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Agricultural Worker Housing: A Review and a New Framework for Action

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Abstract

Housing is a social determinant of health, acting as both a driver and indicator of social inequity. For migrant and seasonal farmworkers, it is difficult to tease apart the interaction between the environmental and social factors related to their housing, in conjunction with extreme poverty, immigration, precarious employment, and linguistic, cultural, and educational factors. The relationship of housing with employment and the transient nature of farmworkers' occupancy add to the complexity. To assess the strengths, weaknesses, and research gaps and to identify areas requiring further investigation, we performed a critical review of the scientific and grey literature on farmworker housing and health. We propose a framework to focus research and suggest housing policy interventions to improve the health and well-being of this essential workforce.

Keywords

housing and health; housing and health and well-being; farm worker housing; rural housing and health; migrant housing camps

Introduction

In Fall of 2022, the National Institute for Occupational Safety and Health (NIOSH) awarded funds to establish the Great Lakes Center for Farmworker Health and Well-being, a new Center for Agricultural Safety and Health.¹ As we embarked on the approved research, outreach, planning and evaluation, we recognized the need to deepen our understanding of the structural and social determinants of health and well-being for hired migrant and seasonal farmworkers, and to become more knowledgeable about the local and national landscape. Framed in WHO's Social Determinants of Health model,² we took on farmworker housing as a focus.

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We declare no conflicting interest.

Housing is a recognized social determinant of health.^{2–6} It can affect health outcomes through exposure to environmental hazards such as mold, mildew, pests, lead paint, poor indoor air quality, poor water quality, inadequate sewage quality, and lack of access to uncontaminated cooking equipment and refrigeration.⁷ Social hazards like crowding, neighborhood safety, proximity to transportation, services, and community are also important.^{8, 9} Lack of housing stability can lead to stress and poor health. It is both a driver and an indicator of social inequity.¹⁰ The transient nature of farmworkers' residence/tenure in housing that is connected with their work adds layers of complexity to the relationship between housing and health for this workforce.¹¹

There are 2–3 million hired migrant and seasonal farmworkers employed in crop and livestock agriculture across the U.S.¹² More than 85% are settled in the U.S., and a majority work over 75 miles from home; a small portion either “follow the crop” from south to north or have an H-2A visa, which allows temporary employment of foreign nationals in agricultural work; some 45% may lack authorization for work.¹³ Immigration status, regional differences in agricultural operations, and the timing of seasonal work all influence the length of time agricultural workers spend in one location. Further, ambient weather conditions, number of workers, and distance from work and social services pose challenges to the ability to provide stable, healthy housing. Finally, housing ownership (landlord vs employer vs worker), rental lease holding the housing (employer or worker), and living arrangement (one worker vs multiple workers vs workers' family members) can integrate work-life and home-life in a way that is unique to the agriculture sector.

While attention has been directed toward health and housing of farmworkers,¹⁴ research and practice have been geographically limited and narrowly focused on well-understood hazards and readily measurable health effects. A more comprehensive and integrated understanding of the current evidence and social context of housing is needed to guide research and interventions toward improving farmworker health and well-being and reducing social inequities related to work in agriculture. Based on a critical review of the scientific and grey literature,¹⁵ visits to farmworker housing in Illinois and Florida, informal discussions with farmworker housing inspectors, and general housing and health research (unrelated to farmworkers), we sought to use answers to the following questions to build a conceptual model that would inform a research and practice agenda:

1. What research has been done regarding farmworker housing and health:
 - a. What are the methods and the settings; how representative are studies likely to be; what are the findings?
 - b. What is the array of housing sites and housing conditions for farmworkers in the US?
 - c. How is farmworker housing connected with the employer and the employment arrangement?
 - d. What hazards have been identified in farmworker housing?
 - e. What adverse health effects are associated with housing?

2. What are the larger economic, social and political contexts of housing for farmworkers?
3. What are the laws and regulatory oversight of farmworker housing; which agencies are engaged; what tools do they use?
4. How does the general literature on housing and health apply to farmworker housing?

Approach

To assess the strengths, weaknesses, and research gaps and to identify areas requiring further investigation, we performed a critical review of the scientific and grey literature on farmworker housing and health. Our intention was to characterize and evaluate the current knowledge about farmworker housing—housing hazards, the relationship between housing hazards and adverse health effects, approaches to improving the housing itself, factors that can modify the relationship between housing and health, and characteristics unique to housing arrangements for temporary workforces. This would allow us to position the work, to date, in a broader context, and set us (and others) up for developing a logical and targeted research and policy agenda on farmworker housing and health.

In a PubMed search on the intersection of farmworker housing and healthy housing in the U.S., we identified 80 peer-reviewed articles that were relevant to our interests. We reviewed references that were cited in the original 80 to further inform our understanding of housing as a determinant of farmworker health and well-being. In an iterative process of reviewing research articles, identifying relevant citations, and entering relevant terms in a google search engine, we also identified documents on the websites of US and global agencies and non-governmental organizations.

