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Vaccinations Among Migrant Farmworkers in the United States: A Scoping Review

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By Chandler Whitenton

Abstract

The COVID-19 pandemic has brought attention to the need for equitable access to vaccines and the reduction of vaccination disparities in public health settings. While efforts have primarily focused on marginalized groups, migrant farmworkers have received little attention in vaccination campaigns and studies. This scoping review aims to explore the existing evidence on vaccination among migrant farmworkers in the United States. The review seeks to identify vaccination programs, understand barriers to access, highlight recommended vaccines, and identify organizations implementing vaccination efforts. A comprehensive search strategy was developed and implemented, resulting in the inclusion of 13 studies. Barriers to vaccination among migrant farmworkers included language barriers, transportation limitations, lack of trust, and conflicts with work hours. Facilitators included involvement of community-based organizations in vaccination activities and use of digital vaccination records. The involvement of community-based organizations played a crucial role in addressing barriers and building trust. The scoping review underscores the need for tailored interventions and policies that address language barriers, transportation limitations, and trust issues that may impact vaccine uptake among migrant farmworkers. Further research is needed to investigate the impact of non-COVID-19 vaccines on migrant farmworkers' health outcomes and develop evidence-based strategies to enhance vaccine uptake. Policymakers, healthcare providers, and public health practitioners can use the findings to improve vaccine access and equity for this vulnerable population, contributing to broader Healthy People 2030 public health goals.

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Introduction

The COVID-19 pandemic has highlighted the urgent need to address vaccination disparities and ensure equitable access to vaccines in public health settings. Where efforts to reduce disparities have predominantly focused on marginalized groups such as racial and ethnic minorities, older individuals, and residents of rural areas in the United States, migrant workers, particularly migrant farmworkers, have received little attention in vaccination campaigns and studies.

Migrant farmworkers face unique challenges that hinder their access to vaccines, including the seasonal nature of their work, migratory patterns, inadequate healthcare infrastructure, lack of insurance, language barriers, cultural differences, and stigma.(ref?) Additionally, these workers are at a higher risk of disease transmission due to crowded living and working conditions, limited healthcare access, and concerns related to immigration status (Arcury, 2009).

Addressing the vaccination needs of migrant farmworkers is crucial for several reasons. Ensuring their vaccination protects their health and well-being, preventing the spread of infectious diseases not only within their communities but also to the broader population they interact with during their work. Migrant farmworkers often reside in close quarters, live in communal settings, and work in environments that make other preventive behaviors such as social distancing challenging. As a result, outbreaks of infectious diseases can quickly occur and spread, posing a significant public health risk. Considering the essential role these workers play in food production and supply chains, their health and vaccination status directly impact food safety and security.

Statistics on vaccination coverage among migrant populations are limited, reflecting the existing gaps in research. Overall health of migrant and seasonal farmworkers in the United States has been the subject of a limited number of existing publications (Bloss 2021). One review article

titled "Advancing the Health of Migrant and Seasonal Farmworkers in the United States: Identifying Gaps in the Existing Literature" (2021) provides valuable insights into the overall health status of farmworkers and highlights gaps in the literature. Although this review does not mention vaccines, it offers a comprehensive analysis of various health aspects and sheds light on the limited research available on this topic. (Bloss, 2021).

Vaccination in the United States encompasses a range of essential vaccines recommended for all individuals, as well as additional vaccines specifically relevant to farmworkers and their families. Essential vaccines in the U.S. include immunizations against diseases such as measles, mumps, rubella (MMR), diphtheria, pertussis, tetanus (DPT), polio, and varicella (chickenpox). These vaccines are universally recommended to protect individuals from preventable diseases. Additionally, specific essential vaccines targeted towards farmworkers and their families due to the nature of their work may include those for hepatitis A, hepatitis B, influenza (seasonal flu), and bacille Calmette-Guérin (BCG) for tuberculosis prevention.

While research on factors associated with vaccinations among migrant farmworkers has been conducted in various regions globally, including Europe, Southeast Asia, and the Middle East, the available literature specific to the United States is limited. Existing literature primarily focuses on COVID-19 vaccinations, with minimal information available on the status of other essential vaccines.

