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Addressing RSV infection in older adults: implications for public health policy

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ABSTRACT

Background: The aging population increases healthcare challenges, especially in preventing infectious diseases. Respiratory syncytial virus (RSV), historically associated with pediatric illness, is now recognized as a significant cause of severe disease and mortality in older adults. Despite scientific advances, including new RSV vaccines, adult immunization policies across Europe remain fragmented and underdeveloped.

Research design and methods: This study, promoted by the World Federation of Public Health Associations (WFPHA), assessed RSV surveillance, vaccination strategies, and capacity-building effort in eight European countries (Bulgaria, Finland, Germany, Italy, Norway, Portugal, Spain, and Serbia). A structured questionnaire, informed by a preliminary literature review, was administered to a panel of 19 experts, with a 79% (15/19) response rate.

Results: Findings revealed marked heterogeneity and persistent gaps across countries, including fragmented RSV surveillance, limited or missing vaccine recommendations for older adults, lack of age-specific monitoring, and insufficient training and communication initiatives for healthcare providers and the public.

Conclusion: To address these issues, the expert panel proposed policy recommendations to improve surveillance, ensure equitable vaccine access, and enhance professional training and awareness, providing a roadmap for stronger, prevention-focused healthcare across Europe.

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1. Introduction

Immunization is one of the greatest achievements in global health, preventing more than 30 life-threatening diseases, saving up to 5 million lives each year [1,2] and representing a highly cost-effective public health intervention [3]. At the same time, rapid global population aging – projected to reach 2.1 billion people aged 60 or older by 2050—poses major challenges for healthcare systems, which must address increasing multimorbidity and heightened vulnerability to infectious diseases, particularly among older adults [4–6].

Given these challenges, a healthy aging approach is essential to ensure that older adults can maintain their functional capacity, reduce the need for hospitalization and long-term care, and enhance the sustainability and resilience of healthcare systems [7]. Adopting this approach requires a paradigm shift, incorporating a life-course perspective on immunization, as outlined in the World Health Organization's (WHO) Immunization Agenda 2030 (IA2030) [8]. Through this strategy, vaccination is recognized as a crucial element in promoting healthy aging.

Nevertheless, despite increasing recognition of the prevention's importance, adult immunization, particularly for older adults, remains fragmented and underprioritized, with significant variability in policies and implementation, especially across Europe [9,10]. Extending the immunization benefits beyond childhood to include the entire life course, especially in later adulthood, emerges not only as a pressing public health need, but also as a strategic investment aligned with the growing emphasis on prevention and long-term health system sustainability [11].

However, the effectiveness of immunization programs relies equitable access, up to date and stratified epidemiological data, robust surveillance [12], and interoperable and reliable data systems to guide evidence-based policy decisions [13]. Strengthening institutional capacity, policy leadership, and coordinated communication is essential to support value-based prioritization, innovative delivery models, and increased vaccine uptake and public trust [13,14].

From 2021 to 2023, the World Federation of Public Health Associations (WFPHA) conducted a global assessment of vaccination policies for older adults, focusing on vaccines

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commonly recommended by international health agencies, including those for influenza, tetanus, diphtheria, pertussis, herpes zoster, and pneumococcal disease [9]. This analysis provided a baseline for identifying best practices and developing core policy recommendations for adult immunization across diverse health system contexts [9].

In recent years, respiratory syncytial virus (RSV) has become a key focus in adult immunization, driven by the availability of vaccines for older adults and high-risk populations and supported by a robust pipeline of candidates using platforms such as messenger RNA (mRNA), live-attenuated (LAV), subunit, and recombinant vector technologies [15].

Following decades of research and development, three RSV vaccines have now received approval from both the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA) for immunization in the adult population. These include two protein subunit vaccines – Arexvy (GSK) and Abrysvo (Pfizer) – and one mRNA-based vaccine – mRESVIA (Moderna) [16].

The availability of these vaccines marks a significant step forward, offering tailored tools to prevent severe RSV disease among vulnerable populations. Several countries – such as Austria, Belgium, Germany, Sweden, and the United Kingdom – have already begun integrating RSV vaccination for older adults into their national immunization schedules [17,18].

The successful implementation of these vaccination strategies requires robust cost-effectiveness evidence, particularly to ensure the long-term sustainability of healthcare systems. Reassuringly, economic evaluations are already available for some of these vaccines, including analyses conducted in European settings, demonstrating favorable cost-effectiveness profiles among older adults and high-risk populations [19,20]. However, beyond the acquisition cost of vaccines, it is essential to emphasize the substantial disease burden associated with RSV infection in the adult population, especially among older individuals and those at increased risk of complications. Preventing this burden through vaccination would generate a return on investment for healthcare systems, not only in terms of clinical benefits – such as reduced hospitalizations, complications, and mortality – but also in economic terms, by alleviating direct medical costs and indirect societal impacts [21].

While historically a major cause of respiratory illness in children, RSV is now recognized for its significant impact on older adults [22], causing about 64 million of infections and approximately 160,000 hospitalizations and deaths annually worldwide [23–25]. Furthermore, studies conducted in the United States and Europe report an annual incidence of RSV infection ranging from 3–7% among healthy older adults, rising to 4–10% in high-risk groups [26–28]. In Europe, over 158,000 adult hospitalizations occur each year, with the vast majority (≈92%) in those aged 65 and older [29].

Despite this considerable burden, RSV surveillance remains limited and fragmented, especially in Europe [30]. Existing RSV surveillance initiatives, such as the WHO pilot program, have mainly focused on children, leaving older adults underrepresented [31]. The COVID-19 pandemic has further underscored the urgent need for proactive adult vaccination and data-driven policymaking, yet the lack of comprehensive, age-stratified data continues to limit targeted strategies and equitable vaccine deployment [32].

To address these gaps, the WFPHA carried out a structured assessment of national RSV infection surveillance, immunization practices, and capacity-building efforts across eight selected European countries, which reflect a diversity of healthcare models, healthcare system capacities, and stages of engagement in RSV-related policy development.

The primary objective of this initiative is to raise awareness of RSV infection, define effective prevention strategies and target populations, establish standards for a robust monitoring and evaluation system across Europe, and promote capacity building and training for healthcare professionals involved in adult immunization. These key areas were the focus of the expert consultation conducted, ensuring that the issues most critical to strengthening immunization efforts for vulnerable populations were directly addressed. By identifying key gaps and offering evidence-based recommendations, this work aims to support policymakers in strengthening adult immunization frameworks and advancing value-based public health strategies for vulnerable populations.