Based on our content expertise in occupational medicine, industrial hygiene, occupational epidemiology/surveillance, toxicology, and housing and health, we grouped the literature into categories to serve as a reference/guide and to make it easier to search. From these references, we extracted indicators of exposure to hazards in farmworker housing according to hazard categories (Table 1),^{46–71} adverse health effects by organ system (Table 2),^{31,34,38,73–86,88,92–94,96} and characteristics to be considered for research and policymaking to improve the quality of farmworker housing (Table 3).^{97–121} We revisited possible research questions based on these findings (last row of Table 3). We read and wrote notes, followed references, and enumerated descriptors—social, work, health, well-being, and housing characteristics. We then created a list of indicators (variables) based on all the data used in the previous sources (Table 4). Finally, we used these indicators to identify constructs that have been recognized as important but not yet presented in the peer-reviewed literature. We categorized these descriptors into drivers, mediators, and moderators that interact with housing to influence the health and well-being of farmworkers and created a conceptual model for consideration by researchers, public health practitioners, and policymakers.

Findings and Discussion

Foci of the literature fall into the following categories: general health, well-being, and health equity;^{17–33} general presentations of farmworker housing and health;^{34–42} housing as a site for outreach and visits from social service organizations and government entities;^{43–45} hazards in housing—chemical (mainly pesticides),^{46–71} biological hazards (water quality,⁷² allergens/particulates,⁷³ and COVID-19^{74–85}), biomechanical and safety hazards,^{86–88} psychosocial hazards;^{89–96} policies and regulatory items;^{97–121} preparedness;¹²³ and models that incorporate employment, health, well-being and health equity that could serve as a basis for guiding a conceptual model on farmworker health and housing.^{124–129}

The majority of peer-reviewed studies were descriptive in nature. Some were exposure assessments, which entailed observations with housing inspection checklists and photos. Others were surveys or interviews of farmworkers about the hazards in their housing. Some studies included health assessments, sometimes in tandem with the exposure assessments, collected through observations (walk-throughs), focus groups, key informant interviews, formal surveys, or collection of environmental samples and biospecimens from housing occupants.^{46–96} There were a few epidemiologic studies linking specific exposures to adverse health conditions. There were several descriptions of visits to farmworkers in their housing by clinical staff, the local or state health department, and housing compliance officers. In the grey literature, we found policy analyses, lists of regulations, guidelines, and advocacy pieces related to farmworker housing. We also found national surveys.^{118–120}

Per our groupings, described above, *exposure hazards* included physical, biological, chemical, and injury/ergonomic categories (Table 1). Poor integrity of building systems and materials included dysfunctional windows, plumbing, and deteriorated exteriors and interiors. Chemical hazards were almost entirely related to pesticides and disinfectants. Injury and safety hazards included broken or absent smoke and carbon monoxide alarms, as well as electrical and fall hazards. Biological hazards included mold and moisture (fungal microorganisms), lack of window screens and inadequate pest management (insect bites), and lack of potable water (microbials).

Psychosocial hazards were identified in many visual inspection and survey studies. The problems of crowding and living with strangers, the lack of separation between work and home (several described the labor supervisor sharing the housing with the workers), and lack of personal security and safety from crime and violence were common. Lack of personal agency (e.g., reading after “lights out,” requesting repairs), low social capital, “man-camps” (prostitution, selling and using of illegal substances), curtailed labor rights, limited access to services (transportation, health care, emergency services) and the exclusion of farmworker housing and the occupants in plans for emergency preparedness were noted.

Inspection methods were primarily visual assessment of housing and occupant interviews. There were many studies that found pesticide residues in the housing, on the doormat, on wristbands, and in farmworker biospecimens (blood and urine).^{46–71} Using geographic information systems, Summers et al (2015) found that 33% of farmworker housing in North Carolina is “hidden” from view.⁴⁵

There were a few studies that found evidence of *adverse health effects* associated with housing. Most analytic studies were about pesticide exposure.^{46–71} They used surveys to identify specific exposure hazards and proximity to the fields as another exposure category. Close proximity to farming operations resulted in higher pesticide residues in housing and detection of pesticide metabolites in blood and urine.⁵³ One study showed that the use of doormats reduced pesticide residue levels compared to houses without doormats.⁵² In a training intervention to reduce pesticide residue/exposure, Thompson et al (2008) did not find their training to be effective compared to the non-intervention group.⁷¹ A few studies described the use of a Community Based Participatory Research approach to collect exposure data and conduct analytic studies.^{25,39,59,71}

Studies examining the *relationship between exposure and adverse health effects* among farmworkers found several associations. One found an association between mold-moisture and asthma.⁷³ In a study of sleep quality, O'Connor et al (2015) found that 22% of 422 men in Mendota, California, experienced “nervios^a.”⁹⁶ “Nervios” is defined as distress caused by vulnerability to acutely stressful conditions and to a syndrome evoked by difficult life circumstances.⁹⁵ *Nervios* was associated with low income, poor housing, and self-reported depression and stress. In an interview study of 371 Latinx males in NC, Sandberg et al (2014) found that those with air conditioning reported better sleep than those without.⁹⁴ We did not find other quantitatively determined associations between hazards and adverse health effects. Table 2 displays the demonstrated and possible adverse health effects from housing exposures in these studies.

