

# Vaccine hesitancy in South Tyrol: a narrative review of insights and strategies for public health improvement

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## Abstract

**Introduction.** This review examines vaccine hesitancy in South Tyrol, Italy, a region characterized by cultural and linguistic diversity. The critical need for vaccination to control infectious diseases contrasts with the region's low vaccination rates, which pose a significant public health challenge.

**Methods.** Based on literature, reports, and studies, we used PubMed, Embase, and Google Scholar to explore vaccine hesitancy in South Tyrol. It emphasizes the analysis of historical, cultural, and socioeconomic factors, and focuses on quantitative surveys and qualitative interviews to understand the roots of vaccine hesitancy.

**Results.** In two studies with four reports, mistrust in health policies and institutions, misinformation, and cultural and linguistic barriers were identified as key factors contributing to vaccine hesitancy in South Tyrol. These factors are accentuated by the region's unique sociopolitical landscape, which influences public health policies and vaccination initiatives.

**Conclusions.** These findings highlight the need for public health strategies specifically tailored to South Tyrol. Recommended actions include developing culturally sensitive and multilingual communication campaigns, increasing community involvement, and rebuilding trust in healthcare systems. These approaches are essential for addressing the specific challenges in South Tyrol, thereby improving vaccine uptake and overall public health outcomes.

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## Introduction

Vaccination, a major public health success, faces challenges owing to the rising anti-vaccine sentiment. The European Union area, as revealed by the Vaccine Confidence Project in 2016, exhibits lower confidence in vaccine safety (1), with Italy among the countries showing significant hesitancy (2). This skepticism contributed to a major measles outbreak in Italy in 2017, linked to persistently low vaccination rates since the introduction in 1976 (3). Despite initiatives such as the National Plan of Measles and Congenital Rubella Elimination, aimed at 95% coverage (4), sociopolitical factors and rising populism have fueled skepticism and hindered these goals. Efforts to counteract this trend include the “VaccinarSi” portal by the Italian Society of Hygiene that offers accessible scientific vaccination information (5). However challenges, such as declining user engagement with the portal persisted, highlighting the ongoing battle against vaccine hesitancy (6).

Administratively, the Italian Republic is divided into 19 regions and two autonomous provinces, Trentino and Alto Adige | South Tyrol (7), forming the Trentino-Alto Adige autonomous region. Each province has legislative power, yet vaccination has been subject to the national plan since 2017 (8). South Tyrol has a unique sociocultural landscape that significantly influences public health initiatives, including vaccination programs. A notable characteristic of the region is its linguistic diversity, with German speakers constituting approximately 70% of the population, Italian speakers constituting around 25%, and the Ladin community making up about 5%. This multilingual composition is a result of the region’s complex history, marked by periods of conflict and cultural tension between German and Italian-speaking communities. The resolution of these conflicts in the early 1970s through the granting of special autonomy to South Tyrol was pivotal in the region’s history, establishing a framework for peaceful coexistence and cultural preservation (9). This unique political and cultural arrangement has implications for public health policies, including vaccination strategies, because it necessitates culturally sensitive and linguistically diverse approaches to health communication and intervention. The intertwining of these linguistic groups, along with South Tyrol’s distinct governance structure, provides a backdrop against which vaccine hesitancy and acceptance must be understood, underscoring the need for tailored public health strategies that respect and address the region’s diverse cultural and linguistic needs.

Vaccine hesitancy is particularly pronounced in the South Tyrol. In 2003, the study of Kreidl and Morosetti (10), which focused on the autonomous Province of Bolzano, revealed that the MMR (Measles, Mumps, and Rubella) vaccine coverage was notably low, especially in rural areas with coverage rates as low as 40%, compared to 80% in urban areas. They also observed a linguistic dimension, where the communes with a higher percentage of Italian-speaking inhabitants had greater vaccine coverage than those that were predominantly German-speaking. These disparities contributed to measles epidemics in 1997 and 1999, predominantly affecting children aged five–nine years, and were particularly severe in communes, with vaccine coverage rates below 40% (10). Their findings underscored the urgency of addressing vaccine hesitancy in South Tyrol. In 2006, another cluster of measles cases was linked to low vaccination rates, particularly within the Roma/Sinti communities in South Tyrol (11).

In 2021, poliomyelitis vaccination coverage at two years of age in South Tyrol was markedly lower than that in other Italian regions, including the neighboring Trentino. With South Tyrol at 75.62% and Trento at 94.84%, the contrast is stark if compared to the Italian national average of 94.00% (12). This gap points to specific challenges in vaccine acceptance and uptake within South Tyrol. Moreover, a similar pattern emerges in influenza vaccination rates among the elderly in South Tyrol, which consistently lags behind those in Trentino and other regions (13). Despite ongoing public health initiatives to improve vaccination, these persistently lower rates across multiple vaccines and demographic groups in South Tyrol highlight broader issues of vaccine hesitancy. Such enduring trends highlight the critical need for specialized interventions to effectively address the roots of vaccine hesitancy in the region.

