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RESPIRATORY SYNCYTIAL VIRUS VACCINES IN THE ELDERLY: EFFICACY AND SAFETY

Gustavo Regus Schuster

Federal University of Santa Maria (UFSM)
Santa Maria - RS
<https://orcid.org/0009-0005-5634-9476>

Poliana de Brito Fontele

National University of Rosario (UNR)
Rosario - Santa Fe
<https://orcid.org/0009-0000-6326-8926>

Nathália Paula Rodrigues da Rocha

National University of Rosario (UNR)
Rosario - Santa Fe
<https://orcid.org/0009-0003-1884-8384>

Fabiana Oliveira Gonçalves

National University of Rosario (UNR)
Rosario - Santa Fe
<https://orcid.org/0009-0002-4959-4033>

Amanda Dulinsky Longo

Italian University Institute of Rosario
(IUNIR), Rosario - Santa Fe
<https://orcid.org/0009-0008-2964-7752>

Daniella Diniz

Italian University Institute of Rosario
(IUNIR), Rosario - Santa Fe
<https://orcid.org/0009-0004-2315-6195>

Camila Montalvão Ladeia

FG University Center (UNIFG)
Brumado - BA
<https://orcid.org/0009-0006-6698-8383>

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Laura Pires Guasti

Estácio de Sá University - IDOMED
(UNESA), Rio de Janeiro - RJ
<https://orcid.org/0009-0002-0105-0248>

Maria Clara dos Santos Góis

Estácio de Sá College - IDOMED Castanhal
Castanhal - PA
<https://orcid.org/0009-0005-7312-0251>

Isabela Pereira da Silva

University Center of Excellence Eniac
(ENIAC), Guarulhos - SP
<https://orcid.org/0009-0004-0221-6195>

Laís Carneiro Ludovico de Paula

Pontifical Catholic University of Goiás (PUC/Go), Goiânia - Goiás
<https://orcid.org/0009-0004-5276-8748>

Thaiz Geovana Bezerra

Feas - Family and community medicine
Curitiba - PR
<https://orcid.org/0000-0002-2525-4424>

Abstract: This literature review aimed to analyze the efficacy and safety of vaccines against Respiratory Syncytial Virus (RSV) in the elderly, considering the duration of protection, adverse effects and reduction of serious complications. To do this, the PVO (Population, Variable and Outcome) strategy was used, with searches carried out in the PubMed/MEDLINE database. Studies published between 2021 and 2025, in English, of the systematic review, meta-analysis, observational and experimental types were included, while duplicate articles were excluded. The studies analyzed showed that the Arexvy® (GSK) and Abrysvo® (Pfizer) vaccines, based on fusion protein F in the pre-fusion conformation, showed greater efficacy compared to post-fusion vaccines, and were approved for use in the elderly in 2023. Moderna's vaccine is currently in phase III trials. The available data suggests that immunization reduces hospitalizations and respiratory complications, with the need for annual boosters to maintain protection. Despite the favorable safety profile, with mild adverse events such as pain at the application site, fatigue and headache, there is a need for additional studies to assess the immune response in immunocompromised elderly people and the duration of the immunity conferred. Continuous monitoring and the expansion of vaccination strategies are fundamental to optimizing the protection of this population and reducing the disease burden.

Keywords: Respiratory Syncytial Virus, Arexvy, Abrysvo, Elderly, Vaccination.

INTRODUCTION

Respiratory Syncytial Virus (RSV) is one of the main causes of respiratory infections in the elderly and is responsible for serious complications such as pneumonia, exacerbations of chronic lung diseases and increased mortality in this vulnerable population. According to Shoukat *et al.* (2024), the incidence of RSV in

the elderly has increased in recent years, representing a significant challenge for health systems. Studies indicate that hospitalization and mortality rates related to RSV are comparable to those caused by the influenza virus, reinforcing the need for effective prevention strategies.

According to Kotb *et al.* (2023), advances in immunization against RSV have enabled the development of specific vaccines for the elderly, including Arexvy® and Abrysvo®. These vaccines were developed based on biotechnological advances to induce a robust immune response, reducing the risk of serious infections and hospitalizations. According to Moghadas *et al.* (2024), the implementation of systematic vaccination can have a positive impact on public health, reducing hospital costs and the burden on the health system.

According to Athan *et al.* (2024), despite the approval and availability of these vaccines, there are still questions that have not been fully clarified about the duration of protection conferred, the immune response in specific subgroups and long-term safety profiles. For Ferguson *et al.* (2024), immunogenicity and safety data need to be continuously monitored to better understand the benefits and possible adverse effects associated with vaccination in the elderly.

According to Drysdale *et al.* (2020), there are gaps in knowledge about the effectiveness of RSV vaccination in populations from different geographical regions and specific subgroups, such as the elderly with comorbidities. Clinical trials have shown a significant reduction in the incidence of severe disease in vaccinated elderly people, but protection against mild infections and their duration are still points of investigation (Curran *et al.*, 2024).

