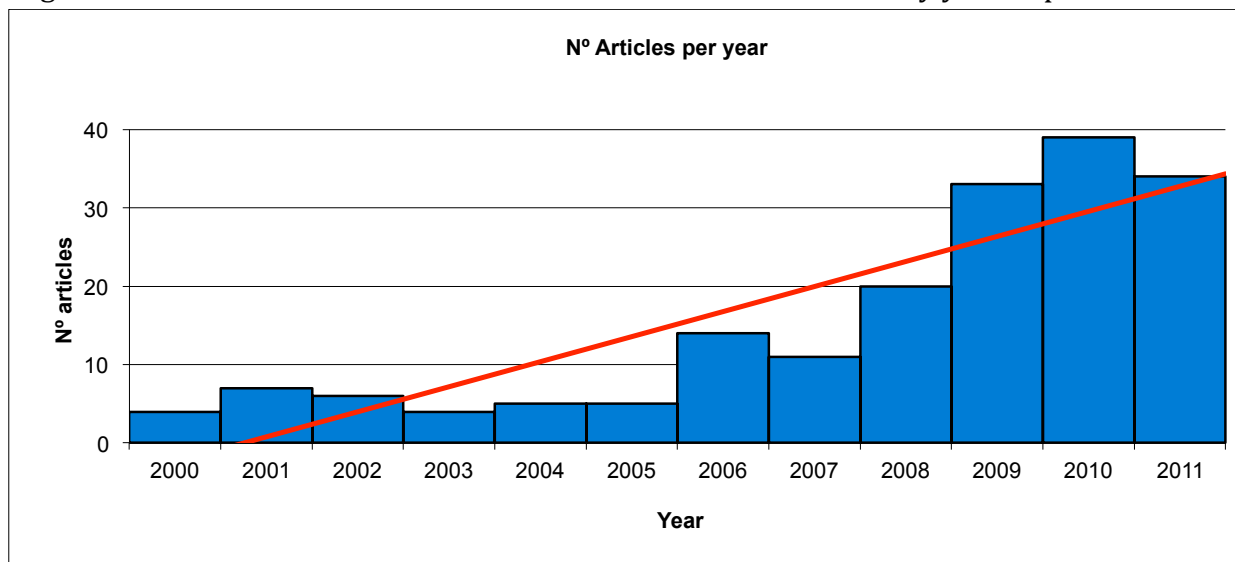
63% of the documents were related to Influenza, 18% to Hepatitis B, 11% to MMR vaccine (mainly about measles), 6% were about Tdap (mostly Pertussis), 4% Varicella and 4% Tuberculosis (often the documents were not specific only for one VPD. This is the reason why the total does not add 100%).

SCIENTIFIC ARTICLES

Of the 374 scientific articles selected through the various searches performed, 162 articles were discarded because they were not from European countries. We defined as relevant 212 scientific articles after the screening. The focus of those scientific articles was on incidence in 45% of the cases, educational programs and KAP studies in HCWs (i.e. perceptions, attitudes, obstacles to the immunization) in 25% while 21% of the total focused on outbreaks. Three articles (2%) reported social or economic impact of immunization.

Overall, 58% of the scientific articles had been published between 2009 and 2011 (Figure 1) and the trend is positive.

Figure 1. Number of documents included in the literature review by year of publication.



TECHNICAL REPORT

Data and results from other EU related projects as well as from international Institutions were taken into consideration, in particular from VENICE project (available at: <http://venice.cineca.org/reports.html>). The Vaccine European New Integrated Collaboration Effort (VENICE) project have conducted different surveys to collect information on the national vaccination programmes, to increase their knowledge and to know the impact of new vaccines introduced in member states. Their documents are the main source of information about vaccination coverage of HCWs:

- The report “Adult Vaccination Strategies and Vaccine Coverage in Europe, 2010”, that describes vaccination policies and country-specific recommendations in adults (general recommendation and specific groups), shows that a comprehensive strategy for adult vaccination is absent in most countries.
- “Vaccination coverage assessment in EU/EEA, 2011” describes and collates information on vaccination coverage assessment for different vaccines included in the National Immunisation Programme of each MS and update data collected in a survey conducted in 2007.