This scoping review aims to fill this gap by exploring the available evidence regarding vaccination among migrant farmworkers in the United States. By examining existing literature, the review seeks to identify vaccination programs, understand barriers to vaccination access, and highlight recommended vaccines for this vulnerable population.

The objective of this scoping review is to explore the extent of evidence available concerning vaccination among migrant farmworkers in the United States. To achieve this objective, the following research questions will guide the review:

Question 1: What vaccination studies or programs specifically targeting migrant farmworker populations in the United States are mentioned in existing literature?

Question 2: What barriers do migrant farmworkers face when attempting to access vaccination services in the United States?

Question 3: What types of vaccinations are being recommended or distributed among migrant farmworker groups?

Question 4: What organizations or government entities have implemented vaccination efforts targeting migrant farmworkers in the United States?

The findings of this review may inform the development of targeted vaccination campaigns, policies, and interventions that promote equitable access to vaccines and ensure the health and well-being of migrant farmworkers, contributing to broader public health goals of disease prevention and control.

Methodology

A preliminary search was conducted using databases such as MEDLINE, the Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis to identify existing reviews on vaccinations among migrant farmworkers. The preliminary search revealed a lack of current or ongoing systematic reviews or scoping reviews on the topic, highlighting the need for this study.

The participants of this study primarily included migrant farmworkers and their families. For this review, we defined migrant farmworkers using the definition provided by the United States Department of Agriculture as: "An individual whose principal employment is in agriculture on a seasonal basis, who has been so employed within the last 24 months, and who establishes, for the purposes of such employment, a temporary abode." Other possible subjects included individuals or groups involved in providing vaccinations, such as clinical workers or volunteers, as well as medical practitioners.

To better understand the context of this study, it is important to distinguish between migrant and immigrant workers. Migrant workers are individuals who move from one region to another in search of temporary or seasonal employment opportunities. They may travel within their home country or across borders, often frequently and multiple times throughout the year. Immigrant workers are individuals who permanently settle in a different country with the intention of establishing a new residence and seeking employment opportunities. In the context of this study, both migrant and immigrant farmworkers are grouped together as they share similar experiences and face common challenges related to access to healthcare and vaccinations.

This study focused on the vaccination status of the participants. Vaccines, as defined by the CDC, are preparations used to stimulate the body's immune response against diseases, usually administered through needle injections, oral administration, or nasal spray. Vaccination, interchangeably referred to as immunization in this study, is the act of introducing a vaccine into the body to provide protection from a specific disease.

The study focused on migrant farmworkers working and residing in urban or rural settings across the United States, including those who migrated for work, such as seasonal workers or workers originating from outside of the United States (immigrant farmworkers). The study was also

interested in any evidence regarding family members of migrant farmworkers under the age of 18.

This scoping review considered various study designs, including experimental and quasi-experimental designs such as randomized controlled trials, non-randomized controlled trials, before and after studies, and interrupted time-series studies. Analytical observational studies, such as prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies, were also considered. Descriptive observational study designs, including case series, individual case reports, and descriptive cross-sectional studies, were included.

Additionally, qualitative studies employing methodologies such as phenomenology, grounded theory, ethnography, and qualitative description were considered.

Search Strategy

A comprehensive search strategy was developed in consultation with a public health informationist. The search strategy aimed to locate published studies that met the inclusion criteria. An initial limited search was conducted by the author using Google Scholar and PUBMED to identify relevant articles on the topic, and the identified keywords and mesh terms from the titles and abstracts were used to develop a comprehensive search strategy for databases including PubMed, Scopus, and SEARCH by the national agricultural library, which consists of the combined repositories of AGRICOLA, PubAg, and the NAL Digital Collections (NALDC). The search strategy was adapted for each included database and/or information source. The reference lists of all included sources were screened for additional studies. Only studies published in the English language since the year 1900 were included, as the identified research

gap pertained to this time period. In addition to the identified databases, unpublished studies or gray literature were sourced from additional research or references within the identified literature.

