



**Superior
Health Council**

VACCINATION AGAINST RSV FOR OLDER ADULTS

**DECEMBER 2024
SHC № 9837**



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Federal Public Service Health, Food Chain Safety
and Environment

Superior Health Council

Avenue Galilée, 5 bte 2
B-1210 Brussels

Tel.: 02/524 97 97

E-mail: info.hgr-css@health.fgov.be

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ADVISORY REPORT OF THE SUPERIOR HEALTH COUNCIL no. 9837

Vaccination against RSV for older adults (revision SHC 9725)

In this scientific advisory report, which offers guidance to public health policy-makers, the Superior Health Council of Belgium provides recommendations on vaccination against RSV for older adults.

This version was validated by the Board on
December 4th 2024

I INTRODUCTION AND ISSUE

Respiratory syncytial virus (RSV) is a highly contagious human pathogen that causes respiratory tract infections in people of all ages.

RSV is usually spread through direct contact with the virus, such as droplets from another person's cough or sneeze contacting your eyes, nose, or mouth. It can also be spread by touching a surface that has the virus on it, like a doorknob, and then touching your face before washing your hands.

RSV infection does not confer long-term immunity; therefore, reinfection with RSV occurs throughout life and is common in all age groups. Usually, reinfections manifest as common acute upper respiratory tract infections. However, in more vulnerable individuals like immunocompromised persons or older adults, reinfections can lead to more severe diseases. In adults, the highest burden of disease is in older people and those with comorbidities such as lung or heart disease and diabetes. In these patient populations, RSV can exacerbate conditions like chronic obstructive pulmonary disease (COPD), asthma, chronic heart failure leading to severe outcomes such as acute respiratory failure, pneumonia, hospitalisation, and death.

Treatment for RSV in older adults is limited to supportive care consisting of supplemental oxygen, intravenous fluids and bronchodilators. In addition, inhaled and systemic corticosteroids are often prescribed in patients with asthma or COPD. Antibiotic prescription, appropriate or not, is frequent among patients hospitalized with RSV infection.

At this moment, there are 2 RSV vaccines on the Belgian market Arexvy® (GSK) and Abrysvo® (Pfizer). The Moderna RSV vaccine (mResvia®) has received an EMA positive opinion recommending marketing authorization in June 2024. The summary of product characteristics (SPC) of the vaccines can be found on the EMA website: [Arexvy®](#), [Abrysvo®](#), [mResvia®](#)

This advisory report is an update of SHC 9725 published in September 2023. Besides Arexvy®, Abrysvo® came on the Belgian market and mResvia® is approved by EMA.

Additionally, real-life effectiveness data were generated during the implementation of both Arexvy® and Abrysvo® in the US during the 2023-2024 season.

Please note that this report this advice is based on available scientific data and does not include a validated pharmaco-economical evaluation.

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III CONCLUSIONS AND RECOMMENDATIONS

Two vaccines are currently on the Belgian market for vaccination against RSV in older adults: Abrysvo® and Arexvy®.

Both vaccines show good efficacy in the prevention of RSV associated lower-respiratory tract infection in the setting of clinical trials.

Recent real-world data show that vaccine effectiveness against hospitalization or emergency department visits aligns closely with clinical trial efficacy estimates for lower respiratory tract disease. Moreover, protection was demonstrated in a population with underlying conditions and immunocompromised patients, who are under or not represented in clinical trials.

Risk factors for severe RSV disease include:

- Immunodeficient patients
- Chronic Kidney Disease
- Severe Obesity (BMI ≥ 40)
- Chronic Respiratory Diseases (COPD, asthma, bronchiectasis, interstitial lung diseases, chronic respiratory failure)
- Current smoker
- Chronic Heart Failure – Coronary artery disease
- Diabetes
- Stroke

Considering the high morbidity and mortality associated with RSV infection among patients with known risk factors and the lack of effective anti-viral therapy, the Superior Health Council recommends vaccination against RSV for:

- At risk persons over 60 years old with at least one risk factor for developing severe RSV disease (listed above), immunodeficient patients (including patients with solid cancer or haematologic malignancy, use of immunosuppressive medications, solid organ transplantation, allogenic HCT) and people living in nursing homes;
- All persons over 75 years old, *especially* those with a risk factor listed above or frail/pre-frail status

The recommended dose is one single injection intramuscularly with one of the 2 vaccines available (Arexvy® or Abrysvo®).

Considering the pre-COVID seasonality of RSV, September/October are the preferred months to be vaccinated although vaccination may be performed year round.

Recent data from the 2nd season analysis from Arexvy® and Abrysvo® showed that vaccine efficacy remains durable over at least 2 seasons (after receiving only one dose) in adults with underlying comorbidities and across advancing ages.

GSK recently showed that a single dose of Arexvy® provided protection for a substantial part of the vaccine recipients in the third RSV season.

Based on these data, the SHC does not recommend a booster at the time of this publication.

The SHC would like to emphasise on the need of increased surveillance to help to follow the clinical impact on RSV infection and the vaccine effectiveness especially in frail and/or immunosuppressed patients and in a higher variety of viral strains over additional seasons.

This advisory report will be revised as soon as new important data will become available (need for a booster in the future?) or when new vaccines enter the Belgian market.

Keywords

Keywords	Sleutelwoorden	Mots clés	Schlüsselwörter
Respiratory Syncytial Virus	<i>Respiratoir Syncytieel Virus</i>	<i>Virus respiratoire syncytial</i>	<i>Respiratorisches Synzytialvirus</i>
Human	<i>Mens</i>	<i>Humain</i>	<i>Mensch</i>
Vaccination	<i>Vaccinatie</i>	<i>Vaccination</i>	<i>Impfung</i>
Elderly	<i>Ouderen</i>	<i>Personnes âgées</i>	<i>Ältere Menschen</i>
Risk Factors	<i>Risicofactoren</i>	<i>Facteurs de risque</i>	<i>Risikofaktoren</i>

IV METHODOLOGY

The Board and the co-presidents of the National Immunization Technical Advisory Group (NITAG) identified the necessary fields of expertise. This revision was performed by the secretariat of the SHC and the ad hoc president.

The report was discussed within the NITAG including experts in microbiology, epidemiology, infectiology, immunology, intensive care, general medicine, geriatrics and pneumology. The experts of the NITAG provided a general and an *ad hoc* declaration of interests and the Committee on Deontology assessed the potential risk of conflicts of interest.

This advisory report is based on a review of the scientific literature published in both scientific journals and reports from national and international organisations competent in this field (peer-reviewed), as well as on the opinion of the experts.

Once the advisory report was endorsed by the NITAG, it was ultimately validated by the Board.

V ELABORATION AND ARGUMENTATION

List of abbreviations used

CFP	Case Fatality Proportion
CFR	Case Fatality Ratio
COPD	Chronic Obstructive Pulmonary Disease
ER	Emergency Room
GBD	Global Burden of Diseases
GP	General Practitioner
ICU	Intensive Care Unit
IgA	Immunoglobuline A
IgG	Immunoglobuline G
LRTD	Lower Respiratory Tract Disease
NITAG	National Immunization Technical Advisory Group
NK	Natural Killer
NPI	Non-Pharmaceutical Interventions
RSV	Respiratory Syncytial Virus
SARI	Severe Cute Respiratory Infection
SHC	Superior Health Council
SPC	Summary of Product Characteristics
VE	Vaccine Effectiveness

1 RSV

1.1 Epidemiology

1.1.1 *Worldwide*

Lower respiratory tract infections were the sixth leading cause of total disability-adjusted life years worldwide in 2019, according to the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) among persons aged 75 years and older. Among persons aged 50 - 74 years, it was the 13th leading cause [1]. In 2016, the number of episodes of acute lower respiratory tract infections in people aged 70 years and older was estimated at 63 million episodes worldwide and 6.1 million episodes in Western Europe. The number of deaths due to acute lower respiratory tract infections was estimated at 1 080 958 deaths worldwide and 125 000 deaths in Western Europe [2, 3].