Some publications described farmworker housing as a *site for visits and services* from professionals. These included community health workers visiting for clinical testing or to invite farmworkers for healthcare services in a local clinic.^{43–45} Personnel from public health departments visited to provide general vaccinations. During the COVID-19 pandemic in 2020–2021, visitors to farmworker housing assessed the presence of infection.⁷⁴ In these publications, there were narrative references to crowding as a source of spreading infection with COVID-19.⁸⁵ Records indicate that labor advocates visited farmworker housing, where farmworkers were informed about their labor rights, including occupational safety and health.⁴⁵

Many studies addressed managing COVID-19 among farmworkers, including isolation and quarantine at home.^{74–85} And the remainder of studies in our search covered a wide array of observational descriptions (usually broad narratives) and commentaries (all of which are described, above).^{16–42}

^aNervios is presented in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) as a cultural concept of distress rather than a formal diagnosis. It is described as a state of heightened vulnerability to stress and a syndrome evoked by difficult life circumstances. The concept is particularly relevant for individuals of Latino-Hispanic heritage. Nervios encompasses a wide range of emotional and physical symptoms, including anxiety, sadness, headaches, and fatigue. It may or may not be associated with other mental disorders. Information is sourced from: Center for Substance Abuse Treatment (US). Improving Cultural Competence. Rockville (MD); Substance Abuse and Mental Health Services Administration (US); 2014. (Treatment Improvement Protocol (TIP) Series, No. 59.) [Table], DSM-5 Cultural Concepts of Distress. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK248426/table/appa.t1/>.

There is a large amount of grey literature on farmworker housing and health; it enhanced the findings in the peer reviewed publications.^{97–121} The grey literature includes descriptions of adverse health effects, the social injustice associated with poor housing, policy analyses, frameworks for characterizing problems, identification of barriers to decent housing, case studies of communities and organizations addressing hyperlocal needs, and recommendations for improvement.

The principal housing law in the U.S. is the Housing Act of 1937, which calls for the provision of “decent, safe and sanitary housing.”¹⁰¹ As amended in later years,¹⁰² the U.S. Department of Housing and Urban Development (H.U.D.) defined such housing in the following way (Figure 1):

The U.S. Department of Labor - Occupational Safety and Health Administration (OSHA) has issued a “Housing Safety and Health Checklist” to be used as an aid by agricultural employers, farm labor contractors, and others providing housing subject to requirements under the Migrant and Seasonal Agricultural Worker Protection Act (MSPA) or the H-2A visa program; the agency has issued standards for such housing, e.g. 29 CFR 1910.142.¹⁰³

Some states appear to use this or similar checklists to license farmworker housing. For example, Illinois runs two programs: The field sanitation program promotes the health and safety of agricultural workers by requiring that basic sanitary facilities be available to them.¹⁰⁴ All farm operators who employ 10 or more agricultural workers must provide toilets, hand-washing facilities, and safe drinking water within one-quarter mile of a work site. The Illinois Department of Public Health (IDPH) staff inspects all licensed migrant labor camps to assure that they comply with the state’s Field Sanitation Act; IDPH responds to complaints involving other agricultural operations. Under the migrant labor camp program, IDPH licenses camps that provide housing for 10 or more workers or 4 or more families. Facilities that provide housing for fewer individuals/families are required to comply with the standards but are not subject to licensing. IDPH staff visits each camp at least once before occupancy and once during the operating season to inspect the water supply system, sewage disposal system, food preparation facilities, general housing conditions, fire safety conditions, and vector control.¹⁰⁴ This approach is essentially followed in all 50 states.

The U.S. Department of Agriculture operates the Rural Housing Service and provides limited funding for the improvement of such housing,¹⁰⁵ but farmers often shoulder most of the costs of providing farmworker housing.

In short, regulatory authority for farmworker housing appears to include a largely ill-coordinated combination of federal, state and local agencies, including health departments, occupational health agencies, community development agencies, code officials, farmworker contracting organizations, and others.

The policy analyses we accessed largely cover the issues and items described in the peer-reviewed literature. National approaches include recommendations for new legislation, recommendations for better enforcement, funding programs for farm owners and rural communities to build or upgrade existing housing, and case studies of local actions.^{97–121}

National Housing Surveys

We found three nationally representative housing surveys in the U.S., The American Housing Survey (AHS)¹¹⁸, the American Community Survey (ACS),¹¹⁹ and the American Healthy Homes Survey (AHHS).¹²⁰ The AHS is conducted by the US Census Bureau with funding from the US Department of Housing and Urban Development. AHS has no variables capturing specific farmworker housing information. In AHS, housing for migrant farmworkers is subsumed by “seasonal units”, defined as “units...intended by the owner to be occupied during only certain seasons of the year... Published counts of seasonal units also include housing units held for occupancy by migratory farm workers.” This category includes vacation homes, for example. The ACS measures the changing social and economic characteristics of the U.S. population and contains questions about housing, including occupancy and structure, housing value, costs and utilities. Farmworker housing, per se, is also not captured in the ACS. The AHHS was conducted by the U.S. Department of Housing and Urban Development in 2005–6 and 2018–9.¹²⁰ This survey conducts environmental measurements of lead, lead-based paint (LBP) hazards, pesticides, formaldehyde, and mold in a small sample of homes nationwide. The AHHS is much smaller than the AHS and the ACS and, like the others, does not include variables for farmworker housing. In short, there is a gap in that there is no nationally representative, ongoing survey of farmworker housing.