- Six countries collect vaccination coverage data for HCWs: five countries have influenza vaccination data for HCWs; in addition to influenza, France has vaccination coverage data for hepatitis B, MMR, varicella, pertussis, diphtheria, tetanus and polio vaccines.
- The report “Seasonal influenza vaccination survey in EU/EEA influenza season 2009-10” shows that most countries recommend influenza immunization in occupational settings such as hospital, long-term care facilities or outpatient care clinics.
- According to “Analysis of determinants for low MMR vaccination coverage in Europe, 2010” in 13 countries MMR vaccination is recommended for all or for some HCWs. In 12 countries MMR vaccination is recommended to both genders (males and females), but vaccination is not compulsory. In one country MMR vaccination is compulsory.
- The report “Varicella and herpes zoster surveillance and vaccination recommendations 2010-2011” collects information on the status of introduction of varicella and herpes zoster vaccination for children, adolescents and high risk groups in the EU/EEA countries. Vaccination for susceptible health care workers is recommended in 13/29 countries (45%).
- “Hepatitis B vaccination in Europe” shows that all countries have recommendations for vaccination of health care workers, including students and trainees.

COUNTRY REPORT

Each partner undertook the review of information available in his own country as well as a number of other MS in order to cover the entire Europe. They covered 24 of the 30 countries.

In Austria the annually updated vaccination recommendations, created by the Federal Ministry of Health and experts of the National Vaccination Council, include, among others, the immunization schedule (standard vaccinations) for infants, children, adolescents and adults, as well as the table of indications vaccinations, occupational vaccinations and booster vaccinations with explanation. It includes a special part “Vaccinations for HCWs”: General protection (standard recommendation): Diphtheria, Pertussis, Polio, Tetanus, Measles, Mumps, Rubella, Varicella; Important protection for every HCW: Hepatitis A, Hepatitis B, Influenza and additional protection (special exposition especially in the fields of paediatrics, infectious diseases and laboratory personnel: Meningococcal).

In Belgium the Conseil Supérieur de Santé provides the yearly directives for flu vaccination. Each year, a list of risk groups or labour force groups for whom vaccination is recommended, is established. Health care workers are systematically included in this list. Vaccine administration is usually organised by the employer and for the risk groups by occupational medicine doctor. The occupational medicine services have to report yearly to the federal public service for labour and social concertation the number of people immunized. The same report is done to the Flanders and French Community in order to receive accreditation of the medical inspection and includes the number of administered vaccines. The Fond des Maladies Professionnelles (occupational illness) reimburses Hepatitis B vaccination, which is compulsory for nurses and other at risk workers.

In Cyprus there is no written law or policy that refers to the vaccination of HCWs. The instructions for vaccines are given through circulars and updated according to new data. Cyprus has established policies regarding occupational vaccinations for HCWs employed in acute healthcare facilities, with most of the vaccines of interest being 'recommended'. In fact, all vaccines of interest are recommended except pertussis and varicella. Influenza immunization is recommended in occupational settings such as hospitals, out-patient care clinics, laboratories and long-term care facilities. Data on HCW vaccination coverage are not available, they refer only to the general population.

Czech Republic has a Decree of the Ministry of Health about vaccination against infectious diseases. Its current version contains also a chapter about mandatory vaccination of some categories of health professionals against hepatitis B, hepatitis A and rabies. Also the National Immunization Committee recommends some vaccinations to general population and risk population as HCWs. Hepatitis B is mandatory therefore coverage among HCWs is very high, close to 100%. No data for other vaccine coverage in HCWs are available.

In Denmark the National Board of Health is the supreme professional health care authority. Together with experts from the Health Care system, the National Board of Health has issued recommendations for this area, based on specific legislations and policies. HCWs are only defining as a risk group for Influenza and Hepatitis B vaccination. In the webpage www.sundhed.dk they have summarized information on each of the 5 vaccines: Hepatitis B, Influenza, MMR, Tdap, and Varicella. They have HCWs vaccination coverage data only for influenza.