The COVID-19 pandemic provided an unprecedented opportunity to observe health behavior dynamics in real time, particularly in South Tyrol, where mass testing initiatives have revealed critical insights. The study by Stillman and Tonin (14) found that testing uptake was closely related to community characteristics, such as local prevalence of the virus, access to testing facilities, and public trust in health authorities. In a region like South Tyrol, marked by its cultural and linguistic diversity, the decision to participate in health measures, such as testing, was significantly influenced by these community factors. Furthermore, the study highlighted the role of social networks and the flow of information in shaping

individuals' responses to public health measures, indicating that vaccine acceptance and testing behaviors are the product of an interplay of social, economic, and cultural elements (15).

This narrative review aimed to systematically explore the complex phenomenon of vaccine hesitancy in the socio-politically unique region of South Tyrol. By bringing together the threads of historical context, linguistic diversity, and the impact of recent public health challenges, this study aimed to derive lessons from past and present vaccination efforts. The goal was to identify the underlying factors that contribute to vaccine hesitancy and to propose informed strategies that could improve vaccine uptake. This review seeks to contribute to the broader discourse on public health in diverse cultural settings and to support the development of effective, culturally congruent health policies that can serve as models for similar regions faced with vaccine hesitancy.

## Methods

### *Searching Strategy*

To analyze vaccine hesitancy in South Tyrol, a systematic literature search was conducted across multiple databases guided by a set of specific search terms. PubMed searches were conducted using the terms “(vaccine OR vaccination) AND (((South Tyrol[Title/Abstract]) OR (Alto Adige[Title/Abstract]) OR (Bolzano[Title/Abstract]))”. The search yielded a total of 23 records. On EBSCOhost's CINAHL database, the search terms used were “TX (Vaccine OR Vaccination) AND AB (“South Tyrol” OR “Alto Adige” OR “Bolzano”) OR TI (“South Tyrol” OR “Alto Adige” OR “Bolzano”).” The search returned 35 records. In Embase, the search strategy employed was “(‘vaccine’/exp OR vaccine OR ‘vaccination’/exp OR vaccination) AND (‘south tyrol’:ab,ti OR ‘bolzano’:ab,ti),” resulting in 25 records.

From these searches, a total of 83 records were identified. After removing 21 duplicate records, 62 records were screened.

### *Study Selection*

The primary criterion for study selection was the direct relevance of the article to vaccinations or vaccine-related issues. Articles that did not specifically address vaccination, vaccine hesitancy, vaccine uptake, or related topics were excluded at the initial stage. Given the specific focus on South Tyrol, articles that did not pertain to this

geographical area were excluded. Animal and wildlife vaccination studies were excluded because they were not the target population. Peer-reviewed research articles and original study results were analyzed, excluding publications such as reviews, editorials, or commentaries. No restrictions on the language or date of publication were provided.

The results of the search are presented in Figure 1. Of the 62 records, four reports from two studies met all the inclusion criteria and were selected for this review.

## Results

The systematic literature search on vaccine hesitancy in South Tyrol yielded only two original studies, resulting in four publications (16-19), all of which were conducted by the affiliated institution of this narrative review, with no other independent study articles identified. One of the two studies was identified as a survey assessing vaccination attitudes quantitatively (16–18), while the other employed a qualitative methodology to explore in depth the underlying reasons for vaccine hesitancy (19). The survey used a cross-sectional design and captured vaccine-related attitudes of the population. This study involved a significant cohort of subjects, with over thousand participants surveyed in detail, ensuring that the sample was stratified to reflect the linguistic and demographic diversity of the region. Attitudes towards vaccines, vaccination intentions, and trust in vaccine information sources were assessed in more detail, along with a range of sociodemographic variables such as age, education, and language group (16). Complementing this, qualitative research has examined the psyche of the community through a series of structured interviews, exploring the layers of individual and collective influences on vaccine hesitancy (19). Together, these studies provide a methodologically comprehensive picture of the vaccine hesitancy landscape, contributing refined and actionable data to inform culturally congruent public health strategies.

### *Prevalence and Correlates of Vaccine Hesitancy in South Tyrol*

In the initial phase of the COVID-19 vaccination campaign in South Tyrol, a quantitative study was conducted to understand the prevalence and factors associated with vaccine hesitancy (16). The COVID-19 findings are summarized in Table 1.