Table 1: Search Strategy

Database	Search Terms	Number of identified publications
PubMed	(migrant[tiab] OR migratory[tiab] OR temporary[tiab] OR "transients and migrants"[Mesh]) AND ("farms"[Mesh] OR "farmers"[Mesh] OR "agriculture"[Mesh] OR farm[tiab] OR farms[tiab] OR farmworker[tiab] OR farmworkers[tiab] OR farmworker[tiab] OR farmworkers[tiab] OR "farm worker"[tiab] OR "farm workers"[tiab] OR agriculture[tiab] OR agricultural[tiab])	62 documents found

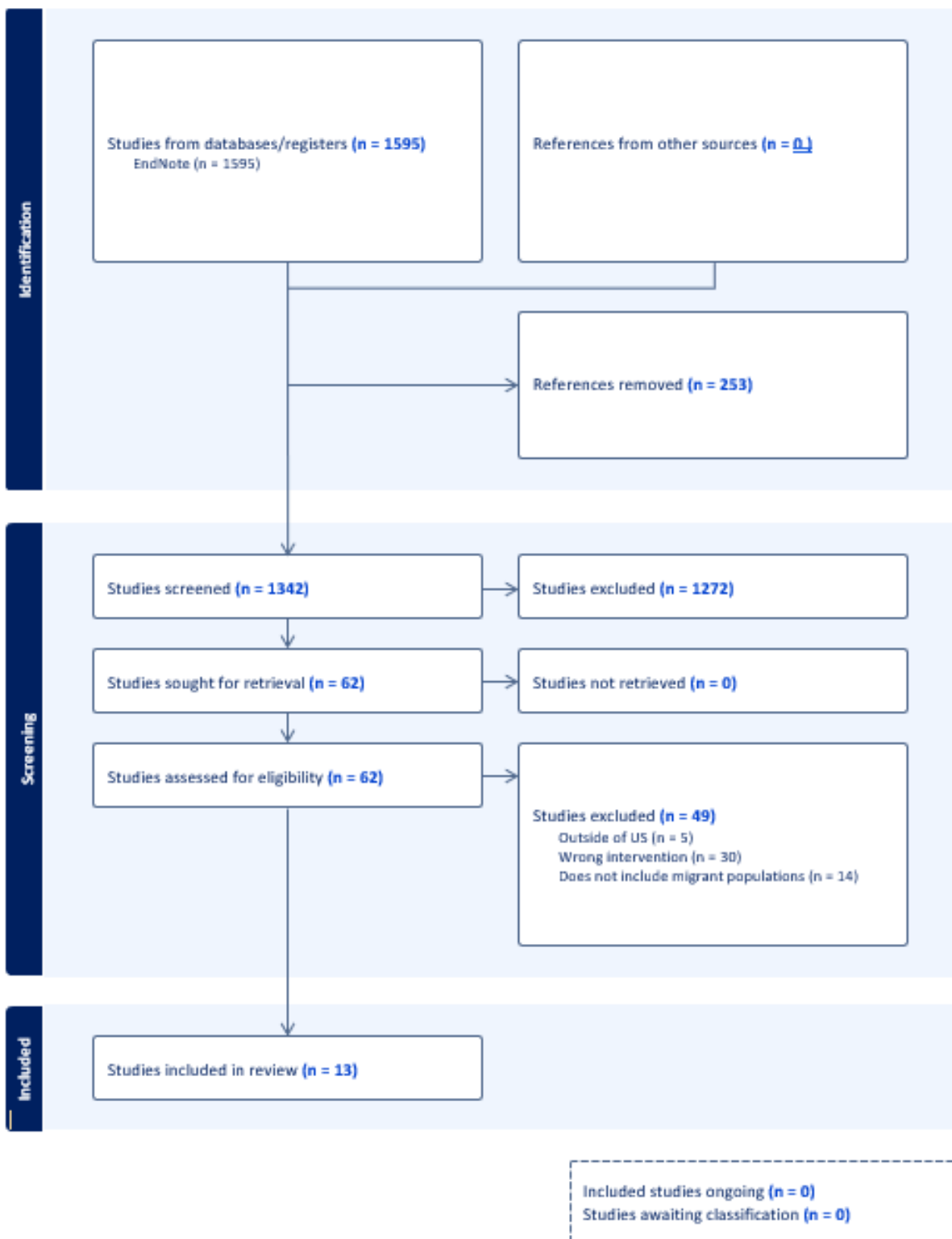
	AND (vaccin*[tiab] OR immuniz*[tiab])	
SCOPUS	TITLE-ABS-KEY ((migrant OR migratory OR immigrant OR immigrants OR transient) AND (farmworker OR (farm AND worker) OR (agricultural AND worker)) AND (vaccine OR immunization OR vaccination)) AND (LIMIT-TO (LANGUAGE , "English"))	53 documents found
SEARCH: PubAG/Agricola/NAL	(migrant OR migratory OR immigrant OR immigrants OR transient) AND (farmworker OR farm worker OR agricultural worker) AND (vaccine OR immunization OR vaccination)	1480 documents found