In Estonia the Minister of Social Affairs is in charge of identification of occupational diseases which can be prevented by vaccination. The Ministry of Social Affairs has issued recommendations for immunization of the risk groups which are not included in the national immunization programme. Data on HCWs vaccination coverage for Hepatitis B, Influenza and dTpa are provided by 3 hospitals.

In France the Ministry of Health is in charge of the vaccination policy for both, HCWs and the general population, as well as of all legal issues. In France, 5 vaccinations are compulsory for HCWs (both students and workers): diphtheria, tetanus, poliomyelitis, hepatitis B and BCG. In addition, other vaccinations included in the National Immunization Schedule, such as measles, varicella, pertussis are recommended for all HCWs, while typhoid or rabies vaccines are recommended only for some categories of health professionals. Recently the French Institute for Public Health Surveillance has published a study which describes estimated vaccine coverage among health staff for both recommended and compulsory vaccinations.

In Germany the annually updated recommendations of STIKO (Standing Committee on Vaccination) include, among others, the immunization schedule (standard vaccinations) for infants, children, adolescents and adults, as well as the indications for occupational vaccinations (also for booster vaccinations, indicated vaccinations, travel vaccinations and post-exposure prophylaxis/ring vaccinations). Compulsory vaccination does not exist in the Federal Republic of Germany. The recommendations for the vaccinations due to an increased occupational/professional risk depend on the specific field of work. The recommended vaccines for all HCWs are hepatitis B, influenza, Measles

and Mumps (included in the MMR vaccination) and pertussis. The recommended vaccinations for specific groups of HCWs or health-care settings are rubella and varicella (there were only listed the project relevant vaccinations). Vaccination with the currently available BCG vaccine is not recommended. The regulation on the implementation of EC directives on the protection of employees against exposure to biological agents at work (Biostoffverordnung, BioStoffV) is a ground rule that specifies the requirements of the German Occupational Safety and Health Act. It regulates the approach for work-related activities involving biological agents, and includes rules to protect workers in these activities. The recommendations of the various institutions always refer to the recommended vaccinations of STIKO. Data on vaccination rates of healthcare workers in Germany are not systematically collected. Statements about vaccination rates for medical staff mostly refer to a small sample size or to specific institutions.

In Greece all immunizations, including the ones advised by the National Immunization Programme, are voluntary. No legislation exists that makes one or more vaccines obligatory. In the recommended immunization schedule for adults included in the National Immunization Committee, HCWs are mentioned in particular as at high risk for Hepatitis A, Hepatitis B and Influenza. HCWs are only mentioned as a particularly high risk group in the guidance for Hepatitis B and Influenza. The Hellenic CDC finances in frequent intervals national vaccination coverage studies. Latest available data are from a study carried out by the National School of Public Health in 2006. Official vaccination coverage data among HCWs for Measles-Mumps-Rubella (MMR), Tetanus, Diphtheria, Pertussis (Tdap) or Varicella is not collected. The Hellenic CDC has undertaken a pilot study in 17 hospitals to investigate the vaccination coverage of Greek HCWs for Hepatitis B. In addition, since 2005, yearly data on HCWs vaccination coverage for seasonal influenza are collected. In fact, all state owned hospitals have to report to the Hellenic CDC each year, at the end of winter, vaccination coverage of health care workers immunized in hospital.