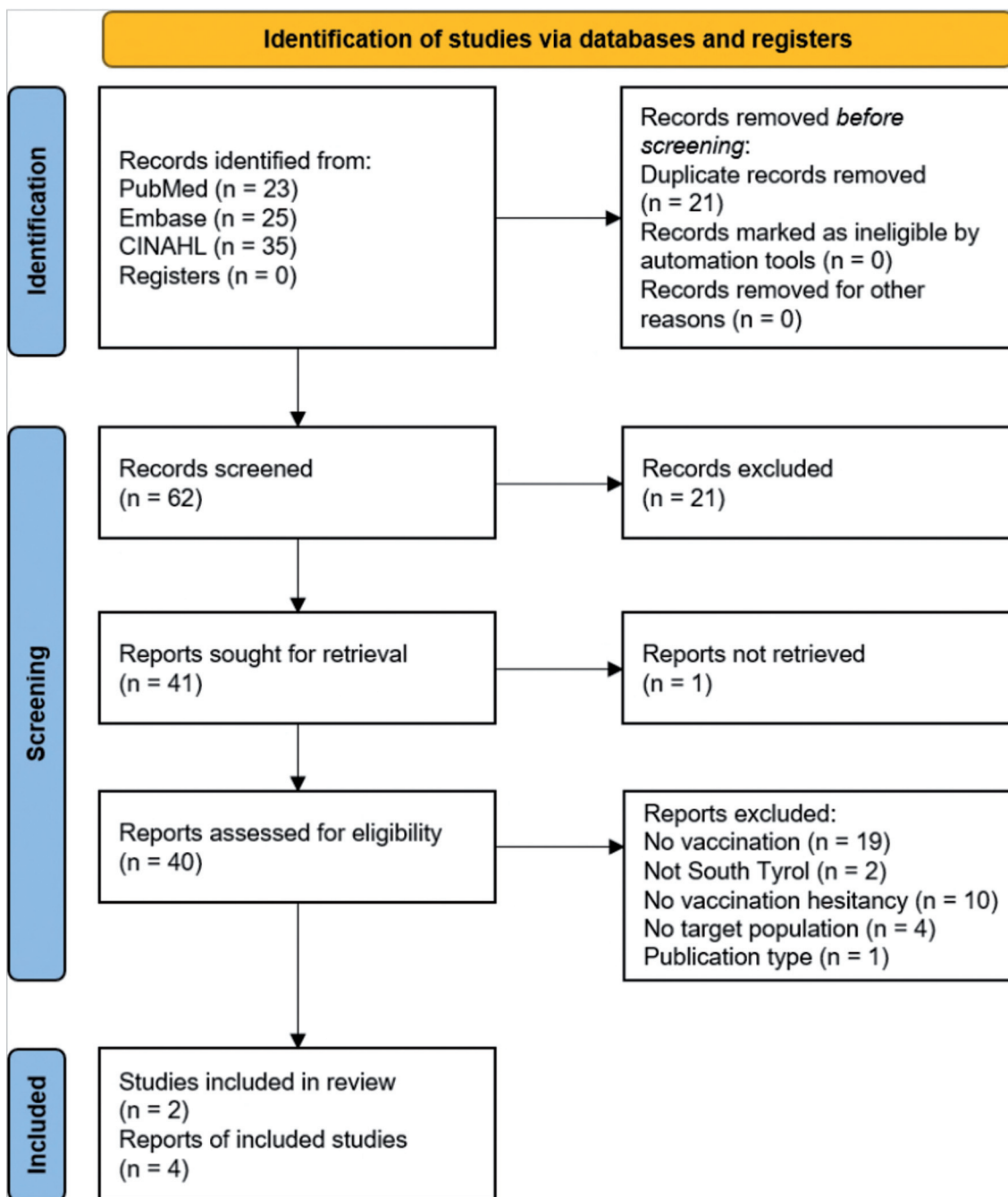


Figure 1 - PRISMA 2020 Flow Diagram for Reports on Vaccine Hesitancy in South Tyrol, Which Included Searches of Databases and Registers Only

Table 1 - Prevalence and Correlates of Vaccine Hesitancy for COVID-19 Vaccination at the Start of the Vaccination Campaign in South Tyrol

Variable	Prevalence and Correlates of Hesitancy <sup>1</sup>
General Prevalence	15.6%
Demographic Factors	
Age Group	Higher among younger participants
Educational Level	Higher among participants with lower education
Health-Related Factors	
Chronic Illness	Higher among participants without chronic illness
Socioeconomic and Cultural Factors	
Trust in Institutions	Lower among distrustful participants; associated with conspiratorial thinking
Economic Status	Higher in worse economic situations
Family Structure	Higher in families with children aged 0-6 years
Place of Residence <sup>2</sup>	Higher in rural areas; not an independent predictor in logistic regression analysis
Linguistic Group	Significantly varies; not an independent predictor in logistic regression analysis

<sup>1</sup> Vaccine hesitancy in this study was assessed through a dichotomous question asking participants, ‘Would you get vaccinated against COVID-19?’ Responses to this question were used to categorize participants as hesitant or non-hesitant towards receiving the COVID-19 vaccine.

<sup>2</sup> South Tyrol is an alpine region with approximately 533.000 inhabitants and an area of 7.400 km<sup>2</sup>. According to the official definition, eight towns (219,340 inhabitants) were categorized as *urban areas* and all other villages as *rural areas*.

The overall prevalence of vaccination hesitancy was 15.6%. Notably, younger participants showed a higher inclination towards hesitancy compared to older age groups. Additionally, hesitancy was more pronounced among individuals with lower educational levels, highlighting the role of educational attainment in shaping vaccine attitudes. Participants without chronic diseases were more likely to exhibit vaccine hesitancy, suggesting a perception of lower personal risks. There was a lower level of hesitancy among participants who trusted institutions, but a link to conspiracy thinking was observed in distrustful institutions. Economic distress due to the pandemic also played a role, with greater hesitancy observed in those in worse economic situations. Interestingly, families with children aged 0-6 years showed higher vaccine hesitancy, indicating specific concerns or considerations among parents of young children (16).