2. Methods

2.1. Construction of the expert panel

A panel of 19 Subject Matter Experts (SMEs) from the International Network of WFPHA were involved, bringing together professionals with recognized expertise in RSV from eight European countries: Bulgaria, Finland, Germany, Italy, Norway, Portugal, Spain, and Serbia. This composition ensured balanced representation from both Southern and Northern Europe. They did not receive any compensation for their participation.

The WFPHA (https://www.wfpha.org/) is the world's leading organization dedicated to promoting public health globally and includes over 130 member organizations and 5 million public health professionals. Therefore, the experts involved in our study were predominantly public health professionals (12 out of 19) from academia, with specific expertise in epidemiology and vaccine-preventable infectious diseases. The panel also included three experts in microbiology, two in respiratory diseases, and two in infectious diseases.

For their involvement, WFPHA contacted the Public Health Scientific Societies of the eight selected countries belonging to its network with the request for experts in RSV.

Initially, 3–4 experts per country were contacted by the WFPHA, for a total of 23 experts. Of these, four experts who were initially contacted did not participate in the project due to a potential conflict of interest.

Among the 19 experts involved, Bulgaria, Finland, and Norway were each represented by one expert – the lowest number per country – while Portugal and Serbia had the highest representation, with four experts each. Germany and Spain were represented by two and three experts, respectively, as was Italy with three experts.

2.2. Expert consultation

Based on a critical review of the literature and an assessment of existing international surveillance systems, which we had previously published [30], a tailored questionnaire was developed for the expert consultation. The developed questionnaire was validated by WFPHA experts belonging to the International Immunization Policy Taskforce.

The experts were invited to participate via an invitation e-mail introducing the objective of the study and the content of the consultation process. Consequently, four meetings were organized with the experts.

The first virtual meeting was held on 2 July 2024, during which the project was presented and the information regarding the expert consultation was shared. In addition, the questionnaire and the supporting scientific evidence were presented to the experts.

Subsequently, two additional meetings were organized to present the results of the consultation, held on 9 October 2024, and 18 November 2024, respectively. In the first meeting, the survey data were shared, and in the second, a set of proposed policy recommendations derived from the consultation was presented.

Finally, during the last virtual meeting held on 25 February 2025, the final recommendations – designed to reduce the impact of RSV on vulnerable populations and to harmonize national approaches across Europe – were validated.

2.2.1. Evidence review and survey development

To assess the current landscape of RSV surveillance and immunization strategies for older and at-risk populations, the research was conducted in two sequential phases: a review of the available scientific evidence to develop a tailored questionnaire, followed by an online survey.

The evidence review constituted the first step of our study. This process was carried out in two sub-phases: the first involved a comprehensive literature review to collect relevant studies and data to evaluate the burden of RSV infection among older and at-risk populations in Europe, while the second focused on web-based screening to evaluate current RSV surveillance systems for adult populations of the eight participating countries. The methodological details of both phases are described in a recently published manuscript [30].

The findings of this initial assessment [30] served as the foundation for the design of the expert survey, allowing the research team to identify key areas requiring further investigation and to structure targeted questions to fill identified knowledge gaps.

The second phase, presented in this study, involved the development and administration of the online survey. Its purpose was to collect missing country-specific data, explore national practices, and inform the formulation of focused policy recommendations to strengthen prevention and control of RSV infection among older and vulnerable populations.

2.2.2. Survey design and structure

The survey was developed by a multidisciplinary team comprising public health professionals and members of the WFPHA International Immunization Policy Taskforce. The study was submitted to the Geneva Cantonal Research Ethics Commission (CCER) under reference Req-2024-00759.

The CCER confirmed that the project did not need to be reviewed by an ethics committee because the aim was outside of the scope of the law. In fact, 'this Act applies to research concerning human diseases and concerning the structure and function of the human body as defined in the Art 2 of the Human Research Act (HRA).'

The questionnaire for the expert consultation was administered via the online platform SurveyMonkey, using a link sent by e-mail from WFPHA to the participating experts. The survey invitation was sent on 2 July 2024, with a completion deadline of July 23. Two reminder e-mails were issued during this period, on July 11 and July 16.

Before beginning the survey, each participating expert was required to provide their consent through the SurveyMonkey platform, agreeing both to take part in the study and to the processing of their data.

The survey included 27 structured questions designed to collect both quantitative and qualitative data. Questions were presented in multiple-choice (59.3%, 16/27) and open-ended formats (40.7%, 11/27). In addition, an introductory section gathered general information, such as name and country, and included a mandatory consent form to ensure informed and voluntary participation.

To align with the study's objectives, the questionnaire was organized into three thematic sections.

The first section, '*Monitoring strategies and data collection*,' included nine questions (33.3%, 9/27), comprising eight multiple-choice items and one open-ended item (Table 1). This section assessed national approaches to RSV surveillance and data collection, with particular attention to older adults and at-risk populations.

The second section, '*Implementation strategies for RSV vaccination*', comprised ten questions (37%, 10/27), evenly divided between multiple-choice (40%, 4/10) and open-ended (60%, 6/10) formats (Table 2). It aimed to explore national immunization policies, vaccine accessibility, prioritization criteria, and the role of HCPs in the rollout of RSV vaccination programs.

Finally, the third section, '*Training and information*', focused on education, training, and vaccine literacy. It included eight questions (29.7%, 8/27), with four open-ended and four multiple-choice items (Table 3). The section placed particular emphasis on capacity building for Health Care Professionals (HCPs) and initiatives to promote vaccine awareness among older and at-risk populations.

Survey responses were collected between July 2 and 23 July 2024, and subsequently analyzed to identify common themes, implementation gaps, and policy-relevant insights across the participating countries.

2.3. Data assessment

To ensure accuracy and relevance, the collected data were analyzed through a structured process combining both quantitative and qualitative approaches.

Table 1. Survey section: Monitoring strategies, and data collection.