In Ireland by law, employers must assess risk. This involves examining what in the workplace could cause harm to employees and other people such as patients and visitors. The employer must then weigh up whether they have enough precautions or controls in place to prevent harm or whether they should do more to prevent it. The Safety, Health and Welfare at Work (Biological Agents) Regulations require that where vaccines are available, employers must offer them, free of charge, to employees who are at risk of occupational exposure to biological agents. Vaccination is recommended for health care workers by the National Immunization Advisory Committee of Ireland. The Department of Health has published guidance on prevention of blood borne pathogens (including Hepatitis B vaccination guidance). There are no legal instruments that dictate the need for particular immunizations for the employment of HCWs. However, since April 2009 the Health Services Executive have stated that all new staff starting a post in the public health services where they may be involved in exposure prone procedures, will have to provide evidence that they are not infectious with hepatitis B. In the absence of such evidence the individual will not be employed. Additionally, all existing staff must have a health clearance statement from Occupational Health that they are not infectious for hepatitis B. In the absence of such clearance statement the individual will not be allowed to perform exposure prone procedures. Decisions about vaccination(s) recommended should be based on the duties of the individual rather than on job title alone. The category A are frontline health-care workers (both clinical and non-clinical), whose work may expose them to blood-borne virus infections and other

infectious diseases. For them the recommended vaccines are hepatitis A, hepatitis B, BCG, varicella, influenza, measles, mumps and rubella. Diphtheria vaccine may require for workers in who handle material that may contain pathogenic corynebacteria (this includes most laboratory staff). Data on influenza vaccination coverage of HCWs is not routinely available at national level. However, telephone surveys have been conducted in recent years.

In Italy a National Vaccination Committee composed of representatives of the Regional Health Authorities, Ministry of Health, National Institute of Health and scientific societies has the task to prepare the National Immunization Plan (NIP). The NIP provides guidelines and recommendations and defines the vaccines to be offered free of charge in all Regions. The NIP, referring to a Legislative Decree issued on 2008 for health and safety in the workplace, states that workers involved in activities for which the risk assessment has highlighted a risk for the health, are subject to health surveillance. The employer must take special protective measures for those workers who, for personal health reasons, are at higher risk. These measures include the provision of effective vaccines for those workers who are not already immune to the biological agents to whom they are exposed in their daily work. The NIP recommends to immunize health workers and students against Hepatitis B, flu, MMR, varicella and pertussis. Vaccination against tuberculosis is mandatory for healthcare professionals with a negative tuberculin test, who for any reason, operate in environments with high health risk of exposure to strains of multidrug resistant TB or operating in high risk environments and cannot be subjected to preventive therapy, because of clinical contraindications to the use of specific drugs. Vaccination coverage data in Italy are available only for influenza.

In Latvia the Cabinet shall determine against which infectious diseases the vaccination of persons shall be compulsory, as well as the procedures for such vaccination and the cohort of persons to be vaccinated. According to the regulation, for preventing occupational infections, vaccination of employees is mandatory against the following infectious diseases: hepatitis B, rabies, tick-borne encephalitis and yellow fever. The costs of these vaccinations are covered by employers. There is a State Immunization programme for 2012 -2014 and Immunization Council at the Ministry of Health and a guideline for treatment and prophylaxis of Influenza where HCWs vaccination is recommended against seasonal and pandemic influenza.

In Lithuania the legal framework is extensive. The employees, who are at risk to fall ill with a communicable disease, have to be vaccinated at the expense of the employer. The list of occupations and positions of the employees, who are vaccinated, has to be approved by the Minister of Health Care. BALTIPA is the local acronym of Baltic Immunoprophylaxis Association, the expert group established in 2009 in Lithuania, who provides recommendations on vaccination calendar for adults in 2012. Additional vaccination of adults (over the National Immunization calendar, which focuses on vaccinations covered by the state budget only) is recommended. According to recommended calendar, HCWs are identified as a target group for vaccination against hepatitis A and B viruses, influenza, MMR, varicella, diphtheria, tetanus and pertussis. There are no official statistical data on vaccination coverage of HCWs available in Lithuania. However, according to the Centre for Communicable Diseases and AIDS, data on vaccination of HCWs should be available in each health care institution. The Centre does not collect such data because their concern is to ensure sufficient level of vaccination against particular diseases among general population (not among particular

professional groups). An exception is vaccination of the population against pandemic influenza. There is a separate program on preparedness for pandemic influenza. According to the program, acquisition of vaccine against pandemic influenza is financed from the state budget; Ministry of Health should ensure vaccination of the risk groups. Three priority groups (among them – HCWs) were identified for receiving vaccine free of charge by the Order of the Minister of Health. The Centre collected statistical data on vaccination against pandemic influenza coverage in each priority group.