As for older persons, due to the often scarce data on aetiology, there is wide variation in estimating the annual number of episodes and deaths that could be specifically attributed to RSV in the years before COVID-19. Estimates range between 1.5 million symptomatic episodes in persons aged 50 years and older in industrialised countries to 2.5 million episodes in persons aged 70 years and older worldwide. The number of deaths due to RSV infections was estimated at 76 600 worldwide, including 22 000 deaths in persons aged 70 years and older [2, 4].

In 2022 systematic review on the burden of RSV disease in older and high-risk adults in developed countries, RSV was found to account for 4.66 % (95 % CI: 3.34 - 6.48 %) of symptomatic respiratory tract infections in annual studies and 7.80 % (95 % CI: 5.77 - 10.45 %) in seasonal studies. The RSV-related case fatality ratio (CFR) was estimated to be 8.18 % (95 % CI 5.54 - 11.94 %). Among high-risk (i.e. patients with lung and heart diseases, diabetes, chronic kidney disease, immunosuppression, dementia, functional impairment or institutionalized) adults, 7.03 % (95 % CI: 5.18 - 9.48 %) of symptomatic respiratory tract infections in annual studies and 7.69 % (95 % CI: 6.23 - 9.46 %) in seasonal studies were attributed to RSV. The RSV-related case fatality ratio in this high-risk group was estimated to be 9.88 % (95 % CI: 6.66 - 14.43 %) [5].

The Global Burden of Diseases, Injuries, and Risk Factors Study found that, unlike in young children, the number of disability-adjusted life years and of deaths from lower respiratory tract infections caused by RSV in persons aged 70 years and older has hardly changed since 1990. The sharp decrease in deaths from RSV infections in young children is not seen in persons aged 70 years and older, where death rates for pneumonia caused by RSV infection have barely decreased since 1990 [3]. Due to the ageing of the population, the absolute annual number of deaths attributed to RSV has increased in the last three decades.

Data on severe complications and healthcare utilisation among older adults are very scarce. The few available data show that overall, an estimated 27 % of older RSV patients develop pneumonia. Respectively 24 % of older adults with RSV infection and 33 % of high-risk RSV-positive patients require hospitalisation and in 5 % require admission to intensive care (in both patient groups)[5].

Until spring 2020, RSV showed a strong seasonal and highly predictable circulation: epidemics from November to April in the northern hemisphere, between August and December in equatorial regions, and from April to August in the southern hemisphere. During the first phase of the COVID-19 pandemic in the autumn of 2020 and the first months of 2021, a sharp reduction in RSV infections was initially observed in many countries, most likely due to the implementation of non-pharmaceutical interventions (NPIs) such as increased hand hygiene, mask wearing, physical distance, closure of schools and day care centers. As the pandemic

progressed, atypical peaks of RSV disease occurred outside the normal season [6]. In 2022, increased levels of RSV transmission were again seen during normal peak times, as well as outside of the typical seasons.

1.1.2 *Belgium*

In Belgium, the public health institute Sciensano monitors the transmissibility, severity and impact of RSV mainly through sentinel surveillance networks of laboratories, general practitioners and hospitals. Some of these surveillances collect clinical data as well as nasopharyngeal swabs.

Before COVID-19, high numbers of confirmed RSV diagnoses were reported by the sentinel laboratories every autumn, from mid-October to the end of January. The weeks with the highest incidences usually fell from early to mid-December. More than 80 % of the positive RSV tests were seen in children aged 0 - 2 years. Prior to 2016, fewer than 5 % of the positive test results pertained to individuals aged 64 years and above. Since 2016, the proportion of positive RSV tests in people aged 65 and over has increased. It is difficult to discern whether this is a result of changed testing practices (because of the growing understanding of the importance of RSV infections in the elderly and the increased use of multiplex panels) or a real increase in the relative number of infections in this age group. A recently published Belgian study describes the monitoring of the 2 distinct subtypes of RSV and a multitude of genotypes over 8 consecutive seasons prior to the SARS-CoV-pandemic. The circulated strains of each subtype were situated in a global context and compared to other countries worldwide with presentation of phylogenies of RSV pointing to the important genetic diversity [7].

As in other countries, in Belgium, in the first phase of the COVID-19 pandemic in 2020, almost no RSV infections were reported and, for the first time since the starting of surveillance in 1996, there was no autumn peak of RSV infections in Belgium. In 2021, exceptionally, an elevation in the number of RSV infections was seen in the period March - May, even exceeding the epidemic threshold. This peak was longer in duration than the pre-COVID-19 peaks. A spike of RSV infections was seen in autumn 2021, at the same time as the pre-COVID-19 peaks, but with a much lower intensity.

There were also multiple RSV epidemics in Belgium in 2022. As in 2021, March and April of 2022 saw a peak of RSV infections that exceeded the epidemic threshold. The number of infections decreased thereafter, but remained above baseline until a second epidemic in June 2022. After a decline in the number of infections in summer, a third epidemic of RSV infections was seen from the second week of November until the end of January 2023. This epidemic was of similar intensity as in the pre-COVID-19 years, but lasted one month longer and affected relatively more old persons (22 % of positive tests in persons aged 65 years and over). The fact that this peak coincided with simultaneous elevations of COVID-19, influenza and human metapneumovirus resulted in a very heavy burden on the healthcare system. In 2023, only 1 autumn RSV peak was observed.

Surveillance by GP and hospital sentinel networks give an idea about the relative proportion of RSV infections among patients with flu-like symptoms and other signs of acute respiratory tract infections. In 2023, 14.7 % (95 % CI: 5.0 % - 31.1 %) of patients aged 65 years and over who consulted the GP because of flu-like symptoms or other signs of acute respiratory tract infection were affected by a confirmed RSV infection. Likewise, in the sentinel network of hospitals in 2022, 6.7 % (CI: 4.9 % - 8.9 %) of the patients aged 65 years and over who were admitted for a severe acute respiratory infection had a positive RSV PCR test at admission.

Pooled over all the seasons before 2021, in the SARI surveillance 7.3 % (CI: 6.5 % - 8.1 %) of the patients aged 65 years and over who were admitted for a severe acute respiratory infection had a positive RSV PCR test at admission, in line with the international cohorts [3]. The RSV-related case fatality ratio (CFR) in this age group was estimated to be 11.3 % (95 % CI: 7.6 - 16.0 %). Among the admitted RSV patients aged 65 years and over 14.2 % (95 % CI: 10.0 - 19.3 %) required transfer to ICU and pneumonia occurred in 25.1 % of the cases (95 % CI: 19.7 - 31.1 %)

The SARI surveillance yields an approximate minimum count of admissions. This is largely due to the stringent case definition that includes fever, even though RSV-infected patients are known to manifest fever less often compared to those infected with influenza. These estimates pertain to severe acute respiratory infection cases that have a confirmed RSV lab test at the point of admission. In the winter of 2022 - 2023, it was estimated that at least 1 100 patients aged 65 years and over were admitted to hospital for a confirmed RSV infection in Belgium (Incidence = 0.48/1 000). These estimates coincide with those published in a study by the European consortium, RESCEU. It was estimated that 3 340 patients (2 704 – 3 975) over 65 are hospitalized annually on average in Belgium (Incidence = 1.44/1 000). When considering all patients hospitalized in Europe for RSV every year, 92 % are over 65 years [8]. Accordingly, in a modelling study performed by Public Health England, it was estimated that the hospitalization rate in the 75+ group was 3-4 times higher as compared to the 65-74 years group (251 (95% CI 186-316) vs 71 (95% CI 52-90)) [9].