Monitoring strategies and data collection
1. Is RSV infection currently designated as a notifiable disease in your country?
– Yes
– No
– I don't know
2. Is there a routine surveillance of RSV in your country?
– Yes
– No
– I don't know
3. If Yes, Please, describe the characteristics of the routine surveillance systems of RSV
4. Does your country have a dedicated national surveillance system specifically designed to monitor RSV infections among at-risk adults/elderly population?
– Yes
– No
– I don't know
5. Does your country currently report RSV data to The European Surveillance System (TESSy) and/or the WHO global RSV surveillance project?
– Yes
– No
– I don't know
6. Is there standardized guidance for RSV testing/data collection in your country to enhance the comprehensiveness and comparability of data?
– Yes
– No
– I don't know
7. Do you think that the lack of a specific definition for detecting RSV cases justifies the creation of a new case definition to address potential limitations resulting from the criteria currently used to define influenza-like illness (ILI) in Europe?
– Yes
– No
– I don't know
8. Do you think it would be appropriate to establish new criteria and diagnostic methods for identifying RSV cases?
– Yes
– No
– I don't know
9. Is there an electronic vaccination registry for the at-risk adult/elderly population in your country?
– Yes
– No
– I don't know

Table 2. Survey section: Implementation strategies for RSV vaccination.

Implementation strategies for rsv vaccination
1. Is RSV vaccination already recommended for at-risk adult/elderly individuals in your country?
– Yes
– No
– I don't know
2. Is there in your country a decision-making process based on Health Technology Assessment (HTA) for the inclusion of new vaccinations such as RSV in the national schedule?
– Yes
– No
– I don't know
3. Considering the preliminary indications from certain European countries regarding RSV vaccination, who do you think should be the adult/elderly target population for RSV vaccination?
4. Do you believe that vaccination services for RSV in the at-risk adult and elderly population should be tailored based on the different age groups and risk factors of the patients?
– Yes
– No
– I don't know
5. If yes, how could this differentiation occur, and what are the potential advantages and disadvantages?
6. Do you believe it would be useful to include RSV vaccination in specific pathways for at-risk, frail, or immunocompromised patients?
– Yes
– No
– I don't know
7. Do you think it would be beneficial to introduce new vaccination strategies for at-risk/elderly adults based on the COVID-19 vaccination campaign?
8. What do you consider to be the priority settings for RSV vaccination among at-risk adults/elderly individuals, and which alternative settings should be integrated to increase vaccine adherence (e.g. hospitals, specialist healthcare settings, pharmacies, occupational settings)?
9. Which healthcare professional should have the governance of RSV vaccination for at-risk adults/elderly individuals?
10. Which other healthcare professional can promote and encourage RSV vaccinations among at-risk adult/elderly patients?

Depending on the nature of the question, responses were analyzed either at country level, by aggregating responses from SMEs within the same country, or at individual expert level, by considering each SME's answer separately. This dual perspective made it possible to capture both national-level patterns and expert-driven insights.

Table 3. Survey section: Training and information.

Training and information
1. Are there any educational campaigns targeting healthcare professionals on RSV vaccination and/or other vaccinations for the at-risk adult/elderly population?
– Yes
– No
– I don't know
2. If yes, have these initiatives been conducted at:
– National level
– Regional level
– Single institutional level
3. If yes, to which healthcare professionals are these educational initiatives primarily directed?
4. Are there national strategies or an immunization plan in your country that specifically addresses RSV and/or other vaccine-preventable infections for the at-risk adult/elderly population?
– Yes
– No
– I don't know
5. Are there specific inter-society documents regarding RSV vaccination and/or other vaccinations for the at-risk adults/elderly population in your country?
– Yes
– No
– I don't know
6. Are there any existing initiatives or programs in your country aimed at promoting RSV vaccination awareness and uptake among at-risk adults/elderly population?
7. Is there collaboration among healthcare professionals, scientific societies, and patient associations to prepare informative materials/initiatives on RSV vaccination and/or vaccination for the at-risk adult/elderly population in your country?
8. Which healthcare professionals should play a significant role in the health literacy of citizens regarding vaccinations for at-risk adult/elderly individuals?

Responses were first reviewed for completeness and consistency. Quantitative data from multiple-choice questions were analyzed using descriptive statistics to summarize national patterns and response distributions.

In cases where discrepant responses were identified within the same country, they were thoroughly reviewed and directly verified with the respective national experts to ensure consistency. Any remaining inconsistencies were addressed through follow-up online meetings with the participating SMEs to achieve alignment and clarity. Where needed, additional clarification was requested from respondents to fully resolve outstanding issues.

Open-ended responses were examined using thematic analysis to identify key issues, common challenges, and areas of consensus or divergence across countries. Recurring themes were grouped and interpreted to highlight priority gaps and strengths in RSV infection surveillance, vaccination strategies, and communication practices.

Cross-country comparisons were conducted to explore similarities and differences among national approaches. These insights informed the development of policy recommendations.

Finally, the results were validated through three follow-up online meetings with participating SMEs. Their feedback helped refine the recommendations and ensured alignment with both the survey evidence and practical experience. Additional verification was conducted by comparing findings with available literature and national reports.

3. Results

A total of 19 SMEs from eight European countries, representing both Southern and Northern regions, were invited to participate in the online survey. Of these, 15 completed the questionnaire, yielding a response rate of 79% (15/19). The four experts who did not participate in the online survey nevertheless took part in the virtual meetings, contributing to the interpretation of the data and the formulation of the final recommendations. Specifically, the non-respondents were: one public health expert from Germany, one infectious disease expert from Portugal, and two experts from Serbia-one in public health and the other in microbiology.

Italy, Spain, and Portugal were the most represented countries, each with three respondents (20%, 3/15). Serbia followed with two experts, while Norway, Bulgaria, Finland, and Germany were each represented by one respondent (Figure 1).

The following subsections present the results according to the three thematic areas of the survey: (i) Monitoring

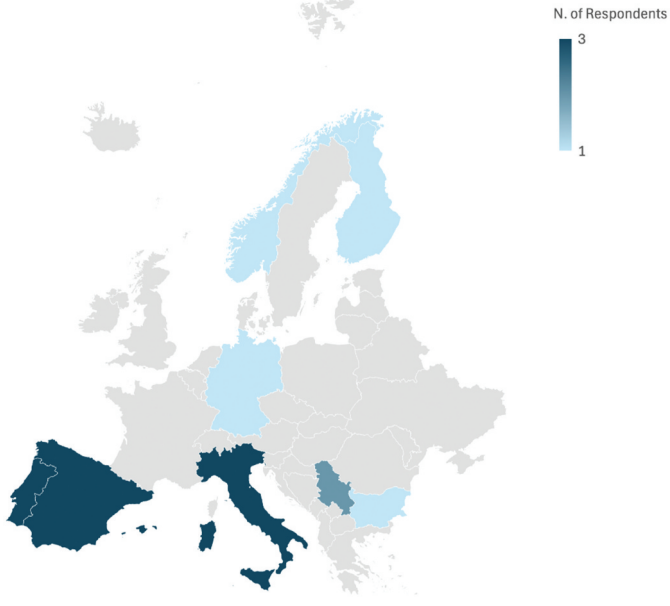

Figure 1. Geographical distribution of Subject Matter Experts (SMEs) who completed the survey.

strategies and data collection; (ii) Implementation of RSV vaccination strategies; (iii) and Training and information.

