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Vaccination policies for dentists and other dental professionals in Europe: a systematic report

Helena C. Maltezou, Audrey Camilleri, Nuala Carney, Anna Chainier, Katrín Guðmundsdóttir, Erminija Guzaitienė, Charlotte Heuzé, Jörg Krainhöfner, Peter Kukolik, Mercedes Linninger, Jens Nagaba, Miguel Pavao, Harry-Sam Selikowitz, Nikolai Sharkov, Freddie Sloth-Lisbjerg, Roman Smucler, Marek Szewczyński, Brigitte van Dam, Luca Vettore, Lynn Woods, Oliver Zeyer & Ioannis Tzoutzas

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ORIGINAL RESEARCH

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Vaccination policies for dentists and other dental professionals in Europe: a systematic report

Helena C. Maltezou [a], Audrey Camilleri[b], Nuala Carney[c], Anna Chainier[d], Katrín Guðmundsdóttir[e], Erminija Guzaitienė[f], Charlotte Heuzé[g], Jörg Krainhöfner[h], Peter Kukolik[i], Mercedes Linninger[j], Jens Nagaba[k], Miguel Pavao[l], Harry-Sam Selikowitz[m], Nikolai Sharkov[n], Freddie Sloth-Lisbjerg[o], Roman Smucler[p], Marek Szewczyński[q], Brigitte van Dam[r], Luca Vettore[s], Lynn Woods[t], Oliver Zeyer[u] and Ioannis Tzoutzas[v]

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ABSTRACT

Background: Dentists and other dental healthcare professionals (DHCP) are at increased risk for several vaccine-preventable diseases (VPDs). We studied vaccination policies for DHCP in Europe.

Methods: The national dental associations and chambers of 31 European countries were invited to complete a structured form. The survey was conducted in 2023.

Results: Vaccination policies for DHCP existed in all (21) participating countries. Vaccination policies against hepatitis B, COVID-19 and influenza existed in 20, 18, and 17 countries, respectively. Vaccination policies against measles, mumps, rubella, and varicella existed in 8, 7, 7, and 7 countries, respectively, and against diphtheria, tetanus, poliomyelitis, and pertussis in 5, 5, 4, and 2 countries, respectively. Vaccination policies against hepatitis A existed in 5 countries, against meningococcus C, meningococcus A, C, W, Y, and meningococcus B in 1, 2, and 2 countries, respectively, and against tuberculosis and pneumococcus in 4 countries each. Thirteen countries had mandatory vaccination policies.

Conclusions: All participating countries had vaccination policies targeting DHCP, however there were significant differences in the number of vaccinations and the implementation frame (mandatory or voluntary vaccinations). Considering the recent outbreaks of VPDs in Europe, vaccination programs for DHCP should be evaluated and strengthened to promote safety in dental facilities.

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Dental healthcare personnel; dentists; Europe; occupational policies; vaccination

1. Introduction

Despite the implementation of routine vaccination programs for several decades globally, vaccine-preventable diseases (VPDs) are still transmitted in healthcare facilities [1]. Dentists and other dental professionals [hereafter referred to as dental healthcare professionals (DHCP)] are at increased risk of occupational exposure and acquisition of several VPDs due to the specific characteristics of dental practice. These include the proximity of DHCP to the oral cavity and upper respiratory tract of their patients, the use of invasive procedures, and the production of aerosols, which predispose to their exposure to droplets, blood, and saliva of their patients. DHCP are also at increased risk for needle-stick injuries, while DHCP have occasionally been traced as sources of transmission of VPDs to their patients [2–8]. Therefore, vaccinations of DHCP are justified as a key measure to protect them and indirectly their patients and to promote safety in dental practice [8–11].

To our knowledge, there is no published review of vaccination policies focusing on DHCP. We present the results of a cross-sectional survey conducted by the Council of European Dentists to record the vaccination policies for DHCP in Europe. The results of this study can be used to guide the development of a basic vaccination program for all DHCP across Europe.