1.2 Physiopathology of severe RSV disease

Severe clinical manifestations of RSV infection are the results of lung immunopathology. It is recognized that severe manifestations are the results of different factors: lack of control of viral replication and viral clearance and subsequent inappropriate immune responses, leading to inflammation and tissue damage [10].

Viral entry and infection of the upper respiratory epithelium is blocked by specific mucosal antibodies (IgA), mucus, surfactant proteins and antimicrobial peptides such as cathelicidin. Different arms of the innate immune system allow an early control of the viral replication, including type I interferon, alveolar macrophages and NK cells.

Adaptive immune responses including systemic and lower respiratory tract IgG, cellular CD4+ and CD8+ T cells contribute both to clearance of the virus from the respiratory tract and immunopathology. The balance between the protection and immunopathology seems to depend on the polarization of CD4+ T cells. Th2 and Th17 CD4+ cells are associated with neutrophilic and eosinophilic inflammation while Th1 responses are not [11].

1.3 Clinical symptoms and risk factors

A seminal study published in 2005 in the NEJM assessed the burden of RSV among healthy elderly patients and high-risk adults with chronic heart or lung disease. The study was prospective, during 4 consecutive winters in New York City. RSV was associated with a high proportion of calls and visits to physicians in the ambulatory settings. Emergency Room (ER) visits and hospitalization were restricted to high-risk adults with chronic lung or heart disease [12]. Moreover, in these at-risk patients, RSV infections may be associated with severe disease and complications at rates comparable to those of influenza infection.

Most frequently identified clinical symptoms among older adults were cough (86 %), weakness/malaise (86.7 %), shortness of breath (72.3 %), sputum (56,1 %) and fever (53.3 %). It was estimated that among older adults, the rate of pneumonia was 27.44 %, hospitalization 24.48 %, and ICU admission 5.01 %. The overall case fatality proportion was 8.18 % (95 % CI: 5.54 - 11.94 %). Of note, a high proportion of older adults were treated with antibiotics (76.95 - 77.91 %). The seasonal incidence among high-risk adults was the highest among immunodeficient patients (260.89 (95 % CI 82.33 – 826.65) RSV cases per 1 000

person - years) followed by cardiopulmonary disease (19.15 (95 % CI 6.06 – 60.49) RSV cases per 1 000 person - years.) and institutionalized older adults (9.78 (95 % CI 3.18 – 20.04) RSV cases per 1 000 person - years). In the case of high-risk adults, 32.82 % required hospitalization, and ICU admission was necessary for 26.74 %. The RSV-related case fatality proportion (CFP) was 9.88 % (95 % CI 6.66 - 14.43) [5].

Unpublished findings of the aforementioned Belgian SARI surveillance data facilitated the profiling of RSV-positive patients who were admitted with SARI over the course of four influenza seasons. Of note is that flu vaccination status of the influenza patients was not taken into account in this comparison. Median age was comparable to influenza patients (71.8 years). There was a similar proportion of patients with diabetes (14.9 %), obesity (11.5 %) and immunosuppression (18.2 %). Compared to influenza, there was a significantly higher proportion of patients with heart disease (39.9 % vs 31.5 %, $p = 0.04$). Meanwhile, the proportion of patients with lung diseases was roughly equivalent (31.1 % vs 27.4 %). Similar proportions of pneumonia on x-ray (25 %), ARDS (3.5 %), ICU admission (9.5 %) and mortality (7.4 %) were found in RSV patients as compared to influenza patients. Of note, RSV patients had 1 day longer length of stay (12.7 vs 11.6 days, $p = 0.04$) [13]. Findings from a tertiary center in Wallonia revealed a higher incidence of ICU admissions among RSV patients compared to those with influenza, even though the mortality rate was comparable between the two groups [14].

A recent Belgian-French multicentric study analyses of 309 cases of RSV-infected patients admitted to ICU between 2011 and 2018 found high mortality after ICU admission (23.9 %), comparable to patients with influenza infection (25.6 %). The study highlighted several prominent risk factors. Among these, the most common was underlying respiratory conditions, which accounted for 60.2 % of cases. This category included conditions such as COPD (38.8 %), asthma (12.6 %), interstitial lung diseases, and bronchiectasis.

Immunodeficiency was found in 35 % of patients, including conditions like solid organ transplantation, solid cancer or hematological malignancy, and the use of immunosuppressive therapy. Chronic heart failure was reported as a risk factor in 17.2 % of cases. Chronic kidney disease was identified in 12.9 % of cases. Diabetes was present in 22.3 % of the cases studied. Lastly, obesity was noted as a risk factor in 16.6 % of the patients. Mean age was 67.2 years, comparable to influenza patients (65.3). ARDS was reported in 14.2 % of the patients with 36.6 % of the patients requiring invasive ventilation. Bacterial respiratory co infection were present in 27,2 % of the case, similar to influenza infected patients [15].

A recent multicentric study performed in the US during the Omicron era, found that RSV-infected patients had similar rate of severe outcomes (death or invasive mechanical ventilation) as compared to unvaccinated patients with COVID-19 or influenzas and higher rate of severe outcomes as compared to vaccinated COVID-19 or influenza patients [16].

A presentation by Woodruff at the ACIP meeting earlier this year indicated that the most common risk factors for developing severe RSV infection include chronic medical conditions such as chronic obstructive pulmonary disease (COPD), chronic kidney disease, coronary artery disease, and diabetes. Additionally, obesity (both standard and severe), asthma, and being a current smoker contribute significantly to increased risk. The impact of these risk factors varies by age, with older adults (particularly those aged 65 and above) being more susceptible [17]. Immunosuppressive conditions were not reported in this study but are a recognized risk factor for severe RSV disease (see above).

RSV infection can have significant impacts on older adults. RSV-associated hospitalization in this age group has been shown to result in acute functional decline, with median Instrumental Activities of Daily Living (IADL) and Activities of Daily Living (ADL) scores decreasing significantly from pre-hospitalization to admission.

While some patients recover their functional status within 6 months post-discharge, a substantial proportion (32-33%) continue to experience decreased IADL and ADL scores. The impact of RSV on frailty is particularly pronounced in certain subgroups, with those admitted from skilled nursing facilities showing significant declines in 6-month IADL scores [18].

It's important to note that the impact on frailty may vary depending on the population studied. In a cohort of generally healthy community-dwelling older adults, RSV infection did not significantly affect frailty or cardiopulmonary status during the course of the study [19]. These findings suggest that the impact of RSV on frailty in older adults may be more pronounced in those with pre-existing health conditions or those requiring hospitalization.

Data extracted from the Belgian Health Interview Survey (2018): sas.sciensano.be/SASStoredProcess/quest?_program=/HISIA/SP/selectmod2018&module=frail. Show that pre-frailty % between the age group of 65-74 years old and 75+ years old is comparable, however the frailty % is much higher in the 75+ group.


Distribution (%) of the population aged 65 years and over with different levels of frailty
All age groups
Belgium , 2018

Age group	Year 2018			
	FR_02: Pre-frail and frail			N(*)
	Robust	Pre-frail	Frail	
65-74	51.1	35.5	13.4	1319
75+	27.7	39.3	32.9	1113
Total	39.9	37.3	22.8	2432

Population aged 65 years and over
Weighted percentage
(*) Total number of respondents (unweighted)
Take care with the interpretation, especially if N < 100!

A three-year prospective study revealed that the average annual incidence of RSV-associated hospitalizations for skilled nursing facility residents aged 65 and older was 440 per 100,000 persons (95% CI: 307-629), which is three to four times higher than the rate for adults not living in a long-term care institution of the same age group [20]. Nursing home residents face a significantly elevated risk of hospitalization due to RSV infection [21]. Data on RSV infection among nursing home residents are limited but document a high risk of illness, frequent hospitalization, and high mortality [22].