Each section summarizes the main findings and highlights country-level variations based on SMEs input. The final subsection presents the recommendations developed by the expert panel.

3.1. Monitoring strategies and data collection: main findings

The first section of the questionnaire consisted of nine questions aimed at assessing national RSV surveillance practices, with particular attention to older adults and at-risk populations (Table 1). Analysis of expert responses revealed significant heterogeneity across countries, especially in the classification of RSV infection as a notifiable disease and the organization of surveillance systems (Table 4).

Only two countries, Germany and the Spanish region of Navarra, reported that RSV is officially designated as a notifiable disease, accounting for 25% (2/8) of the sample. In particular, the region of Navarra has operated a population-based RSV surveillance system since 2006, with stable protocols covering hospitals, emergency care, and primary care [33]. By contrast, other Spanish regions introduced hospital-based surveillance only recently, starting in 2021 [33]. The remaining six countries (75%, 6/8) indicated that RSV infection is not currently subject to mandatory notification, reflecting the absence of a harmonized reporting framework at the European level (***Question 1***).

Routine RSV infection surveillance systems were reported to exist in five of the eight countries surveyed (63%, 5/8), although their scope and structure varied considerably (***Question 2, Question 3).*** Germany emerged as having one of the most comprehensive surveillance frameworks in Europe. Since 2023, laboratory-confirmed RSV cases must be reported under the 'Protection against Infection Act,' with data collection and analysis coordinated by the Robert Koch Institute (RKI) [34]. The system integrates data from sentinel General Practitioners (GPs), hospitals, and laboratories, and produces weekly public health bulletins covering acute respiratory infections (ARIs), including RSV.

Italy has similarly strengthened its national respiratory surveillance capacity through the transition from the InfluNet system, originally established in 1999 to monitor influenza-like illness (ILI), to the more advanced RespiVirNet platform [35]. Since the 2020/2021 season, RespiVirNet has integrated epidemiological and virological data from GPs, pediatricians, local health authorities (LHAs), and regional reference laboratories to track multiple respiratory viruses, including RSV. Likewise, Serbia has implemented an integrated sentinel surveillance system for ILI and SARI, covering influenza, SARS-CoV -2, and RSV, since the 2021/2022 season [36].

In Spain, particularly in the region of Catalonia, a robust surveillance infrastructure is also in place. The 'Daily Information on Acute Respiratory Illness Plan of Catalonia (PIDIRAC),' launched in 2006, was expanded in 2022 with the development of the 'Information System for the Surveillance of Infections in Catalonia (SIVIC)' platform. This system integrates syndromic and microbiological surveillance data for real-time monitoring of RSV, influenza, and SARS-CoV-2 [37].

Portugal, by contrast, has implemented a pediatric-focused sentinel surveillance model through the 'Rede Nacional de Vigilância para VSR (VIGIRSV)' network, involving hospitals and targeting children under two years of age hospitalized with RSV-related ARIs. Neither adult, nor elderly people are currently included in this system [38].

The remaining countries, such as Bulgaria, Finland, and Norway reported the absence of structured RSV routine surveillance system. In Norway, a temporary system for severe acute respiratory infections (SARIs) was introduced during the COVID-19 pandemic. However, this system was discontinued in June 2024, leaving the country without a dedicated RSV surveillance mechanism [39]. In Finland, instead, RSV is tested from hospitalized persons with respiratory symptoms, and there is ongoing monitoring of respiratory viruses, including RSV, in untreated wastewater from multiple cities as part of the national surveillance efforts. This approach helps provide early warning of potential outbreaks and track the temporal and spatial spread of the virus across the country [40].

When asked about the presence of a dedicated surveillance system targeting older adults or at-risk populations, all countries (100%, 8/8) reported the absence of such systems (***Question 4***). Existing surveillance models were generally described as population-based and not stratified by age group, with the only exception of Serbia, where the integrated SARI surveillance system includes the elderly population, with data routinely aggregated into the age groups 65–79 and 80+, although the system is not specifically targeted at this group [36]. By contrast, in Portugal, surveillance efforts are exclusively focused on infants.

Regarding international data sharing, addressed in ***Question 5***, only three countries (37.5%, 3/8) with established RSV surveillance systems, Italy, Spain and Serbia, reported

Table 4. Summary of national approaches to RSV surveillance, diagnostic methods, and electronic vaccination registries, based on expert responses across eight European countries.

Country	Notifiable RSV	RSV routine surveillance	Age-targeted surveillance	Reports to international platforms	Standardized protocols	Electronic vaccination registry
Bulgaria	No	No	No	"I don't know"	"I don't know"	"I don't know"
Finland	No	No	No	"I don't know"	No	"I don't know"
Germany	Yes	Yes	No	No	Yes	No
Italy		Yes	No	Yes	Yes	Yes
Norway	No	No	No	"I don't know"	Yes	Yes
Portugal	No	Yes	Yes (children only)	"I don't know"	"I don't know"	Yes
Serbia	No	Yes	No	Yes	Yes	No
Spain	Yes	Yes	No	Yes	Yes	Yes

contributing data to international platforms such as the European Surveillance System (TESSy) or the WHO Global RSV initiative.

The following three questions (***Questions 6–8***) revealed similar fragmentation across study countries. These items explored the existence of national guidance for RSV testing and SMEs views on the adequacy of current case definitions. Germany, Norway, Italy, Spain, and Serbia, representing 62.5% (5/8) of the sample, reported having standardized national protocols for RSV testing and data collection, coordinated by public health institutions (***Question 6***). Finland reported the absence of such protocols, while responses from Portugal, and Bulgaria, were inconclusive or marked as unknown (37.5%, 3/8).