Geographical factors, such as residing in rural areas, showed higher hesitancy, although this was not an independent predictor in the logistic regression analysis (17). Similarly, linguistic group membership showed significant variance in vaccine hesitancy but was not an independent predictor (16). This study suggests that while linguistic group membership shows variance in hesitancy, it is not an independent predictor when considering other factors. In particular, higher education levels and trust in institutions, which vary across linguistic groups, may play key roles in

explaining this. Italian-speaking participants had higher educational levels, potentially translating to better health literacy. Moreover, the levels of trust in institutions also appear to be closely related to linguistic group membership. Italian speakers, for instance, exhibit higher trust levels in national and regional institutions than German or Ladin speakers (16).

Differences in education, trust, and linguistic group membership are not only distinct between linguistic groups but also between rural and urban participants. In urban areas, 27.9% of participants had a university education compared to 14.5% in rural areas, suggesting a link between educational attainment and vaccine hesitancy (17). Trust in various health and government institutions differed significantly between urban and rural residents, with urban residents generally exhibiting higher levels of trust. The geographic characteristics of being rural or urban may not be independent predictors of vaccine hesitancy because of their level of education. A significant proportion of the German-speaking population, that accounted for 61.7% of the total participants in the study, predominantly resided in rural areas (80.0% of German speakers), compared to Italian speakers who were more concentrated in urban areas (52.7% of Italian speakers). German speakers in the study displayed more risk factors associated with vaccine hesitancy, such as lower education levels and

higher levels of mistrust in institutions. Given that rural areas have a higher concentration of German-speaking residents, this explains the higher prevalence of hesitancy in these areas (17).

Altruism influences attitudes towards COVID-19 vaccination and public health measures, especially in the sociocultural context of South Tyrol. In general, altruistic individuals are more likely to agree with and follow public health guidelines and less likely to believe in conspiracy theories or misinformation about COVID-19. The differences in altruism scores between vaccine-hesitant and non-hesitant individuals are small, suggesting that, while higher altruism is slightly more associated with lower vaccine hesitancy in the elderly, its overall influence remains modest (18). This highlights that, in South Tyrol, where different linguistic groups and rural-urban diversities with different levels of education and trust in institutions intersect, altruism is only one part of a complex set of factors influencing vaccine hesitancy. The unique demographic characteristics of the region suggest that understanding vaccine hesitancy requires consideration of a range of motivational and psychological factors beyond singular traits, such as altruism.

#### *Motivational and psychological factors of vaccine hesitancy in South Tyrol*

A qualitative study on vaccine hesitancy and refusal provides insights into the personal, relational, and structural factors influencing vaccine hesitancy in South Tyrol (19). Conducted through in-depth interviews with vaccine-skeptical parents, the study focuses on pediatric vaccination and describes individual experiences, social contexts, and perceptions of healthcare and state systems that shape vaccination decisions.

In understanding vaccine hesitancy, the concept of “self-relatedness” was apparent among parents, highlighting the role of individual experiences and perceptions in determining attitudes towards vaccination. This concept underscores the importance that participants place on their individual experiences and how these experiences shape their perceptions and attitudes towards vaccination. Participants often relied on information from personal social circles, which tended to consist of like-minded individuals, reinforcing their existing vaccination attitudes. This suggests a tendency to seek and accept information that aligns with pre-existing beliefs, creating a feedback loop that further reinforces vaccine skepticism.

The study also found that participants harbored distrust of healthcare professionals and state orders, perceiving them as one-sided and uncritical. The

participants perceived themselves as tolerant and health-conscious, yet critical, questioning the mainstream narratives of health care (19).

This mistrust, rooted in negative experiences of the healthcare system, was exacerbated by the COVID-19 pandemic. In the quantitative study, the majority of participants (about three-quarters) did not change their attitudes towards mandatory vaccination for non-coronavirus diseases as a result of the pandemic, and about one-fifth of participants became more supportive of vaccination as a result of the pandemic. This shift was more pronounced among non-hesitant participants, with 23% showing increased support for mandatory childhood vaccinations. By contrast, among hesitant participants, a significant proportion (35%) became less supportive of such mandates (16). This divergence in attitudes can be linked to the concept of “self-relatedness”, which implies that personal experiences and perceptions strongly influence individuals’ attitudes towards health-related issues, including vaccination. As a global health crisis with a direct personal impact, the pandemic is likely to have reinforced people’s pre-existing beliefs and attitudes towards vaccines and public health measures. Those who were already inclined to trust vaccination and public health guidelines may have increased their support because of heightened awareness of health risks and the importance of vaccines. Conversely, those who were hesitant or skeptical may have become more entrenched in their views, especially if their personal experiences during the pandemic reinforced their mistrust or skepticism.

Interestingly, the label “No-vax” was met with resistance by participants, who did not identify themselves with this media-created social phenomenon. They displayed high sensitivity to health issues and preferred informed decisions based on their understanding of health and illness. This highlights the importance of personal autonomy in health-related decision-making (19). The findings emphasize the need for appreciative, personal, and well-founded information exchanges with vaccine-hesitant individuals. This underscores the necessity for broad and comprehensible information dissemination, along with flexibility and freedom of choice, to enhance informed decision-making regarding vaccination.

## **Discussion**

A review of vaccine hesitancy in South Tyrol identified two key studies: a quantitative survey of

COVID-19 vaccination (16-18) and a qualitative analysis of parental attitudes towards childhood vaccination (19). The survey revealed a vaccine hesitancy rate of 16%, which was influenced by factors such as age, economic status, family structure, and pandemic burden. Education level and trust in institutions are particularly important in understanding the variance in vaccine hesitancy between linguistic and geographical groups. The qualitative study highlighted 'self-relatedness' as a key factor, emphasizing the influence of personal experiences and perceptions on vaccination attitudes. It revealed a complex set of individual, relational, and structural factors, including mistrust of healthcare and a preference for informed, autonomous decision-making.