1.4 Immune response after RSV infection

It is considered that RSV infection universally occurs in childhood and that 100 % of the population has been infected. Infection-induced immunity is not sufficient to prevent re-infection but experimental models of RSV infection indicate that mucosal IgA plays an important role in symptom intensity [23].

The increase of severity of RSV disease in elderly adults is likely multifactorial and involves a decrease in both the quality and quantity of immune responses. Notably, decreased frequency of RSV-specific CD4+ and CD8+ T cells, are reported in elderly. There is also a shift toward

Th2-biased responses, associated with higher immunopathology. Lower levels of RSV-specific neutralizing antibodies are associated with increased risk of RSV infection and RSV severe disease [11]. Following RSV infection, high titers of neutralizing antibody are induced, indicating that elderly are able to produce RSV-specific antibodies. Cross neutralisation is reported between the two subtype, RSV A and RSV B.

1.5 History of RSV Vaccines

The first RSV vaccine developed in the 1960 (formalin inactivated RSV) was associated with a higher rate of hospitalization and more severe respiratory disease upon exposure to natural RSV infection among vaccinated children. Post-mortem studies also showed that the lungs of vaccinated children had more severe inflammation than unvaccinated children who died from RSV infection. The mechanisms of vaccine-induced disease enhancement include induction of non-neutralizing antibodies leading to antibody-dependent enhancement, i.e. antibody binding to the virus and promoting its entry into the immune cells, leading to uncontrolled viral replication and exaggerated immune response. The formalin inactivated vaccine was also associated with TH2-biased immune response in animal models, which could also explain the more severe immunopathology among vaccine recipients [11].

A breakthrough in the understanding of protective immune responses toward RSV occurred in 2015 when it was discovered that the neutralizing activity was restricted to an antigen expressed in the prefusion form of the F glycoprotein, located on the virus. The antigenic site II is a relatively small region on the surface of the F protein that is exposed when the protein undergoes a conformational change during the fusion process. Antibodies that recognize and bind to this region can block the interaction between the F protein and its receptor on host cells, thereby preventing viral entry and infection.

Accordingly, vaccines based on the post-fusion conformation of the F protein have failed in clinical trials [24].

1.6 RSV Vaccines

1.6.1 Arexvy® (GSK)

GSK has engineered an RSV preF vaccine, Arexvy®, combined with the AS01 adjuvant for increasing RSV-specific CD4+ T-cell frequencies [25]. In pre-clinical trials formulations with AS01E were less reactogenic than those with AS01B (which contains twice the dose of immunostimulants). Therefore, an AS01E-adjuvanted formulation was selected for further development.

GSK vaccine include 120 µg of RSV PreF3 recombinant antigen derived from the RSV fusion surface glycoprotein of an RSV-A strain and is adjuvanted with the AS01 adjuvant, already in use in the malaria and zoster vaccines. The adjuvant is known to increase the recruitment of antigen presenting cells at the level of injection and is associated with strong neutralising antibody and polyfunctional T cells responses [26, 27].

Adverse events Arexvy® (SPC)

There was no difference in the rate of serious adverse events between vaccine and placebo recipient.

The safety profile for Arexvy® is based on a pooled analysis of data generated in two placebo controlled Phase III clinical studies (conducted in Europe, North America, Asia and Southern hemisphere) in adults ≥ 60, and 50 through 59 years of age. In study participants 60 years of age and older (more than 12 000 adults received one dose of Arexvy® and more than 12 000 received placebo, with a follow-up period of approximately 12 months), the most commonly

reported adverse reactions were injection site pain (61%), fatigue (34%), myalgia (29%), headache (28%), and arthralgia (18%). These adverse reactions were usually mild or moderate in intensity and resolved within a few days after vaccination. Most other adverse reactions were uncommon and similarly reported between the study groups.

In study participants 50 through 59 years of age (769 participants, including 386 participants with predefined, stable, chronic medical conditions leading to an increased risk for RSV disease), a higher incidence of injection site pain (76%), fatigue (40%), myalgia (36%), headache (32%), and arthralgia (23%) was observed, compared with those 60 years of age and older (381 participants) in the same study. However, the duration and severity of these events were comparable across age groups in the study.

Of interest is 1 case of Guillain-Barré syndrome occurring 9 days after vaccination which was assessed as related to the vaccine by the investigator ([link](#)). See also section 1.8 below regarding Guillain-Barré syndrome.

Coadministration Arexvy® ([SPC](#))

Arexvy® may be administered concomitantly with inactivated seasonal influenza vaccines (standard dose unadjuvanted, high dose unadjuvanted, or standard dose adjuvanted).

Upon concomitant administration of Arexvy with seasonal influenza vaccines, numerically lower RSV A and B neutralising titres and numerically lower influenza A and B haemagglutination inhibition titres were observed as compared to the separate administration. This was not observed consistently across studies. The clinical relevance of these findings is unknown.

If Arexvy is to be given at the same time as another injectable vaccine, the vaccines should always be administered at different injection sites.

Concomitant administration of Arexvy® with other vaccines such as COVID-19 and pneumococcal vaccines has not been studied.

1.6.2 *Abrysvo® (Pfizer)*

The active substances of Abrysvo® are two recombinant stabilised RSV prefusion F antigens representing the subgroups RSV-A and RSV-B. Abrysvo® induces the production of specific antibodies against the prefusion F protein, which inhibits RSV infection and thereby protects against RSV-associated LRT disease.

The Pfizer vaccine include 60 µg of RSV preF from both RSV A and RSV B strains.

The vaccine is currently being tested in pivotal phase 3 trial, the RSV Vaccine Efficacy Study in Older Adults Immunized against RSV Disease (RENOIR), involving adults who were at least 60 years of age. A second trial, the Maternal Immunization Study for Safety and Efficacy (MATISSE) evaluates the efficacy and safety of maternal RSVpreF vaccination in preventing RSV-associated lower respiratory tract illness in infants [28].

Adverse events Abrysvo®

In individuals 60 years of age and older the most frequently reported adverse reaction was vaccination site pain (11%). The majority of reactions were mild to moderate in severity and resolved within 1-2 days of onset. Guillain-Barré syndrome is listed in the SPC with a

frequency 'rare' ($\geq 1/10\,000$ to $< 1/1\,000$) for individuals ≥ 60 years. See also section 1.8 below regarding Guillain-Barré syndrome ([SPC](#)).

Vaccine recipients had more local reactions than by placebo recipients (12 % vs. 7 %); the incidence of systemic events was similar in the two groups (27 % and 26 %, respectively). These events were generally self-limiting and mild to moderate in severity.

The incidence of serious adverse events was comparable in both groups at 2.3 %. Out of these, investigators deemed three serious adverse events as potentially linked to the trial intervention. The first was a delayed allergic reaction occurring seven hours post-injection of the RSV preF vaccine, with the patient fully recovering on the same day. The second event was a diagnosis of Miller–Fisher syndrome, a variant of Guillain–Barré syndrome characterized by ophthalmoplegia, ataxia, and areflexia. The final event was the identification of acute inflammatory demyelinating polyradiculoneuropathy, consistent with Guillain–Barré syndrome, that manifested seven days post-injection [29].

Coadministration Abrysvo® ([SPC](#))

Abrysvo can be administered concomitantly with seasonal quadrivalent influenza vaccine (QIV, surface antigen, inactivated, adjuvanted). In a randomised study in adults 65 years of age and older, the criteria for non-inferiority of the immune responses in the co-administration versus the separate administration group were met. However, numerically lower RSV A and B neutralising titres and numerically lower influenza A and B haemagglutination inhibition titres were observed when Abrysvo and inactivated adjuvanted seasonal influenza vaccine were co-administered than when they were administered separately. The clinical relevance of this finding is unknown.