Notably, all SMEs surveyed (100%, 15/15) agreed that the lack of a clear RSV infection case definition justifies the creation of a new diagnostic framework, independent from the current ILI model, indicating full consensus on this issue (***Question 7***).

By contrast, opinions were more divided on the appropriateness of introducing new diagnostic criteria and methods for RSV infection identification (***Question 8***). Experts from Finland, Germany, and Spain unanimously supported the proposal. In Italy, only one-third (33%, 1/3) of respondents were in favor, while the remaining two-thirds (67%, 2/3) expressed uncertainty. Portuguese SMEs were evenly split between agreement (33.3%, 1/3), disagreement (33.3%, 1/3), and uncertainty (33.3%, 1/3). For Serbia, only one respondent (50%, 1/2) answered the question, expressing disagreement.

Respondents from Bulgaria and Norway expressed opposition, reflecting the absence of a shared European position and highlighting the need for harmonized diagnostic standards.

Finally, with regard to the existence of electronic vaccination registries for older or at-risk adults (***Question 9***), four out of eight countries (50%), namely Italy, Norway, Spain, and Portugal, confirmed having such systems in place. However, these registries are generally not tailored to RSV nor specifically designed for older populations. Germany and Serbia reported the absence of such registries, and the situation in Bulgaria and Finland remained unclear (Table 4).

3.2. Implementation strategies for RSV vaccination: main findings

The second section of the questionnaire examined national approaches to the introduction of RSV vaccination, with a focus on recommendations for at-risk adults and older populations, national decision-making frameworks, and the identification of priority groups for immunization (Table 2).

At the time of data collection, RSV vaccination was recommended for older adults in four out of eight countries surveyed (50%, 4/8): Germany, Norway, Italy, and Spain (***Question 1***). Among these, Germany and Norway had issued formal national guidelines. In August 2024, Germany's Standing Committee on Vaccination (STIKO) recommended vaccination for all adults aged 75 and older, and for those aged 60–74 with severe underlying conditions or residing in long-term care facilities [41]. In Norway, the National Institute of Public Health issued similar guidance in October 2023, targeting adults aged 60 and above with chronic medical conditions [42]. In contrast, in Italy and Spain recommendations were issued by national scientific societies rather than public health authorities. In Italy, in 2024, a coalition of leading medical societies recommended RSV vaccination for individuals aged 75 and older, as well as for those aged 60 and above with chronic underlying conditions [43,44]. In Spain, similar recommendations were released in the same year, advising vaccination for adults aged 60 and over who have preexisting medical conditions [45]. The remaining countries, such as Finland, Portugal, Bulgaria and Serbia, reported no formal recommendations for RSV vaccination in older or at-risk populations at the time of the survey. Regarding the presence of a structured national decision-making process based on Health Technology Assessment (HTA), five out of eight countries (62.5%) reported having such mechanisms in place (***Question 2***). These included Italy, Norway, Finland, Germany, and Portugal. The subsequent four questions (***Questions 3–6***) in this section shifted the focus from national recommendations and decision-making processes to expert perspectives on prioritization criteria for RSV vaccination. Specifically, these items explored the identification of target populations among older and at-risk adults, the value of tailoring vaccination strategies based on age and clinical vulnerability, and the relevance of integrating RSV vaccination into clinical care pathways for frail or immunocompromised individuals. Regarding the identification of priority groups for RSV vaccination, SMEs responses showed a high level of agreement (***Question 3***). All eight countries (100%, 8/8) identified older adults, typically defined as those aged 60 years and above, as a primary target population. Within this category, SMEs from Finland, Germany, Italy, Norway, Portugal, and Serbia emphasized the importance of reaching individuals affected by chronic conditions such as cardiovascular or respiratory diseases or identified as clinically frail. In addition, experts from Spain, Portugal, and Serbia mentioned residents of long-term care facilities as a group that should receive specific attention. Immunocompromised individuals, including patients undergoing cancer treatment, were cited in two countries. Experts from Germany also highlighted HCPs, while Serbian respondents mentioned adults with occupational exposure and residents of geriatric institutions. ***Question 4*** and ***Question 5*** addressed whether RSV vaccination strategies should be differentiated according to age and health status. Experts from all countries (100%, 15/15) agreed that such differentiation is necessary, reflecting their professional perspectives. Suggested criteria included specific age thresholds such as 60 or 65 years, the presence of chronic illness, clinical frailty, and comorbidities. Experts also stressed the relevance of using surveillance data and clinical evidence to better identify individuals at highest risk. Finally, for ***Question 6***, all SMEs (100%, 15/15) across the participating countries supported the integration of RSV vaccination into clinical pathways for people who are frail, immunocompromised, or otherwise at increased risk, understanding the importance of incorporating vaccination within broader care frameworks for older adults and vulnerable groups.

The final set of four open-ended questions in this section focused on the operational and organizational aspects of RSV vaccination for at-risk and elderly adults (***Questions***

7–10). Specifically, the survey explored whether lessons from the COVID-19 vaccination campaign could inform future RSV strategies (***Question 7***), which care settings would be most appropriate for vaccine administration and how alternative sites might improve adherence (***Question 8***), and the roles of different HCPs in both governance (***Question 9***) and promotion (***Question 10***) of RSV vaccination for target populations.

All participating countries (100%, 8/8) agreed on the value of applying insights from the COVID-19 vaccination campaign to RSV immunization efforts. Commonly suggested strategies included co-administration with influenza and COVID-19 vaccines, prioritization based on age and comorbidities, the use of scheduled appointment, and targeted communication initiatives (***Question 7***).

There was also unanimous agreement among SMEs on the importance of adopting diversified vaccine delivery strategies. Frequently mentioned settings included GPs'clinics, primary care centers, hospitals, and pharmacies. Several respondents also highlighted the role of nursing homes, community-based services, and cooperation between public and private healthcare sectors as key to improving accessibility and convenience for older adults.

GPs were the most frequently identified key figures in the governance of RSV vaccination, with 60% (9/15) of SMEs indicating their leadership role in coordinating and overseeing vaccine delivery.

Public health professionals working in LHAs or vaccination services were mentioned in 40% (6/15) of responses. Other governance-related roles included infectious disease specialists, hospital physicians, family doctors, and community nurses, underscoring the need for a multidisciplinary approach.