This study aims to analyze the efficacy and safety of the Arexvy® and Abrysvo® vaccines in preventing respiratory infections caused by RSV in elderly people aged 60 and over, contributing to a better understanding of the im-

pact of immunization on reducing complications and improving the quality of life of this population. According to Baber *et al.* (2022), advances in research into RSV vaccines represent a promising strategy for the prevention of this infection in the elderly, but further studies are still needed to assess their long-term effectiveness and safety.

METHODOLOGY

A literature review developed according to the criteria of the PVO strategy, which stands for: population or research problem, variables and outcome. This strategy was used to develop the research question “What is the efficacy and safety of RSV vaccines such as Arexvy® and Abrysvo® in preventing RSV infections in elderly people aged 60 and over?”. The searches were carried out using the PubMed - MEDLINE (Medical Literature Analysis and Retrieval System Online) databases. The search terms were used in combination with the Boolean terms “AND” and “OR”, using the following search strategy: (Aged) AND ((“Respiratory Syncytial Virus Vaccines”) AND ((Arexvy) OR (Abrysvo) OR ((RSV) OR (“respiratory syncytial virus”)) AND (vaccine))). From this search, 180 articles were found, which were then submitted to the selection criteria. The inclusion criteria were: articles in English; published between 2021 and 2025 and which addressed the themes proposed for this research, studies of the type (systematic review, meta-analysis, observational studies, experimental studies). The exclusion criteria were: duplicate articles, articles available in abstract form, articles that did not directly address the proposal studied and articles that did not meet the other inclusion criteria. After applying the search strategy to the database, a total of 40 articles were found. After applying the inclusion and exclusion criteria, 33 articles were selected in the PubMed database to make up this study’s collection.

DISCUSSION

EFFICACY AND SAFETY OF RESPIRATORY SYNCYTIAL VIRUS (RSV) VACCINES

Vaccination against respiratory syncytial virus (RSV) has been a promising strategy for preventing serious infections in the elderly, one of the groups most vulnerable to respiratory complications. According to Tuite *et al.* (2024), immunization in the elderly has shown high efficacy in reducing hospitalizations related to RSV, especially when applied to individuals with comorbidities. (2024), the RSVPreF3 OA vaccine provided protection of up to 94.6% against lower respiratory tract diseases associated with RSV, reinforcing its role in preventing serious clinical outcomes. Ison *et al.* (2024) add that the Arexvy® vaccine also showed high protection, significantly reducing the incidence of symptomatic infections and hospitalizations.

The safety of vaccines has also been widely evaluated, with data showing favorable profiles in most studies. Clark *et al.* (2024) point out that coadministration of the RSVPreF3 OA vaccine with the influenza vaccine did not compromise the immunogenicity of both, maintaining an acceptable safety profile. According to Shan *et al.* (2021), the immune response induced by RSV vaccines is long-lasting, with high titres of neutralizing antibodies, although there is a need for long-term monitoring to assess the need for booster doses. According to Leroux-Roels *et al.* (2023), the use of the AS01E adjuvant in the RSVPreF3 vaccine potentiated the immune response in the elderly, significantly stimulating CD4+ T cells and improving the duration of the protection conferred.

Thus, the Arexvy® and Abrysvo® vaccines have been shown to be effective and safe in preventing RSV infection in the elderly, reducing hospitalizations and serious complications (Ison *et al.*, 2024). However, there is a

need for further studies to assess the duration of protection conferred and the impact of vaccination on specific subgroups, such as immunocompromised elderly people. According to Leroux-Roels *et al.* (2023), the immune response induced by these vaccines is sustained, but further studies are needed to determine the longevity of the protection conferred. In addition, long-term monitoring is necessary to understand the rare adverse effects and possible implications of seasonal vaccination in the elderly population.

VACCINATION STRATEGIES FOR THE ELDERLY

The implementation of effective vaccination strategies against RSV in the elderly has been widely debated in the literature, considering the vulnerability of this population. According to Britton (2024), prioritizing vaccination in elderly people with comorbidities, such as cardiovascular and pulmonary diseases, has shown significant benefits in reducing mortality and hospitalizations associated with RSV. For Falsey *et al.* (2022), administering the vaccine to institutionalized elderly people and in communities with high viral circulation can optimize population protection and minimize seasonal outbreaks.

Different vaccination approaches have been explored, including annual booster schemes and combined administration with other vaccines. Jordan *et al.* (2023), mentions that coadministration of the RSV vaccine with the influenza vaccine has been shown to be safe and effective, without compromising the immune response to either immunizer. For Leroux-Roels *et al.* (2024), the use of specific adjuvants, such as AS01E, has been investigated as a way of optimizing the immune response of the elderly, promoting longer-lasting protection against severe respiratory infections.

Vaccination coverage is also a determining factor in the effectiveness of immunization strategies. According to Schwarz *et al.* (2024), awareness campaigns and easier access to vaccination can significantly increase adherence among the elderly, reducing the incidence of serious complications associated with RSV. According to Shaw *et al.* (2024), public policies that include vaccination against RSV in the national immunization schedule for the elderly have been associated with a substantial reduction in the burden of disease and the impact on health systems.