Malta has policies about occupational infections and hepatitis B used in the only state hospital. Hepatitis B vaccination is mandatory for all employees who fall within the high-risk groups identified. Influenza vaccine is offered to all health care workers employed. The combined adsorbed diphtheria and tetanus vaccine for adults is offered to all staff whose immunization status is not up-to-date. Vaccination with the combined measles, mumps and rubella (MMR) vaccine is offered to all non-immune staff. BCG vaccine is offered to all staff with direct contact with patients. Vaccination against varicella is offered to all non-immune staff having contact with high-risk patients in paediatrics, haematology, infectious diseases and obstetrics. Only records of staff working in that hospital are kept, while records of staff working in the other hospitals or health centres are not available. Influenza vaccine is offered to all HCWs, but coverage data is not exhaustive.

In Netherlands there are two decrees (document working condition on biological agents and Dutch decree on screening and vaccination of employees exposed to biological agents in the work setting) and several guidelines exist. Data on the vaccination coverage of health professionals are scarce (only some related articles). About incidence, work-related infectious diseases are reported to the National Centre for Occupational diseases (NCvB) by registered occupational health physicians.

In Norway there are different official documents, some of them more general (The Working Environment Act, Guide to the Working Environment Act, Biological factors, Prevention of blood contamination in healthcare) and some more specific (Regulation on protection against exposure to biological agents in the workplace, Guidelines on immunization against Hepatitis A and B). The Norwegian Institute of Public Health (NIPH) recommends that HCWs with close contact with patients are vaccinated against influenza and tuberculosis. In Norway data on vaccination coverage of HCWs are available only for influenza.

In Poland for people employed or starting work in one of the occupations listed in Ordinance of the Ministry of Health, some vaccinations are recommended. The Prevention and Control of Infections and Communicable Diseases in Humans Act recommends vaccination of persons exposed to biological materials or those in contact with people who might be potential sources of infection. In addition to regulations on vaccinations there is another guideline for prophylactic examinations, which contains information related to exposures which may concern health care workers directly. All HCWs and medical students are obliged to undergo preventive vaccination against hepatitis B. Other vaccinations are only recommended.

Portugal has documents issued by Minister of Health that dictate preventive measures to protect workers against the risks of exposure to biological agents at work and some specific

recommendations about measles and hepatitis B. Influenza, mumps, rubella, diphtheria and tetanus vaccines are also recommended for HCWs.

In Romania there is no specific legal decision that dictates the need for particular immunizations for HCWs employment. There are legal decisions that refer to the health of employees and employers responsibilities and specific recommendations for vaccination against rubella and influenza have been elaborated by the National Institute of Public health, National Centre for Surveillance and Control of Communicable Diseases. Data on vaccination coverage of HCWs are available at the Institute only for influenza vaccination. No publications have been found.

In Slovenia no special or separate document for obligatory and recommended vaccinations for HCWs are available. The Minister of Health every year accepts a regulation document: Programme for Immunization and chemoprophylaxis for the XY year. This document is made on the basis of Law about infectious diseases and recommendations of a body that is responsible for vaccination at the National Institute of Public Health. In this document recommendations for the immunization of all Slovene inhabitants and also for residents that are exposed to infectious agents during their work are reported. For HCWs it is mandatory to be vaccinated against all diseases that are obligatory for all residents. Compulsory vaccinations are funded from public sources and they include diphtheria, pertussis, tetanus, hepatitis B, measles, rubella, rabies, poliomyelitis and mumps vaccines. For HCWs varicella, influenza and meningococcal vaccines are recommended; however, data about vaccination coverage is not very sound.