Regarding vaccine promotion, specialists were the most frequently cited group, mentioned in 67% (10/15) of responses. These included pulmonologists, cardiologists, internal medicine, rheumatologists, immunologists, and infectious disease experts. Pharmacists were cited in 40% (6/15) of responses, emphasizing their accessibility and expanding role in adult vaccination. Nurses, especially those working in nursing homes and community settings, were referenced in 33.3% (5/15) of responses. Several SMEs reiterated the importance of GPs, while others emphasized the contribution of hospital-based physicians and public health communication professionals in raising awareness and supporting vaccine uptake.

3.3. Training and information: main findings

The third section of the survey focused on training and information strategies targeting HCPs, as well as on activities aimed at strengthening vaccine literacy among older or at-risk adult populations (Table 3, Table 5).

Educational campaigns on RSV vaccination or related immunization topics were reported in six out of eight countries (75%), including Italy, Norway, Finland, Germany, Spain, and Serbia (***Question 1***). However, implementation levels varied, with half of these initiatives (50%, 3/6) conducted at the regional level, while the remaining efforts took place at the national level (33.3%, 2/6) or at the institutional level (16.7%, 1/6) (***Question 2***).

Target audiences for these campaigns also differed. GPs were the most frequently cited group, reported in three out of six countries (50%, 3/6), followed by primary care professionals (33.3%, 2/6) and public health specialists (16.7%, 1/6) (***Question 3***).

Regarding the existence of national strategies or immunization plans specifically addressing RSV and other vaccine-preventable infections in older adults, six out of eight countries (75%), including Norway, Finland, Germany, Spain, Portugal, and Serbia confirmed the presence of such plans (***Question 4***).

Documents from intersocietal collaborations regarding RSV or other adult vaccination efforts were available in 50% of the countries (4/8), namely Italy, Norway, Germany, and Spain, where national or regional scientific societies issued position papers or recommendations (***Question 5***).

The final subsection, based on three open-ended questions, addressed the promotion of vaccine literacy among older and at-risk adult populations. It examined the presence of national or local initiatives aimed at increasing awareness and uptake of RSV vaccination, and the level of collaboration between HCPs, scientific societies, and patient organizations (***Questions 6–8***).

Responses highlighted a general lack of structured programs and limited awareness of existing efforts. Only Norway clearly confirmed the presence of national communication initiatives, attributing their effectiveness to the high level of public trust in the National Institute of Public Health.

In Italy and Portugal, expert responses were mixed. One-third (33.3%, 1/3) acknowledged the existence of initiatives, another third (33.3%, 1/3) denied their presence, and the remaining (33.3%, 1/3) were unaware of any. In Bulgaria, Finland, Germany, Spain, and Serbia no initiatives were reported, or the situation remained unclear (***Question 6***).

Table 5. Summary of national educational campaigns, implementation levels, strategic plans, and inter-society collaborations on RSV vaccination for healthcare professionals.

Country	Educational Campaigns Targeting HCPs	Level of Implementation	National Strategies/immunization plan for RSV and/or other vaccine-preventable infections	Inter-society collaborations
Bulgaria	"I don't know"	"I don't know"	"I don't know"	No
Finland	Yes	Institutional	Yes	No
Germany	Yes	National	Yes	Yes
Italy	Yes	Regional	No	Yes
Norway	Yes	National	Yes	Yes
Portugal	No	"I don't know"	Yes	No
Serbia	Yes	Regional	Yes	No
Spain	Yes	Regional	Yes	Yes

Abbreviation: HCPs: Healthcare Professionals.

On intersectoral collaboration (***Question 7***), only Norway confirmed active cooperation between HCPs, scientific societies, and patient associations, highlighting a significant gap in structured public health communication efforts.

Finally, SMEs were asked which HCPs should take a leading role in promoting vaccine literacy among at-risk and older adults (***Question 8***). GPs were consistently identified as central figures. Additional actors varied by country. In Italy, public health professionals, GPs, nurses, and specialists were cited, with emphasis on the oversight role of public health authorities. Norwegian respondents highlighted the role of GPs and municipal nurses. In both Bulgaria and Germany, GPs were considered primary communicators. Finland pointed to broader institutional responsibility. In Spain, GPs, nurses, and primary care providers were emphasized. Portuguese experts identified a wide range of professionals, including doctors, pharmacists, and public health physicians. Serbia offered a more academic perspective, naming university professors, virologists, epidemiologists, and communication experts in addition to frontline staff. These responses underscored the diversity of national approaches and emphasized the need for multi-professional collaboration to promote vaccine literacy in an effective and inclusive way, especially among populations at higher risk for severe respiratory infections.

3.4. Policy recommendations

Based on the evidence gathered through the conducted and published literature review [30], the additional information collected through the expert survey, and the subsequent follow-up discussions (three virtual meetings), a set of policy recommendations was developed to address key gaps and inconsistencies in RSV surveillance, prevention, and awareness across the European countries included in the study.

These recommendations could support public health authorities and stakeholders in implementing effective, equitable, and evidence-based strategies to reduce the burden of RSV-related diseases among older adults and at-risk populations. Although primarily focused on study European countries, the following recommendations could also inform strategies in other contexts facing similar global challenges:

3.4.1. Monitoring and data collection systems

To ensure accurate, timely, and harmonized surveillance of RSV infection across study countries, and potentially in Europe setting, the following actions are recommended:

1. **Formulation of a standardized case definition for RSV infection**: to address the current lack of uniformity in reporting, enhance data comparability across countries and regions, and improve the accuracy and effectiveness of surveillance systems.
2. **Development and implementation of an integrated diagnostic protocol for RSV infection**: to improve diagnostic accuracy and efficiency, and establish standardized testing procedures supported by clear diagnostic guidelines.
3. **Establishment or implementation of a routine RSV infection surveillance system across European healthcare systems**: to improve both epidemiological and vaccination monitoring, ensure the use of unified reporting platforms, and support coordinated prevention and response strategies, generating valuable insights to inform public health strategies.
4. **Strengthening of RSV infection surveillance networks in Europe**: to enhance data integration across healthcare settings and sources, improve real-time monitoring, and support timely, evidence-based public health interventions, especially for older and high-risk populations.