2. Methods

The Council of European Dentists is a non-for-profit association which represents more than 340,000 dentists across Europe [12]. The association was established in 1961 and is

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now composed of the national dental associations and chambers from the following 31 European countries: Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom [12]. The national dental associations and chambers of the above mentioned countries were invited through an e-mail to participate in this survey. Vaccination data were submitted by one representative appointed by each dental association. The survey was conducted from January to October 2023. Ethical approval was not needed. The study was conducted in accordance with the Declaration of Helsinki.

A structured form was developed to collect data regarding the national vaccination policies for DHCP in effect in 2023 (appendix). The form was developed based on our previous work on vaccinations for HCP [13]. The form was accessed by participants through a web-link. Data regarding the following vaccinations, which are of importance for dental healthcare settings, were collected: hepatitis B, COVID-19, influenza, measles, mumps, rubella, varicella, hepatitis A, diphtheria, tetanus, poliomyelitis, pertussis, meningococcus group C, meningococci groups A, C, W, Y (tetravalent vaccine), meningococcus B, bacillus Calmette-Guérin (BCG), and pneumococcus (conjugate and/or polysaccharide vaccine). Vaccination policies were grouped as 'recommended,' 'mandatory,' 'mandatory for salaried DHCP,' 'mandatory for independent DHCP,' and 'not mandatory, not recommended.' The terms 'recommended' and 'mandatory' vaccinations were applied as mentioned in the national laws or regulations of each country. In case of a mandatory vaccination policy, participants were asked to clarify the penalty for vaccination refusers, using an open question at the end of the survey form (appendix). Data on the source of financing for the vaccinations were also requested through e-mail. Vaccination policies for the general population were not considered. The appointed participants were asked to re-verify their country's data upon submission of the manuscript (September 2024), while COVID-19 vaccine information was updated in January 2025. All communications were done through e-mails.

3. Results

The following 21 European countries participated in the survey: Austria, Bulgaria, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Slovakia, Switzerland, and the United Kingdom (67.7% response rate). All participating countries had vaccination policies for DHCP, which consisted of a median of 4 vaccinations per country (range: 1–14 vaccinations). Vaccination policies by country and vaccine are shown in Table 1.

3.1. Hepatitis B vaccination

All countries but one (Portugal) had vaccination policies against hepatitis B for DHCP (Table 1). Mandatory vaccination policies for hepatitis B exist in 12 European countries (Table 1). In 8 countries (Czechia, France, Germany, Hungary, Malta, Poland, Slovakia, and Switzerland) all DHCP should be vaccinated against hepatitis B. In Finland, hepatitis B vaccination is required for DHCP that might be exposed to blood during their work, while those with insufficient vaccination protection cannot work in direct contact with susceptible patients; the risk of exposure is assessed by the occupational health service. In the Netherlands, hepatitis B vaccination is mandatory for all DHCP except for employees that are not involved in any dental treatment (e.g. reception assistants). Vaccination refusers have no consequences; however, they must get tested every three months. In Germany and Switzerland, dentists who refuse vaccination are not allowed to provide dental services (either in the public or the private sector) while in Hungary they do not get permission to work.

Table 1. Vaccination programs for DHCP in Europe, 2023*.

Country	Hep B	COVID-19	Influenza	Measles	Mumps	Rubella	Varicella	Hep A	Diphtheria	Tetanus	Polio	Pertussis	MenC	MenACWY	MenB	BCG	Pneumo
Austria	R	R	R	R	R	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	R	R	nMnR	R
Bulgaria	R	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Czechia	M	R	R	nMnR	nMnR	nMnR	nMnR	R	nMnR	nMnR	nMnR	nMnR	R	R	R	nMnR	R
Denmark	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Finland	spM	R	spM	M	M	M	spM	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
France	M	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	M	M	M	nMnR	nMnR	nMnR	nMnR	M	nMnR
Germany	M	R	R	M	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Greece	R	R	R	R	R	R	R	R	R	R	R	R	nMnR	nMnR	nMnR	nMnR	nMnR
Hungary	M	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	R
Iceland	R	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Ireland	R	R	R	R	R	R	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Italy	R/spM	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	R/spM	nMnR
Lithuania	R	R	R	R	R	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Malta	M	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Netherlands	spM	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Norway	R	spR	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Poland	M	R	R	M	M	M	R	R	M	M	M	M	nMnR	nMnR	nMnR	M	M
Portugal	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	M	M	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Slovakia	M	R	R	nMnR	nMnR	nMnR	nMnR	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
Switzerland	M	R	R	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR	nMnR
United Kingdom	R/spM	spR	R	M	M	M	spR	nMnR	M	M	M	nMnR	nMnR	nMnR	nMnR	spR	nMnR

*COVID-19 vaccination information has been updated for 2025.