A minimum interval of two weeks is recommended between administration of Abrysvo and administration of a tetanus, diphtheria and acellular pertussis vaccine (Tdap). Immune responses to RSV A, RSV B, diphtheria and tetanus on co-administration were non-inferior to those after separate administration. However, the immune responses to the pertussis components were lower on co-administration compared to separate administration and did not meet the criteria for noninferiority. The clinical relevance of this finding is unknown.

1.6.3 mResvia® (Moderna)

Moderna developed a RSV Vaccine (mRNA-1345) designed to encode for a stabilized prefusion F glycoprotein.

One dose (0.5 mL) contains 50 micrograms of Respiratory Syncytial Virus (RSV) mRNA vaccine (nucleoside modified) encapsulated in lipid nanoparticles.

The active substance is a single-stranded 5' capped mRNA encoding the RSV-A glycoprotein F stabilised in the prefusion conformation.

Adverse events mResvia® ([SPC](#))

The most commonly reported adverse reactions were injection site pain (55.9%), fatigue (30.8%), headache (26.7%), myalgia (26.6%) and arthralgia (21.7%). The onset of most solicited local and systemic adverse reactions was within 1 to 2 days after injection and resolved within 1 to 2 days after onset. The majority of local and systemic solicited adverse reactions were mild in intensity.

No case of Guillain Barré was reported [30].

Coadministration mResvia® ([SPC](#))

Co-administration was evaluated with quadrivalent influenza vaccine and bivalent COVID-19 vaccine (mRNA-1345) in adults > 50; all non-inferiority immunogenicity criteria were met.

Concomitant administration of mResvia® with other vaccines has not been studied.

1.7 Vaccine efficacy across seasons

After the first publication of the advisory report [32], more data on efficacy across seasons became available.

1.7.1 Arexvy® (GSK)

GSK recently published efficacy analyses included 12468 recipients receiving Arexvy® and 12498 placebo recipients. Cumulative efficacy over three seasons of one dose was 62,9% (97,5% CI: 46,7-74,8%) against RSV-LRTD (median follow-up 30,6 months from day 15 post-dose 1, with season as covariate) [33].

Endpoint	Season one efficacy	Season two efficacy	Season three efficacy	Cumulative efficacy over three seasons
RSV-LRTD	6.7 months median follow-up 82.6% 96.95% CI, 57.9–94.1 7 of 12,466 vs 40 of 12,494	6.3 months median follow-up 56.1% 95% CI, 28.2–74.4 20 of 4,991 vs 91 of 10,031	7 months median follow-up 48.0% 95% CI, 8.7-72.0 16 of 4,988 vs 61 of 10,03	30.6 months median follow-up 62.9% - with season as covariate 97.5% CI, 46.7-74.8 48 of 12,468 vs 215 of 12,498 69.1% - without season as covariate (post-hoc analysis) 97.5% CI, 55.8-78.9 48 of 12,468 vs 215 of 12,498
Severe LRTD	94.1% 95% CI, 62.4–99.9 1 of 12,466 vs 17 of 12,494	64.2% 95% CI, 6.19–89.2 5 of 4,991 vs 28 of 10,031	43.3% 95% CI, -45.3-81.3 6 of 4,988 vs 21 of 10,031	67.4% - with season as covariate 95% CI, 42.4-82.7 15 of 12,468 vs 75 of 12,498 72.3 % - without season as covariate (post-hoc analysis) 95% CI, 51.3 – 85.2 15 of 12,468 vs 75 of 12,498

1.7.2 Abrysvo® (Pfizer)

Vaccine efficacy against RSV-associated LRTD, defined by three or more symptoms, after disease surveillance in season two was 77.8% (95.0% CI: 51.4, 91.1); vaccine efficacy following season one was 88.9% (95.0% CI: 53.6%, 98.7%), which demonstrates durable efficacy after two seasons.

Vaccine efficacy was also sustained against less severe LRTD, defined by two or more symptoms, from 65.1% (95.0% CI: 35.9%, 82.0%) 1 after season one to 55.7% (95.0% CI: 34.7%, 70.4%) after the end of season two: <https://www.clinicaltrials.gov/study/NCT05035212#study-overview> [29]

Endpoint	Season one efficacy	Season two efficacy
LRTD ≥ 2 Symptoms	65.1% (95% CI: 35.9%, 82.0%)	55.7% (95% CI: 34.7-70.4) Follow up: 16.4 months
LRTD ≥ 3 Symptoms	88.9% (95% CI: 53.6%, 98.7%)	88.9% (95% CI: 53.6%, 98.7%) Follow up: 16.4 months

1.7.3 *mResvia*® (Moderna)

In Moderna's primary efficacy analysis, a single dose of the vaccine demonstrated an efficacy of 78.7% in preventing symptomatic, laboratory-confirmed RSV-LRTD characterized by two or more lower respiratory symptoms. For cases with three or more lower respiratory symptoms, efficacy was 80.9%

Using the complete follow-up dataset (median follow-up: 18.8 months per participant; range: 0.5–24 months), the vaccine's efficacy against RSV-LRTD with two or more symptoms was 47.4% (95% CI: 35.0%–57.4%), while efficacy against RSV-LRTD with three or more symptoms was 48.4% (95% CI: 27.9%–63.1%). These findings are based on data from Moderna's mRNA-1345 phase 2/3 clinical trial (Das et al., ACIP, 2024: www.cdc.gov/acip/downloads/slides-2024-06-26-28/04-RSV-Adult-Das-508.pdf)

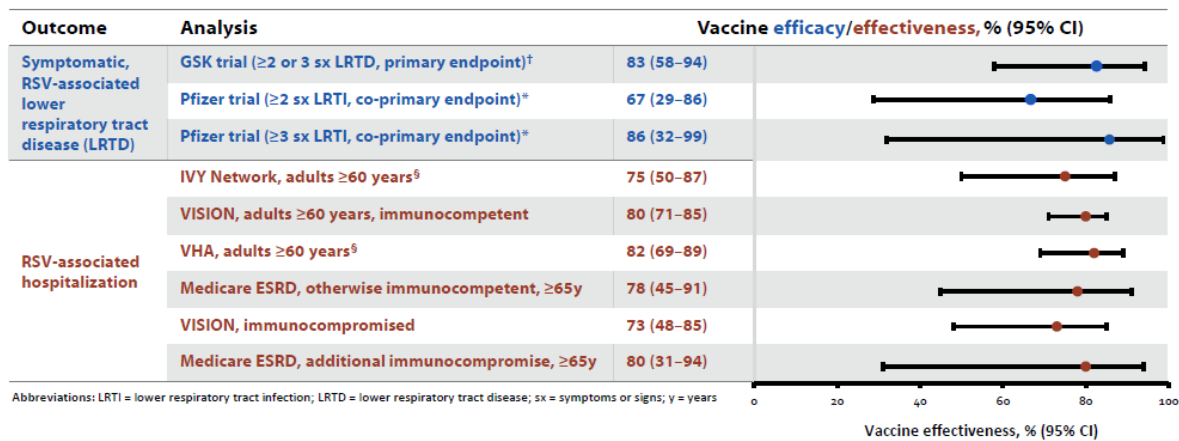
Endpoint	Season one efficacy	Season two efficacy
LRTD ≥ 2 Symptoms	78.7% (95.10% CI: 62.8%, 87.9%)	47.4 % (95.10% CI: 35.0%, 57.4%) median follow-up: 18.8 months
LRTD ≥ 3 symptoms	80.9% (95.10% CI: 50.1%, 92.7%)	48.4% (95.10% CI: 27.9%, 63.1%) median follow-up: 18.8 months