Following the search, all identified citations were collated and uploaded to EndNote 20 and Covidence review management software, and duplicates were removed. Titles and abstracts were screened by the author for assessment against the inclusion criteria. Potentially relevant sources

were retrieved in full, and their citation details were imported into Covidence. The full text of selected citations was assessed against the inclusion criteria by the author. Reasons for exclusion of sources that did not meet the criteria were recorded. The results of the search and study inclusion process were reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews (PRISMA-ScR) flow diagram.

Data were extracted from the included papers using a data extraction tool developed by the author. The data extracted included specific details about the participants, concept, context, study methods, and key findings relevant to the review questions. A draft extraction form was piloted and modified as necessary during the data extraction process.

Figure 1: PRISMA Chart



Results

As seen in Figure 1, implementation of the comprehensive search strategy yielded a total of 1595 studies initially. After removing 253 duplicate studies, 1342 studies remained for eligibility screening. Subsequently, 62 studies were selected for full-text review to assess their suitability for inclusion in the final review. Upon conducting the full-text review, a total of 13 studies (Abarca Tomás et al. 2013, Boggess et al. 2023, Dentinger et al. 2001, Fehrs et al. 1988, Gehlbach et al. 2021, Keeney et al. 2022, Lee et al. 1990, Murtagh et al. 2022, Poss 1998, Quandt et al. 2022, Slesinger et al. 1986, Steege et al. 2009, Thomas et al. 2021) met the inclusion criteria and were included in the final review, as noted in Table 2. Shown in Figure 1, key reasons for exclusion of studies included 5 cases where the study was conducted solely with populations outside of the United States, 30 cases where the study did not mention vaccination, and 14 cases where the study did no mention migrant farmworkers. The publication dates of the included studies ranged from 1986 to 2023, indicating research on this topic has been conducted in the United States over the past few decades.

Table 2: Included Studies

Author	Year Published	Region	Population	Vaccine Type	Program Description
Thomas et al.	2021	Multiple States	Migrant farmworkers	Covid-19	Text and Opinion piece on why it is important to and how to provide Covid-19

					vaccines for farmworkers across the United States
Steege et al.	2009	Multiple States	Migrant farmworkers	Seasonal Influenza Vaccine	Qualitative research on prevention efforts for farmworkers at risk of seasonal influenza
Slesinger et al.	1986	Wisconsin	145 Farmworker Women, 330 farmworker children	DPT, Polio, MMR, Smallpox	Cohort study looking at health among mothers and children
Quandt et al.	2022	California	12 Migrant farmworkers	Covid-19	Qualitative research seeking to understand the COVID-19 experiences of migrant agricultural workers in Imperial County, California
Poss et al.	1998	New York	26 Migrant farmworkers	BCG Vaccine	Qualitative research looking to understand farmworkers views and understanding of tuberculosis
Murtagh et al.	2022	Florida	Migrant farmworkers	Covid-19	Report on the activities of the health coalition in addressing Covid-19