DHCP: dental healthcare professionals; Hep B: hepatitis B; COVID-19: coronavirus disease 2019; Hep A: Hepatitis A; Polio: Poliomyelitis; MenC: Meningococcus group C; MenACWY: Meningococcus group A,C,W,Y (tetravalent); MenB: Meningococcus group B; BCG: Bacillus Calmette-Guérin (tuberculosis); Pneumo: Pneumococcus; R: Recommended for all DHCP; M: Mandatory for all DHCP; spM: Mandatory for specific DHCP; spR: Recommended for specific DHCP; nMnR: Not mandatory, not recommended for DHCP.

In Italy hepatitis B vaccination is mandatory only for dentists in the National Health System, while it is recommended for the remaining DHCP. Penalties for vaccination refusers are established by local health authorities or hospitals, but frequently there is no binding status, legally speaking. Hospital trusts in the United Kingdom may mandate hepatitis B vaccination for DHCP who perform exposure prone procedures (EPPs). Refusal to get vaccinated may result in restriction in performing EPPs or may require regular testing. Independent DHCP may also be subject to mandatory vaccination, depending on their employer or the inspecting authorities/regulators. Dental nurses are not routinely considered as performing EPPs. Vaccination against hepatitis B is recommended for the remaining DHCP in the United Kingdom.

Hepatitis B vaccination is recommended in 8 countries (Austria, Bulgaria, Denmark, Greece, Iceland, Ireland, Lithuania, and Norway). In Iceland hepatitis B vaccination is also recommended for dental students in clinical practice. In Greece hepatitis B vaccination is recommended for HCP at risk of exposure to possibly contaminated biologic materials, including DHCP. In Bulgaria, academic institutions (colleges and universities) offer free-of-charge booster vaccinations against hepatitis B before dental students start their clinical practice.

3.2. COVID-19 vaccination

As per the January 2025 update, vaccination against COVID-19 is recommended for DHCP in 16 countries (Austria, Bulgaria, Czechia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, the Netherlands, Poland, Slovakia, and Switzerland). COVID-19 vaccination is specifically recommended for frontline HCP and staff working in care homes for older adults in the United Kingdom and for DHCP ≥65 years of age and those with high-risk comorbidities in Norway. In France COVID-19 vaccination is highly recommended for DHCP ≥65 years of age and those with high-risk comorbidities (e.g. immunosuppression). There are no COVID-19 vaccination policies for DHCP in 3 countries.

3.3. Influenza vaccination

Annual seasonal influenza vaccination is mandatory in Finland for DHCP providing care to persons at risk of serious influenza-associated complications, including persons with impaired immune system, pregnant women, infants <12 months old, and persons >65 years old (Table 1). In Finland, influenza vaccination also concerns dental students, while unvaccinated personnel cannot provide care to persons at risk of serious complications. Influenza vaccination is recommended for DHCP in 16 countries (Table 1). National policies for influenza vaccination do not exist in 4 countries.

3.4. Measles-mumps-rubella vaccination

Vaccination against measles-mumps-rubella (MMR) is mandatory for DHCP in 3 countries (Finland, Poland, United Kingdom) and is recommended for DHCP in 4 countries (Austria, Greece, Ireland, Lithuania) (Table 1). In Finland, DHCP without proof of immunity are not allowed to provide services to patients who are medically assessed as being susceptible to serious complications. Germany has issued mandatory vaccination policies against measles only and dentists (employed and self-employed) are not allowed to work without proof of measles vaccination or immunity. National policies for measles, mumps or rubella vaccination do not exist in 13, 14, and 14 countries, respectively.