Melot et al. (20) found that 18% of respondents in Trentino were vaccine-hesitant in 2019 before the pandemic, particularly among younger people and those with lower levels of information, highlighting the reliance on healthcare professionals and the Internet for vaccine-related information. Given this pre-pandemic hesitancy rate in Trentino, it is plausible that the 16% hesitancy rate observed in South Tyrol during the pandemic (12, 13) may be an underestimate, considering the lower vaccination rates in South Tyrol than in Trentino (12, 13) and the potential positive effects on vaccination acceptance of COVID-19 as an immediate health threat (21). Although vaccine hesitancy in South Tyrol (16%) and Trentino (18%) appears similar, the significant differences in vaccination rates suggest that additional factors, such as service accessibility and convenience, could also play a role, especially if the impact of the pandemic on the hesitancy rate in South Tyrol is considered minimal.

When analyzing studies conducted during the COVID-19 pandemic, the results, including the estimated 16% vaccine hesitancy rate in South Tyrol, may have been significantly influenced by the pandemic context. This is in line with the study by Giardiello et al. (22) on COVID-19 testing in the rural Val Venosta/Vinschgau district of South Tyrol, where testing behavior was influenced more by pandemic-related contextual factors than by individual characteristics. Key influencing factors included symptoms, exposure to infected individuals, and reporting times aligned with the severity of the pandemic and public health measures. This suggests that even in the case of vaccine hesitancy, external circumstances, in addition to sociodemographic factors, influence vaccination decisions.

In South Tyrol, different patterns of health

information seeking, influenced by age, sex, education, and language, may contribute to these differences in vaccination rates. A 2014 survey showed that Italian speakers in South Tyrol predominantly used online platforms for health information, while German speakers showed a preference for interpersonal sources, including discussions with health professionals and advice from friends and family, which may influence the way vaccination messages are received and acted upon (23).

An additional factor influencing vaccine hesitancy among the German-speaking population in South Tyrol could be their preference for German language information sources. When German-speaking South Tyroleans search for health information online, such as 'Pflichtimpfungen Kinder' (mandatory vaccinations children), they often encounter content relevant to Germany and Austria where vaccination policies differ from those in Italy. This discrepancy in information can create a sense of arbitrariness and uncertainty as they are exposed to differing regulations and recommendations. By contrast, Italian-speaking citizens are more likely to access coherent and consistent information, as they predominantly seek and consume Italian language sources. This divergence in the initial informational landscape between German and Italian speakers might have contributed to differing perceptions and attitudes towards vaccinations. Understanding these language-based disparities in information access is crucial for developing effective communication strategies that address the specific needs and contexts of the diverse linguistic groups in South Tyrol.

A study of COVID-19 mass testing in South Tyrol by Stillman and Tonin (14) highlighted how community characteristics such as convenience, social capital, and attitudes towards public health interventions align with factors influencing vaccine hesitancy. Higher testing rates were associated with socioeconomic status, religiosity, and lower childhood vaccine refusal, suggesting a complex relationship between trust, community engagement, and health beliefs and shedding light on the dynamics of vaccine hesitancy in the region.

Additional findings on COVID-19 vaccine adherence in South Tyrol highlight the impact of geographical, cultural, and sociodemographic characteristics on vaccination rates, supporting the findings of the narrative review on vaccine hesitancy. The study was conducted in all districts of South Tyrol and analyzed variables such as altitude, population density, and linguistic affiliation. In early 2022, there

was notable variation in vaccine adherence, ranging from 57.1% to 74.8%, with lower rates in areas with higher altitudes, lower population densities, and a greater prevalence of German speakers or those with German cultural heritage (24). These results reflect the importance of geographic diversity and the influence of cultural and linguistic factors on health behavior.

#### *Recommendations and Future Directions for Research and Policy*

Strategies to address vaccine hesitancy in South Tyrol are summarized in Table 2, tailored to the specific needs of South Tyrol's diverse communities, with a particular focus on German-speaking (predominantly rural) and Italian-speaking (predominantly urban) populations.

Therefore, the health systems must be strengthened. The focus was on improving access to healthcare in rural areas. For German-speaking/rural communities, this could include improving the availability of vaccines at local health facilities. For Italian speaking/urban populations, improving health infrastructure and access to services in urban centers is equally important.

Culturally congruent communication strategies

require a more person-centered approach. This recommendation focuses on the use of culturally sensitive communication channels. In German-speaking/rural areas, this may involve more use of local media and interpersonal communication than in Italian-speaking/urban communities, where digital platforms are more likely to be used, and social media may be more effective.

Given the significant impact of education level and trust in healthcare systems on vaccine hesitancy (25), as confirmed in the South Tyrol studies (16-19), two recommendations are critical. First, tailoring educational materials to different literacy levels and cultural contexts is essential for promoting vaccine literacy. For rural communities, this could include community workshops, whereas urban areas could benefit from multilingual online educational campaigns. Second, to build trust, initiatives should include transparent communication and ethical health care practices. In rural areas, this could mean more community engagement activities, whereas in urban areas, it could involve public forums and open dialogue with health professionals.