In 2014, an interdisciplinary conference on farmworker housing quality and health was convened to summarize current knowledge, to conceive next steps in research and policy, and to facilitate the development of working groups to conduct research, education, and engineering projects to improve farmworker housing in consideration of health.^{34–38} The research recommendations from that conference were: to conduct new research assessing housing conditions and health of resident farmworkers and families, and to develop a nationally valid cross-sectional survey of farmworker housing conditions.³⁶

This 2014 conference released a research guideline that recommends a consortium to conduct systematic and comparative research, a standard core instrument, basic health measures of health and housing characteristics, work with architects and construction specialists to guide design and construction of high quality housing, and policies on the number of housing units needed, location and ownership.³⁶ Policy recommendations included housing standard revisions, strengthening code enforcement, and further training for public health and healthcare providers on how to ask about and consider housing. They recommended a data collection system to monitor housing effects and financial incentives to underwrite and develop affordable, high-quality housing, in addition to more research.³⁵ The group addressing the role of social factors recommended a more holistic view of housing that includes social and community benefits in design decisions, consideration of crowding, noise, and unsafe housing, as well as isolation to reduce stress, improve social networks, and support healthy behaviors.³⁷ Our review includes the publications of the individuals participating in this conference and the articles they reviewed. A decade later, we find the same problems and needs called out in subsequent peer-reviewed and grey literature.

The situation of farmworker housing provides a unique opportunity to study the impacts of housing on physical and mental health, and, importantly, the effect of short tenure

and temporary residence, as well as the interaction with other social determinants. While complicated to execute, it would be possible to stratify farmworkers by social and residential characteristics and, using new technologies (e.g., WhatsApp, QR codes, wearable monitors, cellphones) and methods (e.g., enrollment in cohort studies—CHAMACOS),¹⁰⁷ to follow their exposure and health status over time. Ethical considerations and participatory approaches are well described for this population, but are beyond the scope of this review.

We catalogued factors explicitly studied or mentioned in the narratives (Table 3), identified characteristics of farmworker housing for consideration in developing a rational plan aimed at research on the relationship between housing and health and on creating and enforcing healthy and safe housing for farmworkers, regardless of the length of occupancy in the housing (Table 4). Regarding government involvement, we looked for legislation in our own state, Illinois. The agencies, roles, and regulations we identified can serve as a template for other states in the U.S. Globally, policy and enforcement are likely reflected in a different organizational scheme and may not correspond with U.S. approaches.

There are practical efforts in the U.S. to develop healthy housing for farmworkers, both on and off the farm, largely because of the importance of a healthy workforce in supporting a healthy food supply. The U.S. Department of Agriculture provides funding opportunities to build or preserve housing for farmworkers.¹⁰⁸

Viewing healthy and safe housing as a right, the World Health Organization Housing and Health Guidelines recommend addressing crowding, indoor cold and insulation, indoor heat, home safety and injuries, and accessibility, and has issued previous guidelines on other housing factors.⁶ While these guidelines seek optimal housing standards that promote and preserve the health and well-being of occupants, they recognize that the context of local needs and priorities—feasibility, acceptability, need, and resources—are also important. The WHO housing and health guidelines do not address farmworker housing specifically.⁶

Based on the information presented, above, Table 3 provides a summary of issues to be considered in developing studies, implementing changes, and adjusting policies to address housing in all aspects, with the goal of improving the health and well-being of tenant immigrant and seasonal agricultural workers.

Farmworker Housing and Health: A Framework to Guide Research and Policy

Using all references, peer-reviewed and grey, we created a table to enumerate items and issues that are critical to include in a farmworker housing and health framework. We also reviewed existing models related to social determinants and worker health.^{124–129} Table 4 provides an extraction of individual characteristics, either investigated directly or mentioned in narratives and policy documents we reviewed; these are grouped by themes. Based on this review, we propose a model that organizes the factors that influence the health and well-being of farmworkers vis-à-vis housing conditions while working in agriculture (Figure 1).

The box on the left (in **black** color, solid thin line) shows the structural and social determinants that drive individuals to work in agriculture, to immigrate, and to reside in temporary housing associated with their work. These items are extracted from the WHO Social Determinants model² and adapted to include the factors mentioned in the grey literature and the narrative sections of the peer-reviewed literature. Social determinants--economic stability, social context, gender, education--are enhanced by items connected with immigration, including reasons for immigrating and legality of working in the destination country. These are important for considering how to adapt or generalize the Framework to countries that address immigration and employment differently than the U.S. Issues of personal resilience and social supports related to travel are likely to influence the outcomes of the experience, as measured, ultimately, by good health and well-being.

The focus and findings aggregated from the peer-reviewed studies are shown in **red/dashed line** in the model. These include the items related to the housing itself, as they impact physical and mental health and delineate the hazards experienced by farmworker occupants.

Items that relate housing to the employer and employment are shown in **green/small dotted line**. Who controls the housing, how rent is paid, separation from outdoor hazards (e.g., pesticides, noise), the proximity of the employer to demand overtime work or determine who can come into the housing, the inability to separate from co-workers--and even the farm labor supervisor, in some cases--certainly influences the mental health and well-being of resident farmworkers. These items are immediate and undoubtedly important yet not included in the research on farmworker housing and health.

External social challenges, underlying and situational health challenges, and challenges related to immigration status (in **blue/large dotted line**) interact with the other, preceding factors described above. Anticipation of what comes after the current temporary job, regarding housing security, income, and immigration status, would be expected to influence mental health.

Finally, the "well-being" construct, in **purple-thick solid line**, has been described in various ways across disciplines and is referred to in many of the referenced studies. Indeed, the U.S. National Institute for Occupational Safety and Health is working on such a definition as applies to workers.¹¹² A clearer definition that more clearly characterizes workers' health and the quality of their lives is needed to ultimately measure housing's impact on farmworker well-being. The details are beyond the scope of this review.