3.5. Varicella vaccination

In Finland immunity against varicella is mandatory for personnel working with people at risk of serious varicella-related consequences, including patients with impaired immune system, pregnant women, infants <12 months old, and people >65 years old (Table 1). Vaccination against varicella is recommended for DHCP in 5 countries (Austria, Greece, Ireland, Lithuania, Poland). In the United Kingdom vaccination against varicella is recommended for susceptible HCP with direct patient contact only, including DHCP. No vaccination policies against varicella exist in 14 countries.

3.6. Hepatitis a vaccination

Vaccination against hepatitis A is recommended for DHCP in 5 countries (Czechia, Greece, Ireland, Poland, and Slovakia) (Table 1). Particularly, in Czechia and Slovakia vaccination against hepatitis A is recommended for persons professionally exposed to increased risk for hepatitis A infection, including DHCP, while in Greece vaccination is recommended for HCP at risk for exposure to possibly contaminated biologic materials, including DHCP. Vaccination policies against hepatitis A do not exist in 16 countries.

3.7. Tetanus and diphtheria vaccination

In France, Poland, Portugal, and the United Kingdom vaccination against tetanus and diphtheria is mandatory for DHCP (Table 1). Particularly in Portugal vaccination against tetanus and diphtheria is enforced by making it a prerequisite for university enrollment and attendance of examinations. In Greece vaccination against tetanus and diphtheria is recommended for DHCP. In 16 countries there are no specific vaccination policies against tetanus and diphtheria.

3.8. Poliomyelitis vaccination

Vaccination against poliomyelitis is mandatory for DHCP in France, Poland, and the United Kingdom, while it is recommended for DHCP in Greece (Table 1). In the remaining countries there are no specific vaccination policies against poliomyelitis.

3.9. Pertussis vaccination

Vaccination against pertussis is mandatory for DHCP in Poland, and it is recommended for DHCP in Greece (Table 1). Given

Table 2. Sources of financing vaccination programs for DHCP in Europe by country.

Country	Sources of financing vaccinations for DHCP
Austria	social insurance
Bulgaria	state
Czechia	health insurance
Denmark	employer/hospital
Finland	employer/hospital; self-employed dentists pay for their vaccines
France	public and private health insurance
Germany	employer for Hep B vaccine; public/private health insurance for other vaccines
Greece	state
Hungary	state for Hep B and COVID-19 vaccines; employer/healthcare facility for other vaccine
Iceland	DHCP pay for Hep B vaccine; state for other vaccines
Ireland	DHCP pay for Hep B vaccine; state for other vaccines
Italy	National Health System
Lithuania	state pays for influenza vaccine; employer for other vaccines
Malta	state
Netherlands	state for COVID-19 vaccine; other vaccines: self-employed dentists for their vaccines/all others: employer
Norway	state, DHCP or employer
Poland	COVID-19 vaccine by state; other vaccines by DHCP or employer
Portugal	information not available
Slovakia	Hep B vaccine by public health insurance; reimbursement of influenza vaccine for DHCP
Switzerland	DHCP pay for their vaccines
United Kingdom*	for employed DHCP (e.g. in NHS): employer; independent contractors in general dental practice: them selves

*There may be differences by country, organization and employer.
DHCP: Dental healthcare professionals; Hep B: hepatitis B; COVID-19: Coronavirus disease 2019; NHS: National Health System.

that there is no stand-alone pertussis vaccine available, vaccination against pertussis is administered in combination with diphtheria and tetanus toxoid vaccine components. No vaccination policies exist in 19 countries.

3.10. Meningococcal vaccination

Czechia has recommendations for vaccination against meningococcus group C for DHCP. In addition, Austria and Czechia recommend vaccination with the tetravalent meningococcus vaccine and the meningococcus group B vaccine for DHCP (Table 1). The remaining countries have no specific recommendations against meningococcus in place.