In Spain there are some official documents of 1995 and 1997 about workers protection against the risk related to the exposure to biological agents during the work. The Ministry of Health and various scientific societies have developed specific guidelines on vaccination of healthcare workers. The vaccines recommended for HCWs by Spanish Association of Vaccinology are: Influenza, hepatitis B, MMR, chicken-pox and tetanus-diphtheria-pertussis. Vaccination coverage data of HCWs are available only for influenza.

In Sweden the National Board of Health and Welfare (NBHW) recommends only H1N1 and hepatitis B vaccine for health care workers. However, for Tuberculosis the health care workers should fill out a health declaration that they are immunized, and in the frame of safe and secure health care the employers should offer their employees TB vaccine. Within the framework of safe and secure health care the health declaration should also states if the employee is immune or susceptible to chickenpox. If the employee is susceptible the employer should offer her/him varicella vaccine. According to regulations from the NBHW it is up to each employer/caregiver/hospital authority to decide if they require their staff to be vaccinated against certain diseases. This falls within the frame of safe care, however, the employer must have rationale for requiring the vaccination. No official data on HCWs vaccination coverage is available.

In Switzerland there are no compulsory vaccinations. For all health care workers the vaccinations recommended are as follows: Hepatitis B, MMR, influenza, varicella, diphtheria, tetanus, poliomyelitis, while hepatitis A and meningococcal vaccines are recommended only for HCWs at particular risk. The costs of all occupational health indicated vaccinations must be paid by the employer. There are

different legal frameworks about prevention of accidents and occupational diseases and protection of workers and the recommendations of the various institutions, always refer to vaccinations recommended by the Federal Commission on Vaccination. Data on vaccination rates of healthcare workers in Switzerland are not systematically collected. United Kingdom has no specific legal framework which dictates the need for particular immunizations, but all work is subject to the provisions of the Health and Safety at Work Act 1974 under which employees and employers have a duty to protect those at work and others who may be affected by their work activities. According to the “Green Book” all staff involved in direct patient care should be up to date with their routine immunizations, e.g. tetanus, diphtheria, polio and MMR. BCG vaccine is recommended for healthcare workers who may have close contact with infectious patients. It is particularly important to test and immunise staff working in maternity and paediatric departments and departments in which the patients are likely to be immunocompromised. Hepatitis B vaccination is recommended for healthcare workers who may have direct contact with patients’ blood or blood-stained body fluids. Influenza vaccination is recommended for healthcare workers directly involved in patient care, who should be offered influenza immunization on an annual basis. Varicella vaccine is recommended for susceptible healthcare workers who have direct patient contact. The only vaccination coverage data routinely collected for healthcare workers is for seasonal influenza.

There are significant variations between countries, in terms of recommended vaccines. As shown in Table 3, vaccination against hepatitis B and influenza are almost universally recommended for HCWs in Europe. Policies regarding HCW vaccination also exist against measles (13 countries), mumps (11 countries), rubella (13 countries), tuberculosis (8 countries), diphtheria (13 countries), tetanus (12 countries), pertussis (9 countries) and varicella (15 countries). This information is from literature ^(4, 5) and validated by the contact points from countries.

Table 3. Policies for vaccination of HCWs by country

	Hepatitis B	Influenza	Measles	Mumps	Rubella	TBC	Diphtheria	Tetanus	Pertussis	Varicella
Austria	R	R	R	R	R		R	R	R	R
Belgium	M	R	R	R	R		R	R	R	R
Bulgaria	-	-	-	-	-	-	-	-	-	-
Cyprus	R	R	R	R	R	R	R	R		
Czech Republic	M	R								
Denmark	R	R								
Estonia	R	R								R
Finland	-	-	-	-	-	-	-	-	-	-
France	M	R	R		R	M	M	M	R	R
Germany	R	R	R	R	R				R	R
Greece	R	R								
Hungary	-	-	-	-	-	-	-	-	-	-
Iceland	-	-	-	-	-	-	-	-	-	-
Ireland	R	R	R	R	R	R	R			R
Italy	R	R	R	R	R	M			R	R
Latvia	M	R					R	R		
Lithuania	R	R	R	R	R		R	R	R	R
Luxembourg	-	-	-	-	-	-	-	-	-	-
Malta	M	R	R	R	R	R	R	R		R
Netherlands	M	R					R	R	R	R
Norway	R	R			M	R	R	R		M
Poland	M	R								
Portugal	R	R	R	R	R		R	R		
Romania	R	R			R					
Slovakia	-	-	-	-	-	-	-	-	-	-
Slovenia	M	R	M	M	M		M	M	M	R
Spain	R	R	R	R	R		R	R	R	R
Sweden	R					R				R
Switzerland	R	R	R	R	R		R	R		R
United Kingdom	R	R	R	R	R	R	R	R	R	R