Limitations

There are limitations related to this work. First, we may have missed relevant peer reviewed studies in our search. There is a vast array of literature on farmworkers across disciplines; these use descriptors that are uncommon in public and occupational health and do not call out housing in the key words. We included several review articles^{31,32} and publications from a workshop³⁴⁻³⁸ that likely covered the majority of characteristics of farmworker housing. Second, we selected English language and largely U.S. based studies; the work is, therefore, applicable mainly in the U.S. To include and scrutinize determinants and issues related to the

farmworker population, housing stock and housing norms in other countries would require a similar analysis, extracting data from local literature. Still, our approach can serve as a model for creating such a framework, and the proposed framework can be considered as a basis for comparison in places outside the U.S. Finally, selection of grey literature and searches using internet search engines run the risk of “cherry picking” relevant articles that could over- or under-emphasize important components. We did not weight any of the items in terms of importance. Government regulations and the three national surveys stand on their own, in terms of informing aspects of the framework. We tried to review the work of major organizations^{16,28,29,106,110,113,117,121} and typical legislation^{101–105,108–9, 111–112} to describe farmworker housing issues. It will take additional research by us and others to flesh out the model we have presented and to develop a research agenda--to design the studies and determine the measures needed to protect the health, well-being, and human rights of farmworkers in the U.S. and worldwide.

Measuring hazardous exposures in farmworker housing and their adverse health effects, modified by length of occupancy, genetics, behavior, and sociocultural factors could certainly contribute to our overall understanding of housing and health, though attending to health norms and human rights should not wait for those studies.

Conclusions and Recommendations

These are the key takeaways from this work:

The structural and social context that drives immigration for employment in agriculture leads directly to the complexities of farmworker housing. Approaches to addressing these systemic drivers of good/ill health and wellbeing require careful consideration and targeted approaches that are beyond the scope of this review.

Housing hazards are well-known, predictable, and easy to identify using existing guidelines and applying results of research on prevention of hazardous exposures. This includes both physical and mental health challenges. Following legislative mandates and inspection protocols should protect farmworkers’ physical and mental health and well-being. External social supports, including visits to housing for social (including health) support and advocacy should promote good health and well-being. At present, a number of organizations conduct outreach to farmworkers including Community Health Workers employed by local health systems, legal services organizations, the Mexican Consulate (in Illinois), workers’ rights groups, Extension agents, and personnel from academic centers who are funded to do outreach and education. Messaging and training focus on improving farmworkers’ health and well-being and realizing their legal rights. Health and well-being topics may include improving workplace health and safety, addressing general health issues (e.g., first aid, prevention of common work related illnesses and injuries, lifestyle changes to promote good health, mental health) and healthcare access. Farmworkers’ rights information may relate to employment, immigration, and healthcare legislation and how to access legal advocacy and healthcare. Training of health and social service providers to understand the needs of farmworkers more holistically, outside these providers’ usual, limited focus, and setting up a robust referral network that crosses a wide array of services would greatly improve

their effectiveness. For example, 211 services—24-hour helplines that link residents to crucial, local resources—are available in all 50 states, limited by counties and funding. 211 services should be expanded across the states and should specifically include the needs of farmworkers and other rural populations.

A variety of health challenges were identified in this review. The interaction of housing and employment conditions—ownership, agency, safety, privacy, and separation from work—should be legislated in ways that are favorable to the health and well-being of farmworker occupants. For example, farmworkers should have the right to receive visitors and services without the permission of the owner, operator, or employer; this right is protected by the first and fourteenth amendments to the Constitution. State laws can provide additional protections or limitations, however, their implementation and enforceability can vary depending on state and federal court decisions. For example, employers have legally imposed “reasonable restrictions” on visits, such as those related to reasonable hours. The rights of H-2A guest workers differ due to legal challenges in several states. Although there should be uniformity in the way all farmworker housing is legislated, rather than a piecemeal approach by state and by immigration status, the current tensions surrounding immigration and state vs federal governance make this inconceivable in the foreseeable future. Farmworkers whose housing is registered with the state should receive clear and regular communications regarding their housing rights. A reporting mechanism should be implemented such that service providers do the reporting of being treated as a trespasser, rather than the worker risking their employment by reporting the violation.

As another example, there is a patchy array of legislation and enforcement at the federal and state levels that should be harmonized, first by assembling stakeholders (economists and legal services, included, along with workers, housing owners, employers, staffing contractors, state agencies, advocacy groups) to: clarify the agenda; review current legislation, research, and best practices documents; and make recommendations for practical approaches, legislation and enforcement. Given the critical importance of human rights and the food supply chain, the federal government should fund a National Academies summit or contract a nonprofit “think tank” to lay out an agenda for change. While prohibitive in the current political environment, supporting subsequent legislation at the federal and state level to harmonize and leverage best approaches could improve effectiveness and reduce costs by streamlining governance, avoiding conflicting regulations, and leveraging best practices across jurisdictions.¹²² Differing priorities and political divides would have to be overcome.

An important consideration for research and prevention is tenure--the period of time farmworkers spend in housing. Very short tenure is generally less hazardous than long tenure, given the difference in length of exposure to toxicants or psychosocial challenges. Research on hazardous exposures that cause long-latency diseases, like cancer and heart disease, requires careful measurement and documentation of dose—the level and length of exposure. Secondhand smoke is a common source of such exposure. Not discussed in this literature is provision of food by the employer. In many cases, employers bring in meals or accessibility of grocery stores is limited. Long-term employment as a farmworker can influence chronic conditions, such as cardiovascular disease. Tenure should be considered in research and in comparisons of one farmworker group to another.