Lee et al.	1990	South Carolina	613 Children of Migrant farmworkers between 3-18	DPT, Polio, MMR	Cross Sectional study looking at the immunization status of farmworker children during the 1986 and 1987 crop seasons
Keeney et al.	2022	California	199 Hispanic/Latino Migrant farmworkers	Covid-19	Qualitative study on how Covid-19 vaccination impacts stressors on migrant farmworkers
Gehlbach et al.	2021	California	55 Migrant farmworkers	Covid-19	Qualitative study on how social and historical knowledge and perceptions impact vaccination uptake
Fehrs et al.	1988	Oregon	303 Pregnant Migrant farmworkers	HB Vaccine	Prevalence study looking at Hepatitis B markers in pregnant farmworkers
Dentinger et al.	2001	Florida	1243 Farmworker Children ages 2-18	Hepatitis A Vaccine	Prevalence study to determine if Hepatitis A is vaccine indicated
Boggess et al.	2023	Multiple States	Migrant farmworkers	Covid-19	Report on efforts to establish farmworker-serving

					organizations and networks for resource access
Abarca Tomás et al.	2013	Multiple States	Global Migrants, including farmworker adults and children in the US	BCG Vaccine	Systematic review of publications relating to TB control among migrant populations globally

Table 2 shows the included publications as well as data on their geographic focus, vaccine of interest, population of interest, and stated aim or description. Geographically, the included studies covered various regions within the United States. Additionally, one study was conducted outside of the US, but included data and publication on migrant farmworkers in the US. Four studies had a nationwide or global scope, providing a broad perspective on vaccination among migrant farmworkers across the country (Abarca Tomás et al. 2013, Boggess et al. 2023, Steege et al. 2009, and Thomas et al. 2021). Among the remaining studies, three (Keeney et al. 2022, Gehlbach et al. 2021, and Quandt et al. 2022) focused specifically on the state of California, while two (Dentinger et al. 2001, Murtagh et al. 2022) studies were conducted in Florida. Additionally, one study each was conducted in South Carolina (Lee et al. 1990), Wisconsin (Slesinger et al. 1986), and Oregon (Fehrs et al. 1988), shedding light on the vaccination experiences of migrant farmworkers in these specific states.

The included studies examined a range of vaccines, both related to COVID-19 and other infectious diseases. Notably, six studies specifically discussed COVID-19 vaccination (Thomas et al. 2021, Quandt et al. 2022, Murtagh et al. 2022, Keeney et al. 2022, Boggess et al. 2023, Gehlbach et al. 2021), reflecting a recent rise in research as a response to the urgent need to understand the impact of the recent pandemic and the inclusion of traditionally underserved populations in Covid-19 vaccine research. Some included studies explored childhood vaccines such as MMR (measles, mumps, rubella), DPT (diphtheria, pertussis, tetanus), Polio, and Smallpox (Slesinger et al. 1986). Others addressed vaccinations against Hepatitis A (Dentinger et al. 2001), Hepatitis B (Fehrs et al. 1988), BCG (bacille Calmette-Guérin) (Poss et al. 1998, Abarca Tomás et al. 2013), and the Seasonal Influenza Vaccine (Steege et al. 2009) .

Regarding the target population, four studies focused on vaccinated populations that included both adults and children (Slesinger et al. 1986, Lee et al. 1990, Dentinger et al. 2001, Abarca Tomás et al. 2013). Among these, two studies exclusively examined vaccination outcomes and experiences in children of ages 2-18 (Lee et al. 1990, Dentinger et al. 2001).

Table 3: Vaccination Barriers and Facilitators

Publication	Vaccination Type	Barriers to Vaccination	Facilitators
Thomas et al, 2021	COVID-19	Language Barriers ¹ , Transportation, Trust ²	Community-Based Organizations ³ , Digital Vaccination Records

¹ Lack of services in the workers' native language or other complications preventing access to vaccination due to language, such as not being able to seek out or request services/information due to limited English proficiency.

² Lack of trust in health institutions, information provides, or health providers.