A better understanding of how socioeconomic factors and community engagement affect vaccine

Table 2 - Strategies to Address Vaccine Hesitancy in South Tyrol: Focused Recommendations for Diverse Communities

Variable		Recommendations <sup>1</sup>
Healthcare System Enhancements	German-Speaking / Rural	Enhanced healthcare and vaccination accessibility
	Italian-Speaking / Urban	Enhanced healthcare accessibility
Culturally Congruent Communication	German-Speaking / Rural	Interpersonal communication, local media outreach
	Italian-Speaking / Urban	Online platforms and social media use
Vaccine Literacy Promotion	German-Speaking / Rural	Tailored educational materials and campaigns
	Italian-Speaking / Urban	Multilingual and culturally sensitive education
Trust-Building Initiatives	General Recommendations	Transparent communication Community engagement Cultural sensitivity through open dialogue Respectful interaction Active listening
	German-Speaking / Rural	Socio-economic and community engagement impact
Research on Contextual Influences	Italian-Speaking / Urban:	Pandemic and external influence effects
Policy Interventions for Specific Subpopulations	German-Speaking / Rural	Policies tailored to rural and German-speaking needs
	Italian-Speaking / Urban	Urban-focused public health campaigns and strategies
Investment in Primary Care	German-Speaking / Rural	Strengthen family medicine and primary care
	Italian-Speaking / Urban	Invest in urban primary care facilities and resources

<sup>1</sup> The recommendations provided in the table are organized to address the specific needs of diverse communities within South Tyrol, particularly focusing on the German-speaking people, predominantly residing in rural areas and Italian-speaking populations, who are primarily found in the region's urban areas. The "German-Speaking / Rural" lines contain strategies tailored to the cultural, linguistic, and geographical characteristics of the German-speaking population. In contrast, the "Italian-Speaking / Urban" lines present approaches more suited to the Italian-speaking residents, who are primarily found in the region's urban areas. These recommendations are designed to be flexible and adaptable, acknowledging the unique challenges and opportunities in each setting for effectively addressing vaccine hesitancy.



hesitancy is essential. In rural areas, this could include studying the impact of community ties, whereas in urban areas, research could focus on the influence of urban lifestyles and infrastructure on health behaviors.

It is essential to tailor public health policies to meet the specific needs of different groups. In rural areas, this could mean policies that address the unique challenges faced by these communities, whereas in urban areas, it could mean strategies that target urban population density and the multiple lifestyles.

Enhancing primary care is crucial for effective vaccine uptake, especially considering the pivotal role of general practitioners (25). In rural areas, this could mean bolstering family medicine practices by establishing Primary Care Units staffed with specially trained nursing personnel focused on targeted counseling and vaccine education. Similarly, in urban areas, the expansion of primary care resources should include similar units, equipped to handle higher patient demand. Addressing the increasing shortage of general practitioners is vital, making this recommendation increasingly pertinent (26). Additionally, offering comprehensive training programs for healthcare professionals on effective communication with vaccine sceptics is essential. These programs should provide strategies for engaging in constructive dialogues, addressing misconceptions, and building trust with patients who may be hesitant about vaccinations. By focusing on these areas, primary care can become more responsive and effective in addressing the unique challenges posed by vaccine hesitancy in both rural and urban settings.

#### *Limitations of the Included Studies*

However, it is important to acknowledge the inherent limitations of these studies. In quantitative surveys (16-18), the use of a non-probability sampling method may limit the generalizability of the results. The self-administered nature of the survey may have introduced information biases, and the study questionnaire did not extend to exploring the underlying reasons for vaccine hesitancy. The timing of data collection during the initial phase of the COVID-19 vaccination campaign may also have influenced the participants' responses, reflecting the current state of the pandemic and evolving information about the vaccine. In addition, psychological factors influencing vaccine hesitancy have not been extensively investigated. The typical limitations of qualitative research are likely to apply to the second study (19). These include potential limitations on the generalizability of the findings due

to the small and specific sample size, the possibility of researcher bias in data interpretation, and a focus that prioritizes depth of understanding over breadth, which may miss broader trends or patterns.

The limitations of our study include the initial lack of specific data on vaccine literacy levels among different native language groups in South Tyrol. Recognizing this gap, the Institute of Statistics of Alto Adige/South Tyrol (ASTAT) is undertaking a survey using the European Health Literacy Survey (EU-HLS 16) questionnaire to assess health and vaccine literacy. This initiative will provide insights for tailoring health education interventions to the unique needs and challenges of each population group.

## Conclusion

This narrative review sheds light on the complex dynamics of vaccine hesitancy in South Tyrol, which is influenced by its distinctive cultural and linguistic diversity. Two studies analyzed in four reports highlighted that vaccine hesitancy is linked to the socio-cultural context of the region, ranging from individual to geographical factors. This review highlights the need for public health strategies specifically tailored to the region's more German-speaking rural population and more Italian-speaking urban population. The critical roles of family medicine, primary care, and community engagement in building trust and facilitating culturally appropriate communication are also evident. The COVID-19 pandemic has further complicated vaccine hesitancy, emphasizing the importance of adaptable and responsive public health strategies. Therefore, addressing vaccine hesitancy in South Tyrol requires a multidisciplinary approach that integrates cultural sensitivity with ongoing research to inform effective public health policies and interventions. This approach is essential for improving vaccine uptake and promoting the overall public health in this region.