There are situational health challenges—workplace injuries, substance use, STIs, presence of children with parents (some very young, some working age), that may be aggravated by isolation and substandard housing conditions. These would certainly interact with unhealthy housing to produce ill health and ill-being. Engagement of public health and occupational health and safety providers in enforcement and support roles could alleviate these conditions and promote good health. While diseases, disabilities, and medications could further challenge unhealthy housing, there is likely to be a healthy worker effect – those that migrate and work in agriculture are likelier to be a healthy workforce. Immigration challenges include variable work authorization, which discourages “speaking up” to address poor housing conditions; practices in 2025 that discourage immigration and make immigrants fearful are likely to exacerbate this problem.

According to the USDA Census of Agriculture, most farmworker in the U.S. are settled in the U.S. and work seasonally in agriculture; they do not move across the border.¹³ Housing and employment insecurity, long distance from home, low income (sometimes due to low wages and often due to very short-term employment), and lack of health insurance and other social benefits are, intuitively, major stressors that are likely to impact mental, if not physical, health. Supports for healthy housing, and attention to the other factors listed, are important to protect the health and well-being of this essential workforce; they also are required of a just society that benefits from their work.

Housing remains challenging for agribusiness and family farmers due to financial costs, inadequate regulations, the requirement to meet standards, and the need for year-round upkeep, even though the housing is occupied for only part of the year. Legislation and regulations are already in place requiring the provision of healthy housing for farmworkers. There is also support for rural housing and for employers of temporary farm labor. Ability to access this support and enforcement of the rules are critical.

The UN Social Development Goal (SDG) 11.1 outlines the need for safe and affordable housing, ensuring access for all to adequate, safe and affordable housing and basic services, and the need to upgrade slums.¹²⁵ While some hired farmworkers live year-round in rural areas and within 50 miles of their work, most do not. The temporary housing required for seasonal agricultural work is not covered by SDG 11 despite the common features of this economic activity around the globe. Every region of the world employs domestic or cross-border labor migrants to do hard work for low wages to support its local food supply chain and, in many cases, sustain the global food trade. Given the phenomenon of global labor migration in the agriculture sector and common features attending this phenomenon, it is critical for global actors—WHO, UN, ILO, World Bank, others—to address the challenges for housing and health in farmworkers. WHO should continue to advocate for minimum international housing and sanitation standards for farmworkers to prevent adverse health effects, including the spread of infectious diseases and mitigating risk factors for chronic diseases and poor mental health.¹²¹ The United Nations Human Rights Council should publish reports and official statements to highlight farmworker exploitation and housing issues and work with governments to strengthen enforcement of international housing standards. The World Bank should direct funding to improve housing infrastructure and promote policies among recipients that protect farmworkers.

Within individual jurisdictions, policy reforms, intersectoral collaboration, data collection and monitoring, and empowering farmworker communities would, additionally, contribute to improvement of housing conditions. Recommendations to this effect should be made by the global entities listed above.

There is a growing body of literature across disciplines on housing and health and there is increasing legislation to address gaps for disadvantaged populations. However, there is limited literature on housing for rural, transient, poor, and immigrant populations. There is also a dearth of information on scenarios where housing is entwined with employment. Migrant and seasonal farmworkers' experience—even embody—all of these characteristics and an understanding of the relationships between housing and health in the context of employment can serve to render a healthier and more just framework for supporting their health and well-being. This model is a starting point for interrogating the relative weights and interactions between social determinants, farmworker housing, and health.

Farmworker housing needs much more attention from researchers, policy makers, agribusiness, healthcare, and financial institutions to understand and better target resources and other supports in a way that protects the health and well-being of this essential workforce and promotes the sustainability of our food supply. Importantly, farmworker participation in research to study relationships between hazardous exposures and health outcomes modified by social factors, can elucidate contributors to health outcomes, in general. Ethical conduct of such research is critically important, though not elaborated on in this broadly focused review. And, of course, interventions to protect the health, well-being, and human rights of the agricultural workforce should not be delayed for such research. Based on our review of the, mostly, U.S. literature, we offer a framework—Housing as a Mediator/Contributor to Farmworker Health and Well-being—to spur research, practice, and policy that supports this essential workforce and the US food supply chain.

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25 CFR § 700.55 - Decent, safe, and sanitary dwelling

1. Meets applicable federal, state, and local housing and occupancy codes; including but not limited to the Uniform Building Code, National Electrical Code, ICBO Plumbing Code, the Uniform Mechanical Code, HUD Minimum Property Standards, and HUD Mobile Home Construction and Safety Standards (24 CFR part 4080).
2. Is structurally sound, clean, weathertight, and in good repair and has adequate living space and number of rooms.
3. Has an adequate and safe electrical wiring system for lighting and other electrical services where economically feasible.
4. Meets the requirements of the HUD lead-based paint regulations for federally assisted and federally owned housing (24 CFR part 35) issued under the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4831et seq.) and Title X of the 1992 Housing and Community Development Act (this section 4 was added in 2010).
5. In the case of a physically handicapped person, is free of any architectural barriers. To the extent that standards prescribed by the American National Standards Institute, Inc., in publication ANSI A117.11961 (R 1971), are pertinent, this provision will be considered met if it meets those standards.
6. Has heating as required by climatic conditions.
7. Has habitable sleeping area that is adequately ventilated and sufficient to accommodate the occupants.
8. Has a separate well-lighted and ventilated bathroom, affording privacy to the user, that contains a sink and bathtub or shower stall, properly connected to hot and cold water, and a flush toilet, all in good working order and properly connected to a sewage drainage system.
9. In the case of new construction or modular housing, complies with the energy performance standards for new buildings set forth by the US Department of Energy. Importantly, this definition placed compliance with housing codes first.