3.11. Bacillus Guerin-Calmette (BCG) vaccination

Vaccination with the BCG vaccine is mandatory for DHCP in France and Poland. In Italy, BCG vaccination is generally recommended for DHCP, however many dental schools require that dental students are vaccinated (Table 1). In the United Kingdom BCG vaccination is recommended for HCP including DHCP, who may have close contact with infectious patients. In 17 countries there are no specific policies for BCG vaccination for DHCP.

3.12. Pneumococcus vaccination

In Austria, Czechia, and Hungary there are recommendations for vaccination against pneumococcus while in Poland it is mandatory for DHCP to get vaccinated (Table 1). No recommendations are in place in the other countries.

3.13. Sources of financing vaccinations for DHCP

Vaccinations for DHCP are funded either by the state, the health insurance provider or the employer in most countries (e.g. Austria, Bulgaria, Czechia, Denmark, France, Germany, Greece, Hungary, Italy, Lithuania, Malta) (Table 2). In Slovakia only mandatory vaccinations are financed by the state but influenza vaccination is fully reimbursed for DHCP. In Finland, the Netherlands, Norway, Poland, and the United Kingdom, the employer pays for vaccinations, however self-employed dentists and independent contractors in general dental practice have to pay for their vaccines (except for COVID-19 vaccine which is covered by the state in the Netherlands, Norway, and Poland). In Iceland and Ireland DHCP pay for hepatitis B vaccination, and the state for the remaining vaccines. In Switzerland, DHCP pay for their vaccines.

4. Discussion

We studied vaccination policies for DHCP in 21 European countries, as of 2023. All participating countries have national vaccination policies for DHCP. Nevertheless, our study revealed significant variations between them in terms of number of vaccinations and frame of implementation (recommended or mandatory vaccinations).

Hepatitis B vaccination policies for DHCP were in place in all European countries but one. This is attributed to the well-documented occupational risk for dental professionals [2,4,11] but also to the World Health Organization (WHO) recommendations and the European Union (EU) Council Directive 2010/32/EU on prevention of sharp injuries in the hospital and healthcare sector [9,10]. Similarly, vaccination policies against COVID-19 were in place in most European countries, which is attributed to the increased risk for SARS-CoV-2 infection

among DHCP, to the need to protect healthcare systems from COVID-19 outbreaks and staff absenteeism, and to the WHO prioritization of HCP for vaccination [3,14,15]. The 2009 EU recommendations on seasonal influenza vaccination may also account for the fact that annual influenza vaccination policies existed in most countries [16].

Approximately one third of countries had vaccination policies against measles, mumps, rubella, and varicella and less than one every four countries have vaccination policies against diphtheria, poliomyelitis, pertussis, and tuberculosis for DHCP. These gaps were found despite the WHO position papers on immunization of HCP, the recent outbreaks of VPDs in Europe, the well-established occupational risk of DHCP, and the 2018 EU Council recommendation on strengthen the protection of HCP through monitoring their immunization status, and actively offering vaccination when needed [10,17–20]. Factors that mostly influence vaccination policies for HCP include the epidemiology of VPDs, the perception of the risk associated with specific VPDs, the national routine vaccination programs, existing vaccination systems, and coverage rates of the general population, the country' income status, vaccination costs, and licensed vaccines, but also cultural and political factors [21,22]. Our survey did not address the factors that potentially impact vaccination policies. Overall, countries may rely on their routine vaccination programs for protecting DHCP. For instance, in the United Kingdom the relevant guidance does say that all healthcare staff should be up to date with their routine immunizations, e.g. tetanus, diphtheria, poliomyelitis and MMR. Nevertheless, booster shots are needed to ensure continuity of protection against several VPDs [21]. At the same time, DHCP may move out of their home country to work. Therefore, it is important for the hosting healthcare systems to ensure that DHCP are immune against specific VPDs. For instance, hospital trusts in the United Kingdom may have their own vaccination policies/requirements and local occupational health services to assess the immunity of DHCP before employment. Moreover, in many countries there are vaccination recommendations issued by dental professional societies, which may fill gaps of national vaccination policies. Similarly, in the United States, although there is written policy by the Centers for Disease Control and Prevention regarding all required and recommended immunizations for DHCP (seasonal influenza, hepatitis B, MMR, varicella, Tdap) [23], specific vaccinations may be required by state law, employers or government agencies [24]. In Australia, DHCP should be up to date with the following immunizations: hepatitis B, MMR, varicella and pertussis, along with annual influenza vaccination; DHCP working with remote indigenous communities should also undergo vaccination against hepatitis A, while BCG vaccination should be considered by those at increased risk of exposure to drug-resistant tuberculosis [25]. Our study demonstrated that most European countries do not align with the WHO position papers on immunization of HCP as well as standards and practices in the United States and Australia.