3.4.2. Implementing effective vaccination strategies

To ensure broad and equitable access to RSV vaccines for older adults and high-risk populations, the following steps are recommended:

5. **Harmonization of RSV vaccination policies for elderly and high-risk populations in Europe**: to align national approaches, ensure equitable and coordinated immunization strategies, and enhance the overall effectiveness of RSV prevention across countries.
6. **Establishment or implementation of a National Vaccination Registry**: to centralize and monitor key data, including vaccine type and patient demographics, improve coverage tracking, ensure timely immunization of high-risk groups, and support data-driven public health decisions through integration with electronic health records.
7. **Implementation of a decision-making process based on Health Technology Assessment (HTA)**: to support informed, cost-effective decision-making by considering the comprehensive value of new vaccination opportunities, including the economic implications of non-vaccination.
8. **Improvement of vaccination access**: to coordinate efforts across primary care, pharmacies, hospitals, and long-term care settings, integrate vaccination into Patient Diagnostic and Treatment Pathways (PDTA), enhance adherence and streamline delivery, and ensure full financial coverage to promote equitable access for all eligible individuals.

3.4.3. Enhancing training and public awareness

To increase vaccine uptake and health literacy, particularly among high-risk populations, the following measures are recommended:

9. **Implementation of capacity building for healthcare professionals on RSV vaccination:** to equip professionals with up-to-date knowledge and skills, through structured, guideline-based training programs integrated into existing seasonal vaccination efforts, and developed in collaboration with scientific societies to ensure consistency, quality, and broad dissemination.

10. **Implementation of health literacy on RSV vaccination:** to raise awareness about the risks of RSV infection and the benefits of vaccination, particularly among high-risk adults and the elderly.

These recommendations offer a comprehensive and actionable roadmap to strengthen RSV prevention efforts among older adults and high-risk populations. They are part of an official WFPHA policy, which has now been shared with its network of over 5 million public health professionals and associations, to support their efforts both within and beyond Europe [46]. Their effective implementation will require strong political commitment, intersectoral collaboration, and continuous engagement with HCPs and the public. By adopting these measures, health systems will be able to improve resilience, reduce health inequities, and mitigate the burden of RSV-related diseases in a rapidly aging population.

4. Discussion

This study provides a comprehensive overview of current national approaches to RSV infection surveillance, vaccination, and public awareness strategies targeting older and at-risk populations across eight European countries. By combining a systematic review of the literature [30] with structured input from a panel of SMEs, the research identified critical gaps and areas of convergence that can inform future policy development and public health planning.

The findings highlight substantial heterogeneity in the structure and functionality of RSV infection surveillance systems in study European countries. While some countries, such as Germany, Italy, and Spain, have implemented robust and integrated monitoring frameworks, others either lack structured surveillance systems altogether or maintain pediatric-focused models that exclude older adults. A key consensus among SMEs was the absence of standardized case definitions and diagnostic protocols, which significantly undermines the comparability and utility of surveillance data across borders. By contrast, opinions were more divided regarding the appropriateness of introducing new diagnostic criteria and methods for RSV infection identification. Experts from Finland, Germany, and Spain unanimously supported the proposal. However, responses from other countries revealed substantial heterogeneity, even among experts within the same national context such as in Italy, Portugal and Serbia. Experts from Bulgaria and Norway also expressed opposition. The variability observed not only between countries but also among experts from the same country was highlighted during the project meetings as reflecting the current absence of clear and shared international guidelines on RSV diagnostic criteria, particularly for adult and older populations. This lack of harmonized recommendations may contribute to uncertainty and differing interpretations at the national level, underscoring the need for coordinated international efforts to establish standardized and widely accepted diagnostic frameworks. Another relevant element that emerged from the discussion among experts during the project meetings was the need for greater involvement of microbiologists in addressing these technical aspects.

Generally, our results are in line with the data in the available scientific literature. Currently, RSV infection surveillance across the European Union (EU)/European Economic Area (EEA) remains highly fragmented, hindering effective monitoring and timely public health response. A 2017 survey found that 27 out of 30 responding countries had some form of RSV surveillance in place, often based on sentinel systems [47]. However, these varied widely in scope and quality, ranging from simple aggregate reporting to more detailed case-based approaches, and frequently lacked the consistency needed for robust epidemiological and clinical monitoring.

Since then, notable progress has been made, particularly in countries like Italy, Germany, Spain, and Serbia where surveillance systems have been strengthened in the aftermath of the COVID-19 pandemic. The recent launch of the ERVISS platform by WHO/Europe and ECDC in 2023 is a promising step toward greater standardization. Nevertheless, further efforts are required to establish a cohesive, region-wide surveillance framework that harmonizes methodologies and enhances data comparability across countries [30].

A key limitation of existing RSV infection surveillance is the absence of standardized case definitions, especially in systems originally developed for influenza monitoring. This complicates the distinction between RSV and other respiratory viruses, particularly in older adults, leading to underreporting and case misclassification. A recent systematic review estimated that around 33% of RSV infections in adults go undetected even when tested for respiratory viruses [48].

The lack of routine RSV testing in adults further contributes to an underestimation of the true disease burden. Diagnostic limitations also play a significant role. Evaluating current testing practices – such as specimen type, timing, and collection methods – is essential to understand the extent of under detection linked to suboptimal protocols [49].

Several studies have shown that relying solely on nasopharyngeal swabs significantly underestimates RSV cases in older adults [50,51]. In contrast, using multiple specimen types, such as sputum, throat and nasal swabs, or serological tests, can substantially improve detection rates. These findings highlight the urgent need for more comprehensive and standardized diagnostic approaches to accurately assess and respond to RSV burden in adult populations [50,51].

Therefore, enhancing RSV infection surveillance, especially by developing systems specifically focused on vulnerable groups such as the elderly, and extending sentinel networks in areas where they are currently absent will be essential to achieving thorough and consistent monitoring across Europe [30].

In parallel, the availability of newly authorized RSV vaccines represents a timely opportunity to advance adult immunization strategies. However, the implementation of RSV vaccination programs remains highly variable. Only half of the surveyed countries had adopted formal recommendations for vaccinating older adults at the time of data collection, and even fewer had integrated these recommendations into national immunization programs. Notably, in several cases,

professional societies rather than public health authorities led the development of guidance, signaling potential fragmentation in policy leadership and decision-making.

Despite these challenges, there was strong consensus among experts regarding the prioritization of older adults – particularly those with chronic conditions or residing in long-term care facilities – as a key target population for RSV vaccination. Respondents widely endorsed the need to differentiate vaccination strategies based on age, clinical vulnerability, and risk exposure. The COVID-19 pandemic was cited as a relevant model for improving vaccine delivery, with suggestions including co-administration strategies, multi-setting access points, and enhanced communication campaigns.