³ Local organizations within the region where farmworkers reside to work, many of which include those who work directly with migrants and farmworkers

Quandt et al, 2009	COVID-19	Work Hours, Long Lines, Vaccine Hesitancy ⁴ , Access to Resources and Services ⁵	Community-Based Organizations, Word-Of-Mouth Sharing
Murtagh et al, 2022	COVID-19	Vaccine Hesitancy, Trust	Building Trust ⁶ , Community-Based Organizations,
Boggess et al, 2023	COVID-19	Vaccine Hesitancy, Virus Variants	Community-Based Organizations
Keeney et al, 2022	COVID-19	Language Barriers, Access to Resources and Services	Programs To Directly Assist Farmworkers with Making Vaccination Appointments
Gehlbach et al, 2022	COVID-19	Misinformation ⁷ , Trust, Immigration Status ⁸ , Fear of a Positive Test Result	Interpersonal And Community Relationship/Trust Building ⁹

⁴ Defined by the World Health Organization as “delay in acceptance or refusal of safe vaccines despite availability of vaccination services”. Includes hesitance due to belief that the vaccine is dangerous or ineffective.

⁵ Resources and Services include clinics, healthcare providers, health insurance, and informational resources on vaccinations.

⁶ Other targeted efforts to improve trust between the farmworker community and healthcare professionals, public health officials

⁷ Publicly or privately circulated information about vaccinations that is not supported by peer-reviewed research or a licensed healthcare professional

⁸ Migrant workers who face deportation or other immigration related consequences or fears and thus do not seek out medical advice or services

⁹ May include outreach efforts from individuals or community organizations to open lines of communication about health needs or available services

Fehrs et al, 1998	Hepatitis B Vaccine	Poverty	Vaccination Programs Within Migrant Communities
Dentinger et al, 2001	Hepatitis A Vaccine	Access to Resources and Services	Vaccination Programs Within Migrant Communities
Poss et al, 1998	BCG Vaccine	Belief In Additional Protection Beyond Intended Purpose of BCG Vaccine, Stigma	
Abarca Tomás et al, 2013	BCG Vaccine	Language Barriers, Fear of a Positive Test Result, Stigma, Work Hours and Long Lines, Access to Resources and Services, Trust	Vaccine Is Already Widespread And Accepted
Steege et al, 2009	Seasonal Influenza Vaccine	Language Barriers, Immigration Status, Access to Resources and Services, Stigma	Migrant-Focused Health Clinics, Building Trust, Improving Communication
Slesinger et al, 1986	DPT, Polio, MMR, Smallpox	Access to Resources and Services	Vaccine Is Already Widespread And Accepted

Table 3 shows identified barriers and facilitators to vaccination among migrant farmworkers across various vaccine types. For COVID-19 vaccination, language barriers, transportation limitations, and a lack of trust in healthcare services were identified as barriers (Thomas et al. 2021). Facilitators included the involvement of community-based organizations working within the population and the utilization of digital vaccination records (Thomas et al. 2021). Digital records allowed healthcare facilities and healthcare workers to access farmworkers' medical history, including past vaccines, without the farmworkers themselves being responsible for keeping track of their own records (Thomas et al. 2021). Additional barriers for COVID-19 vaccination included long work hours limiting time for vaccination or clinic visits, long lines, general vaccine hesitancy, and access to healthcare resources and facilities, while facilitators included community-based organizations and sharing information by word-of-mouth (Quandt et al. 2009, Murtagh et al. 2022, Boggess et al. 2023, Keeney et al. 2022).

Barriers to Hepatitis B vaccination were related to poverty, but dedicated vaccination programs within migrant communities served as facilitators (Fehrs et al. 1998). Similarly, access to resources and services was a barrier for Hepatitis A vaccination, with dedicated programs within migrant communities as facilitators (Dentinger et al. 2001).

Barriers to BCG vaccination included misconceptions about the vaccine itself and stigma, while situations where there was widespread acceptance within the community facilitated vaccination (Poss et al. 1998, Abarca Tomás et al. 2013). These misconceptions included belief that the BCG vaccine induced additional immune protection against other diseases, while acceptance primarily came from the number of people who knew someone with a vaccine or who knew they were protected from TB because they had received the vaccine (Abarca Tomás et al. 2013).