Figure 1.

U.S Dept of Housing and Urban Development Housing Definition

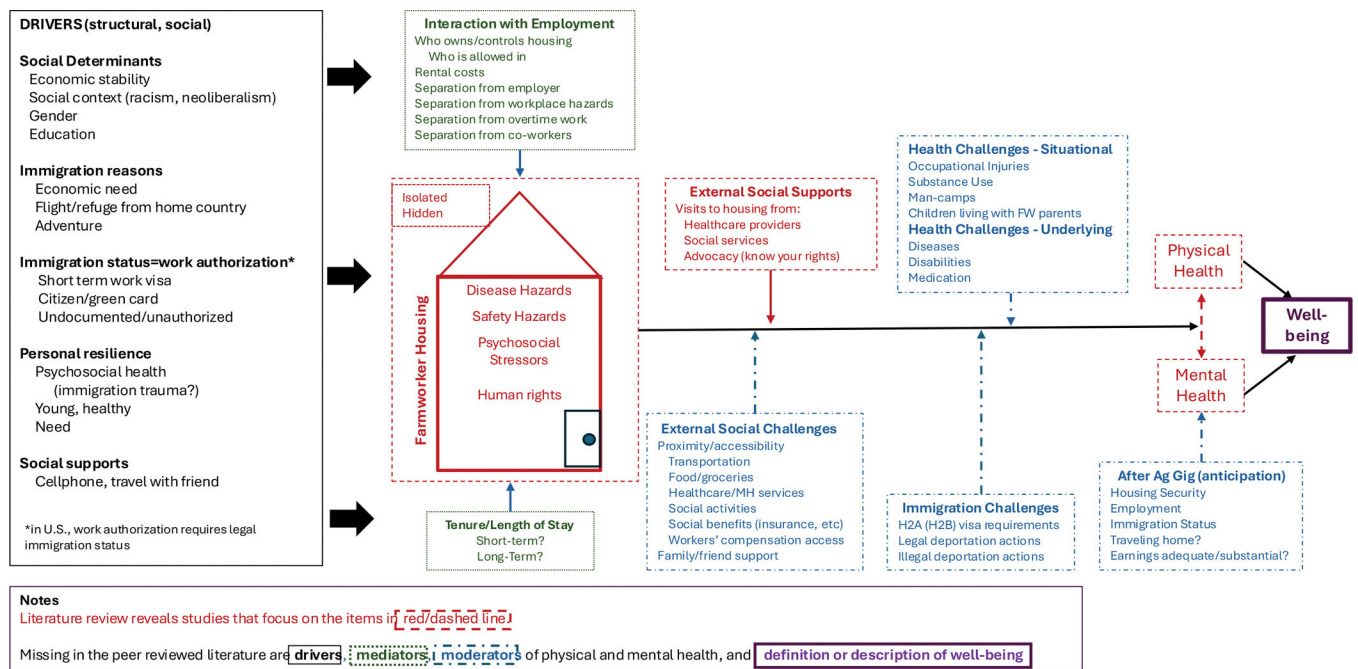


Figure 2.
Housing as a Mediator/Contributor to Farmworker Health and Well-being

Table 1.

Description of exposure hazards in farmworker housing.

Hazard type	Noted problems
Physical	Inadequate heating/cooling, ventilation (window dysfunction), lighting, noise
Biological	Crowding—infectious diseases, mold and moisture, no screens (insects), potable water, working plumbing, adequate refrigeration (food spoilage); man-camps→STIs
Chemical	Pesticides, disinfectants, secondhand smoke
Injury/ ergonomic/ general safety	CO/smoke detectors, alarm systems, electrical hazards, fall hazards, ladders for bunk beds, damaged flooring
Psychosocial	Crowding, lack of privacy, living with strangers, family separation, no community, work and home coalesced (living with crew leader), nowhere to safely store property, “lights out” time, internet/telephone access to communications
Miscellaneous	<i>Lifestyle:</i> Lack of refrigerator, access to healthy foods, accessibility to services, low social capital, “man-camps” →coercion, access to alcohol & substances <i>Labor rights:</i> forced overtime, no sick leave, low minimum wage, pay by pound, child labor <i>Access to services:</i> health care, emergency services, preparedness

Table 2.
Adverse health effects associated with farmworker housing

System	Symptoms, signs, diagnoses
*Mental Health	Stress, depression, anxiety, “nervios”
*Neurologic	Sleep Quality; Concussion, neuropathy, chronic diseases
*Respiratory	Asthma
Cardiovascular	Hypertension, atherogenesis
Musculoskeletal	<i>Acute injury</i> : fracture, contusion, acute strain, <i>Chronic injury</i> : repetitive sprain/strain <i>Body sites</i> : upper extremity, low back, upper back, neck
Dermatologic	Rash, contact dermatitis, sunburn

* Topics with analytic studies looking at associations between exposure and adverse health effect

Table 3.