1.8 Safety findings on Guillain-Barré Syndrome (GBS) amongst adults ≥ 60 years

In October 2024, CDC evaluated GBS using a Self-Controlled Case Series (SCCS) Design. The analyses suggest an increased GBS risk following Abrysvo® and Arexvy® among adults aged 65 years and older. There was an elevated incidence rate ratio of GBS following both vaccines and results reached statistical significance for Arexvy®, but not for Abrysvo®, which had fewer doses administered. The estimated attributable GBS risk was similar for both products: Arexvy®: 7 excess cases per 1 million doses (95% CI: 2, 11) and Abrysvo®: 9 excess cases per 1 million doses (95% CI: 0, 18). There was no difference in GBS risk among persons with and without concomitant vaccination on the same day with RSV vaccines. (Lloyd et al., ACIP, 2024: <https://www.cdc.gov/acip/downloads/slides-2024-10-23-24/05-RSV-Adult-Lloyd-508.pdf> and Melgar et al., ACIP, 2024 <https://www.cdc.gov/acip/downloads/slides-2024-10-23-24/06-RSV-Adult-Melgar-508.pdf>)

1.9 Vaccine effectiveness against hospitalisation

Real life effectiveness against health care use (i.e. hospitalization, ICU admission) and death were generated using different observational cohorts in the US following the implementation during the 2023-2024 season with Abrysvo® and Arexvy®. Vaccine efficacy against hospitalisation could not be estimated in the clinical trials due to the low numbers of events. (Surie et al., ACIP, 2024 : <https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2024-06-26-28/07-RSV-Adult-Surie-508.pdf>)



[†] Papi A, et. al. Respiratory Syncytial Virus Prefusion F Protein Vaccine in Older Adults. *N Engl J Med.* 2023;388:595–608. See slide 44 for detailed definitions.

^{*} Walsh E, et. al. Efficacy and Safety of a Bivalent RSV Prefusion F Vaccine in Older Adults. *N Engl J Med.* 2023;388:1465–77. See slide 44 for detailed definitions.

[§] Includes patients with immunocompromising conditions in the displayed VE estimate.

Table from Surie et al. ACIP, June 26 2024

Surie et al. concluded that under real-world conditions, RSV vaccination provided protection against severe RSV disease among US adults aged ≥ 60 years in this first season of use [25, 29, 34].

These results provide evidence of VE against RSV-associated emergency department visits, hospitalizations, and critical illness and demonstrate protection in a population that more closely represents those at high-risk of severe RSV disease, including adults aged 75 years or older, adults with a composite of various immunocompromising conditions and adults with underlying conditions, especially cardiopulmonary disease.

A peer-reviewed research paper was published by Surie et al. providing more real world evidence of vaccine protection against RSV-associated hospitalization. VE against RSV-associated hospitalization was 75% (95% CI, 50%-87%) among adults aged 60 years and older during the first season [16].

2 Other country/NITAG recommendations (Last consulted October 2024)

Country	Specific age group for recommended vaccination against RSV (older adults)	link
USA	All adults aged ≥75 years and adults aged 60–74 years who are at increased risk for severe RSV disease should receive a single dose of RSV vaccine.	Britton A, Roper LE, Kotton CN, et al. Use of Respiratory Syncytial Virus Vaccines in Adults Aged ≥60 Years: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2024. MMWR Morb Mortal Wkly Rep 2024;73:696-702. DOI: http://dx.doi.org/10.15585/mmwr.mm7332e1 .
Norway	Over 60 years and with underlying disease	Respiratory syncytial virus (RSV) immunisation programme: JCVI advice, 7 June 2023 - GOV.UK
UK	Over 75 years and above	Respiratory syncytial virus (RSV) immunisation programme: JCVI advice, 7 June 2023 - GOV.UK
Austria	Over 60 years	Vaccination plan Austria (sozialministerium.at)
France	Over 75 years and over 65 years for patients with chronic diseases	Haute Autorité de Santé - Vaccine strategy for the prevention of RSV infections in adults aged 60 years and over (has-sante.fr) https://www.has-sante.fr/jcms/p_3550892/fr/strategie-de-vaccination-contre-les-infections-par-le-vrs-chest-l-adulte-age-de-60-ans-et-plus-place-du-vaccin-mresvia-moderna
Germany	Over 75 years and aged 60 to 74 years if there is chronic disease	RKI - Vaccinations A - Z - Answers to frequently asked questions about vaccination against RSV
Ireland	NIAC recommends RSV vaccination for those aged 65 years and older with either RSVPreF3 (Arexvy, GSK) or RSVpreF (Abrysvo, Pfizer) but there is no programme in place or implementation yet.	RSV (respiratory syncytial virus) signs, symptoms, causes and treatments - HSE.ie
Sweden	Over 75 years and those over 60 years in risk groups that have specific diseases, diagnoses or conditions.	Vaccination against RSV — Public Health Agency of Sweden (folkhalsomyndigheten.se)

3 Possible Impact of RSV Vaccination for Older Adults

Vaccination against RSV in older adults could substantially reduce the burden of RSV related respiratory illness and associated complications. This would likely have multiple effects on the health system, including:

- **Reduction in disease burden:** RSV is known to cause serious lower respiratory tract infections, which can lead to pneumonia and exacerbations of chronic conditions like chronic obstructive pulmonary disease (COPD) and heart failure. Immunization can reduce the incidence and severity of these infections, thereby decreasing hospitalizations and mortality rates among older populations.
- **Decreased hospital admissions:** By preventing severe RSV infections, vaccinations could lead to fewer hospitalizations, especially among those with comorbidities.
- **Protection of high risk populations:** Older adults often have weakened immune systems due to age-related immunosenescence or medical conditions. The availability of an effective RSV vaccine helps bolster their immunity, lowering the risk of severe disease outcomes. This is particularly crucial for persons with known risk factors: Chronic Kidney Disease; Severe Obesity (BMI ≥ 40); Chronic Respiratory Diseases (COPD, asthma, bronchiectasis, interstitial lung diseases, chronic respiratory failure); Current smoker; Chronic Heart Failure – Coronary artery disease; Diabetes; Stroke; Immunodeficiency, including patients with solid cancer or haematologic malignancy, use of immunosuppressive medications, solid organ transplantation, allogenic HCT; Institutionalized Patients.
- **Reduction in antibiotic prescriptions:** As RSV contributes significantly to antibiotic use among older adults, vaccination could lower the incidence of RSV-related respiratory infections, thus decreasing inappropriate antibiotic prescriptions and mitigating risks of antibiotic resistance [35].