For the seasonal flu vaccine, barriers included illiteracy, language barriers, immigration status, discrimination, stigma, and lack of insurance. Migrant-focused health clinics, trust-building, and improved communication were identified as facilitators (Steege et al. 2009). Barriers related to childhood vaccines, such as DPT, Polio, MMR, and Smallpox, included access to resources and services such as vaccination clinics or health insurance, while their widespread acceptance and trust in the vaccine's ability to protect from disease facilitated vaccination (Slesinger et al. 1986).

Table 4: Involved Organizations

Publication	Name of Vaccine	Involved Organization(s)
Thomas et al, 2021	COVID-19	State (University of Minnesota)
Quandt et al, 2009	COVID-19	State (San Diego State University)
Murtagh et al, 2022	COVID-19	Community Health Coalition
Boggess et al, 2023	COVID-19	Federal (Centers for Disease Control)
Keeney et al, 2022	COVID-19	State (University of San Diego)
Gehlbach et al, 2022	COVID-19	State (University of California Riverside)
Fehrs et al, 1998	Hepatitis B	State (Acute Infection Control Unit, Los Angeles County Health Department, CA)
Dentinger et al, 2001	Hepatitis A	Federal (Centers for Disease Control, Hepatitis Branch)
Poss et al, 1998	Influenza	State (University of Texas)

Abarca Tomás et al, 2013	Bacille Calmette-Guerin	International (Department of Preventive Medicine and Public Health, University of Granada, Granada, Spain)
Steege et al, 2009	Bacille Calmette-Guerin	Federal (CDC), Farmworker Health Committee
Slesinger et al, 1986	Childhood Vaccines ¹⁰	State (University of Wisconsin-Madison)
Lee et al, 1990	Childhood Vaccines	State (Department of Family and Preventive Medicine, University of South Carolina School of Medicine)

For each of the 13 included publications, the organization providing vaccination services was identified and is shown in Table 4. These organizations either funded the research or conducted the study themselves. For COVID-19 vaccination, state-level institutions such as the University of Minnesota, San Diego State University, University of San Diego, and University of California Riverside, along with one community health coalition, were involved (Thomas et al. 2021, Quandt et al. 2009, Murtagh et al. 2022, Boggess et al. 2023, Keeney et al. 2022, Gehlbach et al. 2022). Additionally, the U.S. Centers for Disease Control (CDC), a federal public health agency, contributed to COVID-19 vaccination initiatives and research (Boggess et al. 2023, Steege et al. 2009).

¹⁰ Childhood Vaccines: MMR, DPT, Polio, and Smallpox

For Hepatitis B vaccination, the Acute Infection Control Unit of the Los Angeles County Health Department, CA, was involved (Fehrs et al. 1998). The CDC, specifically the Hepatitis Branch, played a role in Hepatitis A vaccination efforts (Dentinger et al. 2001). Influenza vaccination efforts targeting migrant farmworkers involved the CDC's Farmworker Health Committee (Steege et al. 2009). The Bacille Calmette-Guérin (BCG) vaccine study was implemented by the University of Texas (Poss et al. 1998, Abarca Tomás et al. 2013). The University of Wisconsin-Madison and the Department of Family and Preventive Medicine at the University of South Carolina School of Medicine were involved in vaccination programs for studies that included various vaccine types, including childhood vaccines (Slesinger et al. 1986, Lee et al. 1990).

Discussion

An analysis of the barriers and facilitators to vaccination across different vaccine types revealed several common themes for migrant farmworkers. Barriers to vaccination included a lack of institutional trust, language and literacy barriers, lack of access to services and resources, and conflicts with work hours or fear of losing work due to a positive test. Facilitators of vaccination included utilization of community-based organizations and existing lines of communication, efforts to build trust and communication within the community, and identifying and targeting known health issues or vaccines within the community that are already commonplace to improve overall vaccination rates.