Another finding of our study is that mandatory vaccination policies existed in 13 European countries. Most mandatory vaccination policies concerned hepatitis B vaccination (12 countries), followed by measles, diphtheria and tetanus vaccinations (4 countries each), and mumps, rubella, poliomyelitis, and BCG vaccinations (3 countries each). More European countries implement mandatory vaccination policies for HCP in the past years, which is attributed to the emergence or reemergence of several VPDs in Europe, the onset of large outbreaks in healthcare facilities, but also to increasing vaccine hesitancy among HCP [13,14,26]. Nevertheless, there are gray areas regarding mandatory vaccinations. For instance, in Finland although the employees have the right to refuse vaccinations under the Constitution and the Patients Act, the Communicable Diseases Act obliges employers in healthcare facilities to ensure adequate vaccine protection or acquired immunity for employees when treating patients susceptible to serious consequences, while employees with inadequate vaccination protection can be used only for special reasons. Moreover, although voluntary vaccination policies are more preferred by HCP, voluntary vaccination programs usually require sustainable efforts to achieve high vaccination coverage rates among HCP [22].

Of note, not all countries provide funds for all DHCP vaccinations. In several countries self-employed dentists have to pay for their vaccinations while in others DHCP are vaccinated against hepatitis B at personal expense. Even when vaccination policies are in place, vaccine availability and costs are key determinants for HCP vaccination [11,22]. Studies indicate that free-of-charge and easy access to vaccinations are associated with significantly higher vaccination rates among HCP and therefore should be in place to increase vaccination coverage rates [11]. Moreover, two recent European cross-sectional studies among DHCP, including dental students, revealed gaps in immunity and awareness of their vaccination status [27,28]. The need to capture unvaccinated dental students upon entering clinical practice has been addressed in the 2018 EU Council recommendation on enhancing the protection of HCP [18].

The main strength of the present study is the detailed presentation of the current vaccination policies for DHCP in Europe, using a structured form to collect data. Nevertheless, our study is potentially subject to the fact that only 21 out of 31 European countries participated in the survey. We are not aware if the countries that did not respond to our invitation to participate did so because they had no vaccination policies for DHCP. Another potential limitation is that the terms 'recommended' and 'mandatory' may be used differently in different countries. Lastly, we did not collected data regarding booster doses against diphtheria, tetanus, poliomyelitis and pertussis, since variations in the number and timing of vaccine doses for adults and HCP in particular exist in Europe [13,21].

5. Conclusions

This is a review of the 2023 vaccination policies targeting dentists and other DHCP in Europe. All participating European countries had vaccination policies for DHCP as of 2023, with significant disparities among countries regarding the number of vaccinations, the target personnel, and the implementation policy (voluntary or mandatory vaccinations).

Mandatory vaccination policies for DHCP existed in 13 countries, mainly against hepatitis B, measles, diphtheria, and tetanus. Our study revealed that there are gaps in vaccination policies for DHCP in Europe, particularly against measles, rubella, varicella, pertussis, and tuberculosis. The national vaccination policies for DHCP in Europe should be strengthen, considering the present epidemiological trends of several VPDs, their occupational risk, and the need to ensure safety for dental patients. A basis vaccination program for DHCP across Europe should be considered. The findings of the present study can serve as a basis to harmonize vaccination programs for DHCP in Europe.

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The opinions in this article are those of the authors, and do not necessarily represent those of their institutions.