VI REFERENCES

1. Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*, 2020. 396(10258): p. 1204-1222. 10.1016/s0140-6736(20)30925-9
2. Estimates of the global, regional, and national morbidity, mortality, and aetiologies of lower respiratory infections in 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Infect Dis*, 2018. 18(11): p. 1191-1210. 10.1016/s1473-3099(18)30310-4
3. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*, 2018. 392(10159): p. 1736-1788. 10.1016/s0140-6736(18)32203-7
4. Ting Shi, Angeline Denouel, Anna K Tietjen, et al. Global Disease Burden Estimates of Respiratory Syncytial Virus–Associated Acute Respiratory Infection in Older Adults in 2015: A Systematic Review and Meta-Analysis. *J Infect Dis*, 2019. 222(Supplement_7): p. S577-S583. 10.1093/infdis/jiz059
5. J. S. Nguyen-Van-Tam, M. O'Leary, E. T. Martin, et al. Burden of respiratory syncytial virus infection in older and high-risk adults: a systematic review and meta-analysis of the evidence from developed countries. *Eur Respir Rev*, 2022. 31(166). 10.1183/16000617.0105-2022
6. R. T. Stein and H. J. Zar. RSV through the COVID-19 pandemic: Burden, shifting epidemiology, and implications for the future. *Pediatr Pulmonol*, 2023. 58(6): p. 1631-1639. 10.1002/ppul.26370
7. K. Ramaekers, E. Keyaerts, L. Houspie, et al. Epidemiology and genetic diversity of human respiratory syncytial virus in Belgium between 2011 and 2019. *Virology*, 2024. 21(1): p. 270. 10.1186/s12985-024-02542-4
8. Richard Osei-Yeboah, Peter Spreeuwenberg, Marco Del Riccio, et al. Estimation of the number of RSV-associated hospitalisations in adults in the European Union. *J Infect Dis*, 2023. 10.1093/infdis/jiad189. 10.1093/infdis/jiad189
9. A. Sharp, M. Minaji, N. Panagiotopoulos, et al. Estimating the burden of adult hospital admissions due to RSV and other respiratory pathogens in England. *Influenza Other Respir Viruses*, 2022. 16(1): p. 125-131. 10.1111/irv.12910
10. Hannah Jarvis Akhilesh Jha, Clementine Fraser, Peter JM Openshaw. SARS, MERS and other Viral Lung Infections. 2016, European Respiratory Society.
11. P. J. M. Openshaw, C. Chiu, F. J. Culley, et al. Protective and Harmful Immunity to RSV Infection. *Annu Rev Immunol*, 2017. 35: p. 501-532. 10.1146/annurev-immunol-051116-052206
12. A. R. Falsey, P. A. Hennessey, M. A. Formica, et al. Respiratory syncytial virus infection in elderly and high-risk adults. *N Engl J Med*, 2005. 352(17): p. 1749-59. 10.1056/NEJMoa043951
13. N. Dauby, Gerard, M., Bourgeois, M., Delaere, B., Magerman, K., Jouck, D., Reynders, M., Petit, E., Lacor, P., Hoeland, X., Lissioir, B., Thomas, I., Barbezange, C., & Bossuyt, N. SV infection in hospitalized adults with severe acute respiratory infection during four influenza seasons in Belgium: prevalence, subtype distribution, risk factors & outcome. 2019, ECCMID.
14. Bourgeois M. COVID-19 and flu/respiratory syncytial virus (RSV) adult hospitalisations in a Belgian tertiary referral centre: epidemiological, clinical and outcome data comparison. *ESCMID eAcademy*, 2021: p. Bourgeois M. 07/09/2021; 327622; 488.
15. Julien Coussement, Benjamin Zuber, Eve Garrigues, et al. Characteristics and Outcomes of Patients in the ICU With Respiratory Syncytial Virus Compared With Those With Influenza Infection: A Multicenter Matched Cohort Study. *Chest*, 2022. 161(6): p. 1475-1484. <https://doi.org/10.1016/j.chest.2021.12.670>

16. D. Surie, K. A. Yuengling, J. DeCuir, et al. Severity of Respiratory Syncytial Virus vs COVID-19 and Influenza Among Hospitalized US Adults. *JAMA Netw Open*, 2024. 7(4): p. e244954. 10.1001/jamanetworkopen.2024.4954
17. Woodruff R. CDC. Chronic conditions as risk factors for RSV-associated hospitalization. February 29, 2024. 2024, ACIP February 28-29, 2024 Presentation Slides | Immunization Practices | CDC.
18. A. R. Branche, L. Saiman, E. E. Walsh, et al. Change in functional status associated with respiratory syncytial virus infection in hospitalized older adults. *Influenza Other Respir Viruses*, 2022. 16(6): p. 1151-1160. 10.1111/irv.13043
19. Koos Korsten, Niels Adriaenssens, Samuel Coenen, et al. Burden of respiratory syncytial virus infection in community-dwelling older adults in Europe (RESCEU): an international prospective cohort study. *European Respiratory Journal*, 2021. 57(4): p. 2002688. 10.1183/13993003.02688-2020
20. A. R. Branche, A. R. Falsey, L. Finelli, et al. Residency in Long-Term Care Facilities: An Important Risk Factor for Respiratory Syncytial Virus Hospitalization. *J Infect Dis*, 2024. 230(5): p. e1007-e1011. 10.1093/infdis/jiae424
21. M. Haeberer, M. Mengel, R. Fan, et al. RSV Risk Profile in Hospitalized Adults and Comparison with Influenza and COVID-19 Controls in Valladolid, Spain, 2010-2022. *Infect Dis Ther*, 2024. 13(9): p. 1983-1999. 10.1007/s40121-024-01021-1
22. R. Osei-Yeboah, S. Amankwah, E. Begier, et al. Burden of Respiratory Syncytial Virus (RSV) Infection Among Adults in Nursing and Care Homes: A Systematic Review. *Influenza Other Respir Viruses*, 2024. 18(9): p. e70008. 10.1111/irv.70008
23. M. S. Habibi, A. Jozwik, S. Makris, et al. Impaired Antibody-mediated Protection and Defective IgA B-Cell Memory in Experimental Infection of Adults with Respiratory Syncytial Virus. *Am J Respir Crit Care Med*, 2015. 191(9): p. 1040-9. 10.1164/rccm.201412-2256OC
24. J. Falloon, J. Yu, M. T. Esser, et al. An Adjuvanted, Postfusion F Protein-Based Vaccine Did Not Prevent Respiratory Syncytial Virus Illness in Older Adults. *J Infect Dis*, 2017. 216(11): p. 1362-1370. 10.1093/infdis/jix503
25. A. Papi, M. G. Ison, J. M. Langley, et al. Respiratory Syncytial Virus Prefusion F Protein Vaccine in Older Adults. *N Engl J Med*, 2023. 388(7): p. 595-608. 10.1056/NEJMoa2209604
26. A. M. Didierlaurent, B. Laupèze, A. Di Pasquale, et al. Adjuvant system AS01: helping to overcome the challenges of modern vaccines. *Expert Rev Vaccines*, 2017. 16(1): p. 55-63. 10.1080/14760584.2016.1213632
27. I. Leroux-Roels, M. G. Davis, K. Steenackers, et al. Safety and Immunogenicity of a Respiratory Syncytial Virus Prefusion F (RSVPreF3) Candidate Vaccine in Older Adults: Phase 1/2 Randomized Clinical Trial. *J Infect Dis*, 2023. 227(6): p. 761-772. 10.1093/infdis/jiac327
28. B. Kampmann, S. A. Madhi, I. Munjal, et al. Bivalent Prefusion F Vaccine in Pregnancy to Prevent RSV Illness in Infants. *N Engl J Med*, 2023. 388(16): p. 1451-1464. 10.1056/NEJMoa2216480
29. E. E. Walsh, G. Pérez Marc, A. M. Zareba, et al. Efficacy and Safety of a Bivalent RSV Prefusion F Vaccine in Older Adults. *N Engl J Med*, 2023. 388(16): p. 1465-1477. 10.1056/NEJMoa2213836
30. E. Wilson, J. Goswami, A. H. Baqui, et al. Efficacy and Safety of an mRNA-Based RSV PreF Vaccine in Older Adults. *N Engl J Med*, 2023. 389(24): p. 2233-2244. 10.1056/NEJMoa2307079
31. Das R. ACIP February 29, 2024. Overview of Moderna's Investigational RSV Vaccine (mRNA-1345) in Adults ≥ 60 Years of Age. . 2024, <https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2024-02-28-29/02-RSV-Adults-Das-508.pdf>.
32. Superior Health Council. Report 9725. Vaccination against RSV (adults). 2023, <https://www.hgr-css.be/nl/advies/9725/vaccinatie-tegen-rsv-volwassenen>.

33. M. G. Ison, A. Papi, E. Athan, et al. Efficacy and Safety of Respiratory Syncytial Virus (RSV) Prefusion F Protein Vaccine (RSVPreF3 OA) in Older Adults Over 2 RSV Seasons. *Clin Infect Dis*, 2024. 78(6): p. 1732-1744. 10.1093/cid/ciae010
34. A. B. Payne, J. A. Watts, P. K. Mitchell, et al. Respiratory syncytial virus (RSV) vaccine effectiveness against RSV-associated hospitalisations and emergency department encounters among adults aged 60 years and older in the USA, October, 2023, to March, 2024: a test-negative design analysis. *Lancet*, 2024. 404(10462): p. 1547-1559. 10.1016/s0140-6736(24)01738-0
35. Lucy Miller, Thomas Beaney, Russel Hope, et al. General practice antibiotic prescriptions attributable to Respiratory Syncytial Virus by age and antibiotic class: An ecological analysis of the English population. *medRxiv*, 2024. 10.1101/2024.10.31.24316265

VII COMPOSITION OF THE WORKING GROUP

The composition of the Committee and that of the Board as well as the list of experts appointed by Royal Decree are available on the following website: [About us](#).