Finally, continuous surveillance and adaptation of vaccination strategies are essential to ensure long-term effectiveness. For Mazur *et al.* (2023), epidemiological monitoring and evaluation of the immune response of vaccinated elderly people are essential to determine the need for adjustments in the frequency and formulation of vaccines. In addition, Walsh *et al.* (2024) point out that further studies on the duration of immunity conferred by RSV vaccines can contribute to refining vaccination guidelines and maximizing clinical benefits for the elderly population.

TECHNOLOGICAL ADVANCES AND IMMUNOGENICITY

The evolution of technological platforms for the development of RSV vaccines has led to improvements in immunogenicity and duration of protection. According to Papi *et al.* (2023), the use of vaccines based on fusion proteins in the pre-fusion conformation of the virus has proven to be an effective strategy for stimulating robust immune responses in the elderly. According to Walsh *et al.* (2023), advances in molecular engineering have enabled the development of immunizers with greater stability and the ability to induce high titres of neutralizing antibodies.

Another significant advance in the field is the use of immunomodulatory adjuvants. According to Wilson *et al.* (2023), the incorporation of the AS01E adjuvant has shown potential to amplify the immune response in the elderly, optimizing the duration of vaccine protection. (2023), innovative delivery strategies such as mRNA vaccines and lipid nanoparticles are being investigated to improve the efficacy and safety of RSV vaccines.

The immunogenicity of vaccines has been a central point in recent research. According to Du *et al.* (2024), clinical studies show that the humoral and cellular immune response is significantly greater when the vaccine is administered in an annual booster schedule. According to Zeng *et al.* (2024), analysis of post-vaccination immunological markers suggests that the protection conferred can be sustained for up to two epidemic seasons, reducing the need for frequent doses.

For Kurai *et al.* (2024), mathematical modeling has been an important tool for predicting the impact of vaccination on reducing the burden of disease in the elderly. The results indicate that the adoption of new formulations and personalized immunization schemes can significantly increase the effectiveness of vaccination against RSV in this population, contributing to the reduction of morbidity and mortality associated with the virus.

CLINICAL AND EPIDEMIOLOGICAL IMPACT OF RSV VACCINATION

The introduction of vaccines against respiratory syncytial virus (RSV) has played a key role in reducing the burden of disease, especially among the elderly. According to Jastorff *et al.* (2024), the implementation of vaccination on a large scale has resulted in a significant decrease in hospitalizations and serious respiratory complications in the elderly over the age of 60. Falsey *et al.* (2023) reinforce this observation, pointing out that immunization has reduced

the incidence of symptomatic RSV infections by up to 75%, providing a positive impact on the burden on health systems and improving the quality of life of the elderly population.

Epidemiological analysis shows that vaccination can also modify seasonal patterns of infection. According to Du *et al.* (2024), immunization in the elderly reduced the circulation of the virus in the community, reducing the risk of outbreaks and complications associated with co-infection with other respiratory pathogens. Mazur *et al.* (2023) point out that administering the vaccine during strategic seasonal periods increased population protection, preventing hospitalizations and reducing hospital costs related to the management of serious RSV infections.

In the clinical context, vaccination has shown benefits beyond the direct prevention of infection. For Papazisis *et al.* (2024), immunization contributed to a reduction in the use of antibiotics in vaccinated elderly people, minimizing the occurrence of secondary infections and the risk of antimicrobial resistance. In addition, studies show that vaccination was effective even in elderly people with comorbidities, a group especially vulnerable to severe respiratory complications.

Finally, in the long term, vaccination against RSV can play a crucial role in adapting public health policies. According to Agac *et al.* (2023), vaccine booster strategies and monitoring of the immune response in the elderly are essential to optimize the benefits of immunization. Despite these advances, additional studies are still needed to assess the duration of protection provided and possible vaccine adaptations to cover emerging RSV variants. Thus, continued epidemiological surveillance will be essential to ensure the sustained effectiveness of immunization strategies against RSV in the elderly population.

FINAL CONSIDERATIONS

This review analyzed the efficacy and safety of the Arexvy® and Abrysvo® vaccines in preventing respiratory syncytial virus (RSV) in the elderly, highlighting their positive impact on reducing serious complications, hospitalizations and mortality. The studies demonstrate high efficacy in preventing symptomatic infection and reinforce the importance of immunization for this vulnerable population group. However, there are still gaps in knowledge, especially in relation to the duration of the protection provided, the immune response in specific subgroups and the need for booster doses. In addition, the effectiveness of vaccination in elderly people with comorbidities requires further research to assess long-term risks and benefits, ensuring that immunization meets the needs of this population in a safe and effective way. Incorporating RSV vaccines into public immunization programs could represent a significant step forward in reducing the disease burden and optimizing protection for the elderly population. Combined strategies, such as coadministration with other vaccines, including influenza, can enhance the benefits of vaccination and broaden immunization coverage. Future studies should focus on the longevity of the immune response, the effectiveness of vaccines in different epidemiological scenarios and the personalization of immunization strategies for risk groups. Continuous monitoring of the safety and efficacy of these vaccines will be essential to inform public health policies and improve vaccination guidelines, ensuring maximum protection for the elderly population.

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