Declarations of interest

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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Author contributions

HC Maltezou: conception and design of the study, analysis and interpretation of the data, drafting of the first version of the manuscript, revising critically for intellectual content, final approval of the submitted manuscript. **A Camilleri**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **N Carney**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **A Chainier**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **K Guðmundsdóttir**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **E Guzaitienė**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **C Heuze**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **J Krainhöfner**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **P Kukolik**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **M Linninger**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **J Nagaba**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **M Pavao**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **H-S Selikowitz**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **N Sharkov**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **F Sloth-Lisbjerg**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **R Smucler**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **M Szewczyński**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **B van Dam**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **L Vettore**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **L Woods**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **O Zeyer**: design of the study, collection of data, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. **I Tzoutzas**: conception and design of the study, analysis and interpretation of the data, revising critically for intellectual content, final approval of the submitted manuscript. All authors agree to be accountable for all aspects of the work.

AI-based tools and technologies

No AI-based tools and technologies were used in this paper.

Data availability statement

Data are available upon request.

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References

Papers of special note have been highlighted as: • of interest •• of considerable interest

1. Maltezou HC, Poland GA. Immunization of healthcare providers: necessity and public health policies. Healthcare. 2016;4(3):E47. doi: 10.3390/healthcare4030047
2. Lewis JD, Enfield KB, Sifri CD. Hepatitis B in healthcare workers: transmission events and guidance for management. World J Hepatol. 2015;7(3):488–497. doi: 10.4254/wjh.v7.i3.488
3. Dental Tribune. Dentists in Indonesia are dying from COVID-19. [cited 2025 Apr 22]. Available from: https://www.dental-tribune.com/news/dentists-in-indonesia-are-dying-from-covid-19/
4. Cleveland JL, Cardo DM. Occupational exposures to human immunodeficiency virus, hepatitis B virus, and hepatitis C virus: risk, prevention, and management. Dent Clin N Am. 2003;47(4):681–696. doi: 10.1016/S0011-8532(03)00041-7
5. Wicker S, Rabenau HF. Occupational exposures to bloodborne viruses among German dental professionals and students in a clinical setting. Int Arch Occup Environ Health. 2010;83(1):77–83. doi: 10.1007/s00420-009-0452-3
6. Van Wijk P, Meiberg A, Bruers J, et al. The risk of blood exposure incidents in dental practices in the Netherlands. Comm Dent Oral Epid. 2012;40(6):567–573. doi: 10.1111/j.1600-0528.2012.00702.x
7. Zachar JJ, Reher P. Percutaneous exposure injuries amongst dental staff and students at a university dental clinic in Australia: a 6-year retrospective study. Eur J Dent Educ. 2022;26(2):288–295. doi: 10.1111/eje.12701
8. Centers for Disease Control and Prevention. Summary of infection prevention practices in dental settings: basic expectations for safe care. [cited 2025 Apr 22]. Available from: https://www.cdc.gov/dental-infection-control/hcp/summary/index.html