Even from the literature data it emerges that some countries have adapted global RSV vaccination guidance to fit national contexts [30], but a more coordinated European approach is needed to guarantee fair access for high-risk groups, especially older adults [52]. Ongoing inequalities – linked to variations in healthcare infrastructure, funding, and public awareness – require unified procurement, consistent eligibility criteria, and aligned policies [53]. Integrating vaccination strategies with improved surveillance will not only reduce the impact of RSV infection but also strengthen Europe's preparedness for future respiratory health threats.

Another important finding that emerged from our study is related to the need for greater training and awareness on RSV infections and related prevention strategies. Although some countries have launched targeted initiatives to educate HCPs and increase vaccine literacy, these efforts are often fragmented and lack national coordination. SMEs uniformly agreed on the need to strengthen HCP capacity through structured training and to engage a broad range of actors – including general practitioners, specialists, pharmacists, and nurses – in the promotion and delivery of RSV vaccines.

A recent systematic review [54] summarized current evidence on knowledge and attitudes regarding prevention of RSV infection, including vaccination intention, uptake (where vaccines were already available), and healthcare provider recommendations. The review found that although awareness and understanding of RSV infection and its prevention remain limited, attitudes toward preventive strategies are generally positive. Key drivers of acceptance or refusal are consistent across RSV infection prevention methods: protection from illness and perceived severity support acceptance, while concerns about side effects contribute to refusal or hesitancy. The reviewed evidence also highlights the importance of bridging knowledge gaps about RSV infection, its associated risks, and the benefits and potential side effects of vaccination, both among the general public and HCPs. Education on RSV infection should be guided by research on decision-making processes to ensure clear and effective health communication. Given the role of healthcare providers as trusted sources of information, their knowledge and confidence in discussing RSV infection prevention are crucial. Training programs aimed at increasing familiarity with RSV infection epidemiology, prevention strategies, and the latest clinical trial results could support more effective patient counseling [53]. Additionally, advanced training on communication techniques to address vaccine concerns and combat misinformation could empower healthcare providers to engage in meaningful discussions, supporting informed and confident decision-making [55].

Therefore, in light of the growing burden of RSV-related disease among older adults, our study underscores the urgent need for a coordinated, evidence-based approach to prevention across Europe. The lack of harmonized surveillance systems, limited vaccine policy alignment, and insufficient training and communication efforts all represent major barriers to effective RSV infection control.

This study has several limitations that should be acknowledged. First, the data collection relied on expert self-report through an online survey, which may introduce subjectivity and reporting bias. While efforts were made to select well-qualified SMEs across a balanced range of European countries, the selection process itself may have introduced potential selection bias. Experts were contacted through the WFPHA network and the national Public Health Scientific Societies, which may have favored the inclusion of professionals primarily affiliated with public health and academic institutions, potentially limiting perspectives from other relevant sectors. Furthermore, although 19 experts were initially involved, 15 participated in the survey. Nevertheless, this sample size is in line with the minimum recommended number for Delphi processes, which is generally between 8 and 12 experts, ensuring the numerical validity of the consultation [56].

Second, the number of participating countries (eight) limits the generalizability of the findings across the entire EU/EEA region. Smaller or underrepresented countries may face distinct challenges not reflected in this analysis. Third, while the survey was informed by a comprehensive evidence review- the dynamic nature of RSV policy development, especially in light of recent vaccine authorizations, means that national strategies may have evolved since the data collection period (July 2024). As such, some information may no longer reflect the most current practices. Fourth, open-ended responses were thematically analyzed to identify key issues, but this qualitative analysis is inherently interpretive and may be influenced by researcher bias, despite cross-validation efforts. Finally, the study primarily focused on RSV surveillance and vaccination in older adults. Other critical aspects – such as economic evaluations, or logistical constraints – were beyond the scope of this work and warrant separate investigation.

Our study does not provide any new data. However, despite the stated limitations, the study presents several notable strengths. A key achievement lies in the collaborative development of policy recommendations through a structured process involving SMEs from diverse European contexts, ensuring that the insights reflect an important range of professional expertise and national perspectives. The resulting recommendations offer a clear and actionable roadmap to address critical gaps in RSV prevention and management. They encompass the standardization of case definitions and diagnostic protocols, the integration of RSV into national surveillance systems, and the promotion of equitable vaccine access and coverage guided by HTA-informed decision-making. Additionally, the recommendations emphasize enhancing education and vaccine literacy among HCPs and the general public, supporting

informed decision-making and broader public health impact. Collectively, these elements reinforce the study's practical relevance and its potential to inform harmonized strategies for RSV control across Europe.

As Europe's population continues to age, investment in adult immunization – including for RSV – must become a central pillar of healthy aging strategies. Achieving this goal will require strong political commitment, cross-sector collaboration, and sustained engagement with both HCPs and communities. By implementing the recommended measures, European countries can not only reduce the burden of RSV-related disease but also enhance the resilience, equity, and overall effectiveness of their healthcare systems. Now formally adopted as an official WFPHA policy and disseminated across its extensive global network, these recommendations have the potential to significantly improve RSV prevention both within Europe and internationally. Our study provides valuable cross-country insights into current RSV prevention efforts and establishes a solid foundation for more coordinated and evidence-informed policy development, within Europe and beyond.

5. Conclusions

This study highlights significant variability in RSV surveillance, vaccination strategies, and public awareness efforts for older and at-risk populations across eight European countries. Combining a rigorous literature review with expert insight, it identifies critical gaps: no standardized surveillance protocols, limited vaccine rollout, and fragmented training for HCPs.

Yet, there are encouraging signs. Older adults are consistently prioritized for vaccination, and healthcare providers are recognized as central champions of immunization. The collaborative development of policy recommendations stands out as a major strength, offering a clear, actionable roadmap to improve RSV prevention across Europe. Tackling the growing burden of RSV in aging populations demands stronger political commitment, harmonized surveillance, broader vaccine access, and coordinated training.

Implementing these measures will not only curb RSV-related disease but also reinforce the equity, resilience, and effectiveness of healthcare systems across the EU/EEA.

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Ethics statement

The study was submitted to the Geneva Cantonal Research Ethics Commission (CCER) under reference Req-2024-00759. The CCER confirmed that the project did not need to be reviewed by an ethics committee because the aim was outside of the scope of the law.

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