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## Riassunto

### *Esitazione vaccinale in Alto Adige: una revisione narrativa su intuizioni e strategie per il miglioramento della salute pubblica*

**Introduzione.** Questa revisione esamina l'esitazione vaccinale in Alto Adige, Italia, una regione contraddistinta dalla sua diversità culturale e linguistica. La necessità cruciale della vaccinazione nel controllo delle malattie infettive contrasta con i bassi tassi di vaccinazione della regione, rappresentando una sfida significativa per la salute pubblica.

**Metodi.** Attingendo dalla letteratura, dai report e dagli studi, la revisione utilizza PubMed, Embase e Google Scholar per esplorare l'esitazione vaccinale in Alto Adige. Pone l'accento sull'analisi dei fattori storici, culturali e socio-economici, concentrando l'attenzione su metodi qualitativi, sondaggi e interviste per comprendere le radici dell'esitazione vaccinale.

**Risultati.** La revisione identifica la sfiducia nelle istituzioni sanitarie, la disinformazione e le barriere culturali e linguistiche come fattori chiave che contribuiscono all'esitazione vaccinale in Alto Adige. Questi fattori sono ulteriormente intensificati dal particolare contesto socio-politico della regione, influenzando le misure di salute pubblica e le iniziative di vaccinazione.

**Conclusione.** I risultati evidenziano l'importanza di strategie di salute pubblica pensate specificamente per l'Alto Adige. Le azioni raccomandate includono lo sviluppo di campagne di comunicazione culturalmente sensibili e multilingue, un maggiore coinvolgimento della comunità e il ristabilimento della fiducia nei sistemi sanitari. Questi approcci sono essenziali per affrontare le sfide specifiche dell'Alto Adige, migliorando così l'adozione del vaccino e i risultati complessivi in termini di salute pubblica.

## References

- Larson HJ, Figueiredo A de, Xiahong Z, Schulz WS, Verger P, Johnston IG, et al. The State of Vaccine Confidence 2016: Global Insights Through a 67-Country Survey. *eBioMedicine*. 2016 Oct 1;**12**:295–301. doi: 10.1016/j.ebiom.2016.08.042.
- European Commission. Directorate General for Health and Food Safety. State of vaccine confidence in the EU 2018. [Internet]. LU: Publications Office; 2018 [cited 2023 Dec 7]. Available from: <https://data.europa.eu/doi/10.2875/241099>. [Last accessed: 2024 Jan 28].
- Filia A, Bella A, Del Manso M, Baggieri M, Magurano F, Rota MC. Ongoing outbreak with well over 4,000 measles cases in Italy from January to end August 2017 - what is making elimination so difficult? *Euro Surveill*. 2017 Sep 14;**22**(37):30614. doi: 10.2807/1560-7917.ES.2017.22.37.30614.
- La conferenza permanente per i rapporti tra lo stato, le regioni e le province autonome di Trento e Bolzano. Piano nazionale per l'eliminazione del morbillo e della rosolia congenita [Internet]. Atto n. 1857 Nov 13, 2003. Available from: [https://www.salute.gov.it/imgs/C\\_17\\_pubblicazioni\\_730\\_allegato.pdf](https://www.salute.gov.it/imgs/C_17_pubblicazioni_730_allegato.pdf). [Last accessed: 2024 Jan 28].
- Bonanni P, Ferro A, Guerra R, Iannazzo S, Odone A, Pompa MG, et al. Vaccine coverage in Italy and assessment of the 2012–2014 National Immunization Prevention Plan. *Epidemiol Prev*. 2015;**39**(4 Suppl 1):146–58.
- Ferro A, Bonanni P, Castiglia P, Montante A, Colucci M, Miotto S, et al. [Improving vaccination social marketing by monitoring the web]. *Ann Ig*. 2014;**26**(3 Suppl 1):54–64.
- Senato della Repubblica. Constitution of the Italian Republic. English Edition [Internet]. N. 2. Sect. Art. 114 Nov 7, 2022. Available from: [https://www.senato.it/sites/default/files/media-documents/Costituzione\\_INGLESE\\_2023.pdf](https://www.senato.it/sites/default/files/media-documents/Costituzione_INGLESE_2023.pdf). [Last accessed: 2024 Jan 28].
- Crenna S, Osculati A, Visonà SD. Vaccination policy in Italy: An update. *J Public Health Res*. 2018;**7**(3):jphr. 2018.1523. doi: 10.4081/jphr.2018.1523. .
- Steininger R. South Tyrol: A Minority Conflict of the Twentieth Century (Studies in Austrian and Central European History and Culture). New Brunswick, NJ: Transaction; 2009.
- Kreidl P, Morosetti G. [Must we expect an epidemic of measles in the near future in Southern Tyrol?]. *Wien Klin Wochenschr*. 2003;**115** Suppl 3:55–60.
- Filia A, Curtale F, Kreidl P, Morosetti G, Nicoletti L, Perrelli F, et al. Cluster of measles cases in the Roma/Sinti population, Italy, June–September 2006. *Euro Surveill*. 2006 Oct 12;**11**(10):E061012.2. doi: 10.2807/esw.11.41.03062-en.
- Siddu A. Vaccinazioni dell'età pediatrica e dell'adolescenza - Coperture a 24 mesi [Internet]. Roma: Ministero della Salute Direzione generale della prevenzione sanitaria; 2022 Sep. (Dati comunicati dalle regioni.). Available from: [https://www.salute.gov.it/imgs/C\\_17\\_tavole\\_20\\_10\\_0\\_file.pdf](https://www.salute.gov.it/imgs/C_17_tavole_20_10_0_file.pdf). [Last accessed: 2024 Jan 28].
- Istituto Superiore di Sanità. EpiCentro. 2023. Coperture della vaccinazione antinfluenzale in Italia. Available from: <https://www.epicentro.iss.it/influenza/coperture-vaccinali>. [Last accessed: 2024 Jan 28].
- Stillman S, Tonin M. Communities and testing for COVID-19. *Eur J Health Econ*. 2022;**23**(4):617–25. doi: 10.1007/s10198-021-01385-y.
- Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the health belief model. *Health Educ Q*. 1988;**15**(2):175–83. doi: 10.1177/109019818801500203.
- Barbieri V, Wiedermann CJ, Lombardo S, Ausserhofer D, Plagg B, Piccoliori G, et al. Vaccine hesitancy during the coronavirus pandemic in South Tyrol, Italy: Linguistic correlates in a representative cross-sectional survey. *Vaccines*. 2022;**10**(10):1584. doi: 10.3390/vaccines10101584.
- Barbieri V, Wiedermann CJ, Lombardo S, Plagg B, Gärtner T, Ausserhofer D, et al. Rural-urban disparities in vaccine hesitancy among adults in South Tyrol, Italy. *Vaccines (Basel)*. 2022 Nov 5;**10**(11):1870. doi: 10.3390/vaccines10111870.
- Barbieri V, Wiedermann CJ, Lombardo S, Plagg B, Piccoliori G, Gärtner T, et al. Age-Related Associations of Altruism with Attitudes towards COVID-19 and Vaccination: A Representative Survey in the North of Italy. *Behav Sci (Basel)*. 2023 Feb 19;**13**(2). doi: 10.3390/bs13020188.