M: MANDATORY VACCINE; R: RECOMMENDED VACCINE; -: NO DOCUMENTS AVAILABLE

DISCUSSION AND CONCLUSIONS

Workers in the EU are protected by the framework Directive (89/391/EEC). This Directive is supplemented by national directives to cover safety and health requirements. All the EU MS have implemented the Directive 2000/54/EC and established in their legal acts national policies related to biological agents at workplaces. The national regulations reflect EU legislation with regard to national needs and priorities and provide general framework for activities related to identification and prevention of all biological agents. The literature review and the synopsis sent by the EU countries participating to the project show that HCWs immunization policies are not homogeneous in EU. Some countries do not even have specific legislation for HCWs. We need a consensus about HCWs immunization in order to promote HCW and patient safety.

Our review has highlighted a considerable variation in terms of number of scientific articles available in each country. Most of them are about influenza vaccination among general population, even though in recent years publications about HCWs vaccination are increasing.

Vaccination of HCWs against hepatitis B is recommended in 16/24 countries that responded to the survey and mandatory in eight of them. Also vaccination against influenza is recommended for HCWs in all countries except Sweden, where only H1N1 vaccine is recommended. However, in no country influenza vaccination is mandatory. The recommendations of other vaccines for HCWs vary by countries. Remarkably, half of European countries have no specific policies for HCWs vaccination against mumps, measles, rubella and varicella and pertussis. Half of the participating countries (12/24) recommend eight or more vaccines of the ten prioritized. However, in 7/24 (29%) countries only two or three of these vaccines are recommend for HCWs.

With the exception of the some countries where vaccine-specific mandatory policies exist, policies pertaining to occupational vaccination of HCWs are voluntary in the vast majority of European countries. Only France and Slovakia have a big number of compulsory vaccinations (4 and 7 respectively).

The analysis shows the need to strengthen surveillance and collection of coverage data for this subgroup of the population. The majority of studies about vaccination coverage among HCWs focus on influenza and are usually limited to regions or hospitals. Venice Project is the main source of information about HCWs vaccination coverage and strategies in Europe and it would be very useful to strengthen our collaboration with this network in order to better explore and update information related to HCWs.

BIBLIOGRAPHY

1. Loulergue P, Moulin F, Vidal-Trecañ G, Absi Z, Demontpion C, Menager C, Gorodetsky M, Gendrel D, Guillevin L, Launay O. Knowledge, attitudes and vaccination coverage of healthcare workers regarding occupational vaccinations. *Vaccine* 2009; 27: 4240–4243.
2. CDC. Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMRW* 2011; 60(RR07): 1-45.
3. Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16 (1) of Directive 89/391/EEC. *Official Journal L 262* , 17/10/2000 P. 0021 – 0045.
4. Maltezou HC; Wicker S; Borg M; Heininger U; Puro V; Theodoridou M; et al. Vaccination policies for health-care workers in acute health-care facilities in Europe. *Vaccine* 2011/11/28; 29(51): 9557-9562.
5. Haverkate M, D’Ancona F, Giambi C, Johansen K, Lopalco PL, Cozza V, Appelgren E, on behalf of the VENICE project gatekeepers and contact points. Mandatory and recommended vaccination in the EU, Iceland and Norway: results of the VENICE 2010 survey on the ways of implementing national vaccination programmes. *Euro Surveill.* 2012;17(22):pii=20183. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20183>