Among the barriers seen, language disparities emerged as a consistent issue, limiting access to accurate information, and creating challenges in understanding vaccine-related instructions and discussions. Transportation limitations were also commonly identified, making it difficult for

farmworkers to access vaccination sites due to their remote work locations or lack of reliable transportation options. Trust was another recurring theme, with a lack of trust in healthcare services or practitioners hindering vaccine uptake. This lack of trust may stem from historical experiences of discrimination, cultural differences, or concerns related to immigration status.

For facilitators to vaccination, the involvement of community-based organizations consistently emerged as a facilitator across different vaccine types. These organizations played a crucial role in addressing language barriers, providing transportation support, and building lasting trust within the migrant farmworker community. Relationships and trust built with these community-based organizations have been able to last multiple years, with returning members remembering and working again with the same existing community organizations. Digital vaccination records were also identified as a facilitator, allowing for easy access to vaccination histories and eliminating the need for farmworkers to carry physical records while mobile.

The findings of this scoping review have significant implications for practice, policy, and future research. The literature on vaccination among migrant farmworkers is relatively limited, particularly outside of the COVID-19 context, indicating gaps in research and the need for further investigation. Overall, the findings reveal the urgent need to address vaccination disparities and ensure equitable access to vaccines for this vulnerable population. The involvement of community-based organizations has been instrumental in overcoming barriers and building trust within the migrant farmworker community. These organizations can serve as key partners in developing and implementing culturally sensitive and linguistically appropriate interventions to promote vaccination. Additionally, the identified gaps in the literature highlight the need for future research to investigate the impact of essential vaccines beyond COVID-19 on migrant farmworkers' health outcomes and to develop evidence-based strategies to enhance

vaccine uptake. The identification of these common results and themes underscores the importance of tailored interventions and policies that address language barriers, transportation limitations, and trust issues while leveraging the role of community-based organizations in promoting vaccine access and uptake among migrant and immigrant farmworkers.

The scoping review methodology employed in this study has both strengths and limitations. The comprehensive search strategy, including multiple databases and consultation with a public health informationist, ensured a thorough exploration of the literature. The third utilized database, SEARCH by the national agricultural library, included three combined repositories: (AGRICOLA), PubAg, and the NAL Digital Collections (NALDC). The utilization of this resource allowed for an easier search of all three sources but resulted in a large amount of extraneously identified publications.

The inclusion of various study designs and the consideration of qualitative research added depth and diversity to the findings. However, limitations include the restriction to studies published in English since 1900, which may have excluded relevant non-English literature and historical data. Additionally, the limited availability of literature specifically focusing on migrant and immigrant farmworkers highlights the need for more primary research in this field. While some research has been conducted globally, focus specifically on the population within the United States is essential due to the significant differences in policies and practices impacting this population in the US.

Based on the findings of this scoping review, several recommendations can be made for future research, policy, and practice. Firstly, further research is needed to investigate the impact of essential vaccines beyond COVID-19 on the health outcomes of migrant and immigrant farmworkers. This includes exploring vaccination coverage rates, identifying effective strategies to address barriers, and evaluating the long-term impact of interventions. Secondly, policies

should be developed and implemented to improve vaccine access and equity for this population. This can include expanding dedicated vaccination programs, enhancing communication strategies, and collaborating with community-based organizations to address cultural and language barriers. Finally, future research should consider incorporating a broader range of languages, such as Spanish, and conducting systematic reviews to further explore the effectiveness of vaccination interventions for this population.

In conclusion, this scoping review highlights the urgent need to address vaccination disparities and ensure equitable access to vaccines for migrant and immigrant farmworkers in the United States. The findings emphasize the role of community-based organizations as key facilitators in overcoming barriers to vaccination and building trust within the migrant farmworker community. The identified barriers and facilitators provide valuable insights for the development of targeted vaccination campaigns, interventions, and policies. Addressing the unique challenges faced by migrant and immigrant farmworkers and improving vaccine access can significantly contribute to their health outcomes and promote equity in healthcare. By implementing evidence-based strategies, policymakers, healthcare providers, and public health practitioners can make a positive impact on the well-being of this vulnerable population and ultimately contribute to broader public health goals of disease prevention and control.

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