19. Wiedermann CJ, Koler P, Tauber S, Plagg B, Psailer V, Barbieri V, et al. Unravelling Vaccine Scepticism in South Tyrol, Italy: A Qualitative Analysis of Personal, Relational, and Structural Factors Influencing Vaccination Decisions. *Healthcare (Basel)*. 2023 Jul 1;**11**(13). doi: 10.3390/healthcare11131908.
20. Melot B, Bordin P, Bertoni C, Tralli V, Zuccali M, Grignolio A, et al. Knowledge, attitudes and practices about vaccination in Trentino, Italy in 2019. *Human Vaccines & Immunotherapeutics*. 2021 Jan 2;**17**(1):259–68. doi: 10.1080/21645515.2020.1763085.
21. Wang J, Jing R, Lai X, Zhang H, Lyu Y, Knoll MD, et al. Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. *Vaccines*. 2020 Sep;**8**(3):482. doi: 10.3390/vaccines8030482.
22. Giardiello D, Melotti R, Barbieri G, Gögele M, Weichenberger CX, Foco L, et al. Determinants of SARS-CoV-2 nasopharyngeal testing in a rural community sample susceptible of first infection: the CHRIS COVID-19 study. *Pathog Global Health*. 2023;**117**(8):744–53. doi: 10.1080/20477724.2023.2191232.
23. Ausserhofer D, Wiedermann W, Becker U, Vögele A, Piccoliori G, Wiedermann CJ, et al. Health information-seeking behavior associated with linguistic group membership: latent class analysis of a population-based cross-sectional survey in Italy, August to September 2014. *Arch Public Health*. 2022 Mar 21;**80**(1):87. doi: 10.1186/s13690-022-00847-w.
24. Uguzzoni F, Palandri L, Lorenzon A, Cristofor CD, Lozza F, Poluzzi R, et al. Crossing the border: Adherence to the Vaccination Campaign in multicultural provinces of South-Tyrol during COVID-19 Pandemic, a cross-sectional study. *Popul Med [Internet]*. 2023 Apr 26 [cited 2023 Nov 27];**5**(Supplement). Available from: <http://www.population-medicine.eu/Crossing-the-border-Adherence-to-the-Vaccination-Campaign-in-multicultural-provinces,163985,0,2.html>. [Last accessed: 2024 Jan 28].
25. Ferrara M, Bertozzi G, Volonnino G, Di Fazio A, Di Fazio N, Arcangeli M, et al. Learning from the Past to Improve the Future-Vaccine Hesitancy Determinants in the Italian Population: A Systematic Review. *Vaccines (Basel)*. 2023 Mar 12;**11**(3):630. doi: 10.3390/vaccines11030630.
26. Piccoliori G, Barbieri V, Wiedermann CJ, Engl A. Special roles of rural primary care and family medicine in improving vaccine hesitancy. *Adv Clin Exp Med*. 2023;**23**(4):401–6. doi: 10.17219/acem/162349.

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