9. Official Journal of the European Union. Council directive 2010/32/EU of May 10 2010 implementing the framework agreement on prevention from sharp injuries in the hospital and healthcare sector concluded by HOSPEEM and EPSU. [cited 2025 Apr 22]. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2010.134.01.0066.01.ENG&toc=OJ%3AL%3A2010%3A134%3ATOC
10. World Health Organization. Table 4: summary of WHO position papers – immunization of health care providers. [cited 2025 Apr 22]. Available from: https://cdn.who.int/media/docs/default-source/immunization/tables/table_4_feb_2023_english.pdf?sfvrsn=c2ced2f1_12
11. Nikolopoulou GB, Tzoutzas I, Tsakris A, et al. Hepatitis B in healthcare personnel: an update on the global landscape. Viruses. 2023;15(12):2454. doi: 10.3390/v15122454
12. Council of European Dentists. Our mission. [cited 2025 Apr 22]. Available from: https://cedentists.eu/about.html
13. Maltezou HC, Botelho-Nevers E, Brantsaeter AB, et al. Vaccination of healthcare personnel in Europe: update to current policies. Vaccine. 2019;37(52):7576–7584. doi: 10.1016/j.vaccine.2019.09.061
14. Maltezou HC, Ledda C, Gagneux-Brunon A, et al. Mandatory COVID-19 vaccination for healthcare personnel in the era of new SARS-CoV-2 variants. Vaccine. 2022;40(50):7167–7169. doi: 10.1016/j.vaccine.2022.10.053
15. World Health Organization. WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination, 14 September 2020. [cited 2025 Apr 22]. Available from: https://iris.who.int/bitstream/handle/10665/334299/WHO-2019-nCoV-SAGE_Framework-Allocation_and_prioritization-2020.1-eng.pdf?sequence=1
16. Official Journal of the European Union. Council recommendation 2009/1019/EU of December 22 2009 on seasonal influenza vaccination. [cited 2025 Apr 22]. Available from: https://eur-lex.europa.eu/search.html?scope=EURLEX&text=Council+recommendation+2009%2F1019%2FEU+of+December+22+2009+on+seasonal+influenza+vaccination&lang=en&type=quick&qid=1745338846569
17. World Health Organization. A 30-fold rise of measles cases in 2023 in the WHO European region warrants urgent action. [cited 2025 Apr 22]. Available from: https://www.who.int/azerbaijan/news/item/14-12-2023-a-30-fold-rise-of-measles-cases-in-2023-in-the-who-european-region-warrants-urgent-action
18. Official Journal of the European Union. Council recommendation 2018/C 466/01 of December 7 2018 on strengthened cooperation against vaccine-preventable diseases. [cited 2025 Apr 22]. Available from: https://eur-lex.europa.eu/search.html?scope=EURLEX&text=Council+recommendation+2018%2FC+466%2F01+of+December+7+2018+on+strengthened+cooperation+against+vaccine-preventable+diseases.&lang=en&type=quick&qid=1745338967980
19. Malsam R, Nienhaus A. Occupational infections among dental health workers in Germany – 14-year time trends. Int J Environ Res Public Health. 2021;18(19):10128. doi: 10.3390/ijerph181910128
20. Rinaggio J. Tuberculosis. Dent Clin North Am. 2003;47(3):449–465. doi: 10.1016/S0011-8532(03)00015-6
21. Cassimos DC, Effraimidou E, Medic S, et al. Vaccination programs for adults in Europe, 2019. Vaccines (Basel). 2020;8(1):34. doi: 10.3390/vaccines8010034
22. Maltezou HC, Theodoridou K, Tseroni M, et al. Influenza vaccination policies for health workers in low-income and middle-income countries: a cross-sectional survey, January–March 2020. Vaccine. 2020;38(47):7433–7439. doi: 10.1016/j.vaccine.2020.10.001
23. Centers for Disease Control and Prevention. Summary of infection prevention practices in dental settings. [cited 2025 Apr 22]. Available from: https://www.cdc.gov/dental-infection-control/media/pdfs/2024/07/safe-care2.pdf
24. American Dental Association. Staff immunizations. [cited 2025 Apr 22]. Available from: https://www.ada.org/resources/practice/legal-and-regulatory/10_staff-immunizations
25. Australian Dental Association. Guidelines for infection prevention and control. [cited 2025 Apr 22]. Available from: file:///C:/Users/User/Downloads/ADA%20Guidelines%20for%20Infection%20Control%205th%20edition%20-%20Public%20version.pdf
26. Pavlovic D, Sahoo P, Larson JJ, et al. Factors influencing healthcare professionals' confidence in vaccination in Europe: a literature review. Hum Vaccin Immunother. 2022;18(1):2041360. doi: 10.1080/21645515.2022.2041360
27. Maltezou HC, Rahiotis C, Tseroni M, et al. Attitudes toward vaccinations and vaccination coverage rates among dental students in Greece. Int J Environ Res Public Health. 2022;19(5):2879. doi: 10.3390/ijerph19052879
28. Zeller B, Kulik EM, Zitzmann NU, et al. Awareness of vaccine-preventable diseases and self-reported immune status of Swiss dental healthcare workers. Swiss Med Wkly. 2021;151(3940):w30036. doi: 10.4414/SMW.2021.w30036