All experts joined the working group *in a private capacity*. Their general declarations of interests as well as those of the members of the Committee and the Board can be viewed on the SHC website (site: [conflicts of interest](#)).

This advisory report SHC 9837 is a revision of report SHC 9725 and was performed by the ad hoc president **Nicolas DAUBY** and the scientific secretariat, Veerle Mertens.

The following experts of the former ad hoc working group (SHC 9725) reviewed the report and approved the revision by email on November 21 2024:

ANDRE Emmanuel	Medical Microbiology	<i>UZ Leuven / KU Leuven, National Reference Center for Respiratory Pathogens</i>
BOSSUYT Nathalie	Epidemiology	<i>Sciensano</i>
CALLENS Steven	Infectiology, internal medicine	<i>UZ Gent</i>
	Infectiology, medical immunology	<i>CHU Saint-Pierre/ULB</i>
DAUBY Nicolas	Internal Medicine, infectious diseases, travel medicine, HIV	<i>UZ Gent</i>
DE SCHEERDER Marie-Angélique	Infectiology	<i>UZ Leuven</i>
DERDELINCKX Inge	Intensive Care	<i>Erasme</i>
GRIMALDI David	Medical Microbiologist	<i>AZ Sint-Jan</i>
REYNDERS Marijke	Epidemiology	<i>KCE, UNamur</i>
ROBERFROID Dominique		
VAN LAETHEM Yves	Infectiology, vaccinology, travel clinic	<i>CHU Saint-Pierre</i>

The standing working group Vaccination (NITAG) approved the report at the NITAG meeting of November 21 2024 (or by mail on the same day).

The standing working group was chaired by **David TUERLINCKX and Steven CALLENS**; the scientific secretary were Veerle MERTENS and Fabrice PETERS.

ALDERS Nele	Pediatrics, Infectiology, Travel and Tropical Medicine	ITG
BEUTELS Philippe	Social Sciences, Health Care Economics and Organizations, Infectious Disease Medicine.	UAntwerpen, CHERMID, SIMID
BLUMENTAL Sophie	Pediatrics, Infectious Disease Medicine, Vaccinology, Primary Immunodeficiency Diseases, Pneumococcal Infections, Tuberculosis.	ULB, CHIREC
BOIY Tine	Pediatrics, Rare Diseases, Congenital Hereditary and Neonatal Diseases and Abnormalities, Down Syndrome.	UAntwerpen, UZA

CALLENS Steven	Internal Medicine, Infectious Disease Medicine, Emerging Communicable Diseases, Travel Medicine, Vaccinology, Tuberculosis, AIDS-HIV, Ebola, COVID-19.	UGent, UZ Gent
CARRILLO SANTISTEVE Paloma	General Practice, Infectious Disease Medicine, Vaccinology, Preventive Medicine, Public Health.	ONE
CHATZIS Olga	Pediatrics, Infectious Disease Medicine, Congenital Hereditary and Neonatal Diseases and Abnormalities, Vaccinology.	UCLouvain, Cliniques universitaires Saint-Luc
CORNELISSEN Laura	Obstetrics, Gynecology, Epidemiology, Infectious Disease Medicine, Maternal Health, Public Health.	Sciensano
CHRISTIAENS Thierry	Pharmacology.	CBIP/BCFI, UGent
DE SCHEERDER Marie Angélique	Internal Medicine, Infectious Disease Medicine, Travel Medicine, AIDS-HIV, Anti-Bacterial Agents.	UGent, UZ Gent
DE SCHRYVER Antoon	Occupational and environmental medicine	U Antwerpen
DESMET Stéfanie	Clinical microbiology, epidemiology	UZ Leuven, NRC for Pneumococci
DOGNE Jean Michel	Pharmacy and pharmacovigilance	U Namur, AFMPS, EMA
MAERTENS Kirsten	Vaccinology and maternal immunization	U Antwerpen
MANIEWSKI-KELNER Ula	Infectiology and travel medicine	ITG
PELEMAN Renaat	Pediatrics, infectiology, vaccinology healthcare services management	UZ Gent
SWENNEN Béatrice	Epidemiology and vaccinology	ULB
TUERLINCKX David	Pediatrics and vaccinology	CHU UCL Namur
VEKEMAN Veerle	General medicine	Kind en Gezin
VERHAEGEN Jan	Immunology, clinical microbiology, transplantation	UZ Leuven
WAETERLOOS Geneviève	Quality of vaccines and blood products	Sciensano

The following experts were heard but did not take part in endorsing the advisory report:

DAELEMANS Siel	Pediatrics, Infectious Disease Medicine, Pulmonary Medicine, Cystic Fibrosis, RSV, COVID-19.	VUB, UZ Brussel
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DAEMS Joël	Directorate Drugs	RIZIV-INAMI
JONG Veerle	Infection control and vaccinology	VAZG
FRERE Julie	Pediatrics and infectiology	CHR Citadelle
PERIN Belinda	General medicine, Vaccinology	AVIQ - ONE
SABBE Martine	Vaccinovigilance and safety of vaccines	AFMPS-FAGG
SCHELSTRAETE Petra	Pediatrics, pneumology and infectiology	UZ Gent
TAAME Adrae	General medicine	CCC-GGC
THEETEN Heidi	Vaccinology	VAZG
VANDEN DRIESSCHE Koen	Pediatrics, infectiology, oncology	UZA

About the Superior Health Council (SHC)

The Superior Health Council is a federal advisory body. Its secretariat is provided by the Federal Public Service Health, Food Chain Safety and Environment. It was founded in 1849 and provides scientific advisory reports on public health issues to the Ministers of Public Health and the Environment, their administration, and a few agencies. These advisory reports are drawn up on request or on the SHC's own initiative. The SHC aims at giving guidance to political decision-makers on public health matters. It does this on the basis of the most recent scientific knowledge.

Apart from its 25-member internal secretariat, the Council draws upon a vast network of over 500 experts (university professors, staff members of scientific institutions, stakeholders in the field, etc.), 300 of whom are appointed experts of the Council by Royal Decree. These experts meet in multidisciplinary working groups in order to write the advisory reports.

As an official body, the Superior Health Council takes the view that it is of key importance to guarantee that the scientific advisory reports it issues are neutral and impartial. In order to do so, it has provided itself with a structure, rules and procedures with which these requirements can be met efficiently at each stage of the coming into being of the advisory reports. The key stages in the latter process are: 1) the preliminary analysis of the request, 2) the appointing of the experts within the working groups, 3) the implementation of the procedures for managing potential conflicts of interest (based on the declaration of interest, the analysis of possible conflicts of interest, and a Committee on Professional Conduct) as well as the final endorsement of the advisory reports by the Board (ultimate decision-making body of the SHC, which consists of 30 members from the pool of appointed experts). This coherent set of procedures aims at allowing the SHC to issue advisory reports that are based on the highest level of scientific expertise available whilst maintaining all possible impartiality.

Once they have been endorsed by the Board, the advisory reports are sent to those who requested them as well as to the Minister of Public Health and are subsequently published on the SHC website (www.hgr-css.be). Some of them are also communicated to the press and to specific target groups (healthcare professionals, universities, politicians, consumer organisations, etc.).

In order to receive notification about the activities and publications of the SHC, please contact: info.hgr-css@health.belgium.be.

www.shc-belgium.be



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