Summary of issues to be considered in developing studies, implementing changes, addressing policies to improve farmworker housing

GENERAL OBSERVATIONS FROM READING LIT, VISITING, TALKING TO KEY INFORMANTS	Few states have conducted any research on this topic: WA, CA, OR; NC has by far the most There was a summit in 2014 (Arcury,2015) Housing issues could be very different in different states – weather (need for insulation, heating, cooling), crops, harvest season, proximity to border, remoteness, culture/ethos Legislation on FW housing is spread across multiple agencies Many different agencies and NGOs visit or vet FW housing Regulatory framework for FW housing (and possibly worker housing, in general) is ill-defined.
STUDY TYPES (peer reviewed lit)	Focus groups (very few) Key informant interviews (many) Observations with check lists (many) Individual FW surveys (attempted representative samples); some about housing, their perception of housing, and adverse health effects especially mental health Descriptive studies: environment sampling, biospecimen sampling
STUDY LIMITATIONS	Sampling is problematic because of the way FWs and their housing are identified (“labor camps” is a lot of it) There are some standardized survey instruments/tools that have been validated elsewhere (mental health tools, for example) Most survey tools have not been validated in this workforce All surveys are in Spanish; leaves out indigenous workers There was one intervention study of FWs, specifically
NATIONAL SURVEYS	USHUD’s American Housing Survey includes housing quality; does not identify farmworkers USCB American Community Survey includes demographics and economic issues; does not identify farmworkers There are several national that have a question about housing, but these are largely outdated or capture a representative sample or the questions are extremely limited. (USBLS, USDOL, USDA, others)
HOUSING PROTOTYPES	Labor Camps – cluster of buildings with multiple farmworkers or families living in individual units Re-purposed dwellings, like motels or vacated rural apartments Mobile units/homes, single or clustered More primitive/homeless type shelters: cars, buses, tents Tenant in another person’s home Are there local shelters for workforce development that FWs occupy? FWs’ usual home with a daily commute to work (the surveys distinguish whether the commute is > or < 75 miles or 50 miles)
WHO PROVIDES HOUSING	Employer (small farm owner; large farm business); could be employer-owned or employer rented Workers find dwelling on their own Government – often local, city, state, federal Rent may or may not be paid by the worker in each of these
LENGTH OF TIME LIVING IN THE HOUSING	Temporary – weeks, months (this will be different by state due to growing season) Permanent or long term (length of exposure to environmental and psychosocial hazards will be important in assessing risk)
HOUSING INFRASTRUCTURE	Regulations and checklists are about structures, integrity of materials, no. of toilets, kitchen facilities, safety (locks, secure storage of belongings) Moisture, mold, mildew, pesticide residue, other chemicals, rodents, trash; heating, cooling, ventilation Clean water
PHYSICAL SAFETY	From injuries – unintentional and intentional
HAZARDS	Biological Chemical Physical Ergonomic Psychosocial
PSYCHOSOCIAL FACTORS	Crowding – shared bedrooms, bathrooms, shower, kitchen, living space Living with strangers vs. family members vs friends Lack of privacy Behavior must conform to the group (lights out in dormitory) Multiple people have access to workers’ belongings (locked storage, locked door to building) Living with boss—crew leader or farm labor supervisor Social Capital No line between work and home Subject to employer oversight all the time Accessibility to social settings—church, saloon Accessibility to green space – parks, water, places to walk

BASIC GOODS & SERVICES	Accessibility to services (proximity, transportation availability) Accessibility to healthcare, specifically Accessibility to grocery for food Food provision by employer
IMMIGRATION STATUS	H2A, settled, shuttlers/migrating; how is housing different for each?
GOV AGENCIES THAT OVERSEE ± INSPECT± CONNECT WITH FW Housing	HUD- Rural Housing & Economic Development (RHED) What Is It? The RHED grant program funds activities to build capacity at the state and local level and economic development in rural areas. Who Can Apply? Rural nonprofits, community development corporations (CDCs), state housing finance agencies (HFAs), state community and/or economic development agencies, and federally recognized Indian tribes. IDPH/State Health Depts. https://dph.illinois.gov/topics-services/environmental-health-protection/migrant-labor.html Local Health Depts. Outreach for vaccinations OSHA https://www.osha.gov/laws-regs/mou/1978-04-19 USDA/IDAg. https://www.rd.usda.gov/files/3560-1Chapter12.pdf IDES/State Unemployment Insurance agency. https://ides.illinois.gov/jobs-workforce/programs/migrant-seasonal-farm-workers.html (no housing scope) Illinois Migrant Council. https://www.illinoismigrant.org/programs/housing.htm IDHS.(not housing specifically). https://www.dhs.state.il.us/page.aspx?item=159538
LEGISLATION THAT GOVERNS FW HOUSING – FED, STATE, LOCAL	IL Migrant Labor Camp legislation: https://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=1240&ChapterID=21 DOL. https://www.dol.gov/agencies/whd/agriculture/mspa
RESEARCH QUESTIONS	• What is distinct about Illinois vs other states • Studies of housing-related exposures and diseases/adverse health effects • Relationship between housing and mental health • Interaction of housing determinants and other factors/stressors (immigration, employment, general health, ACES/histories) • Impact of identified exposures over the lifespan (how does short term, intermittent exposure impact long term health outcomes; issues for children, teens, young adults, elderly) • How is FW housing different from that of other precarious workforces, informal settlements—FW-type housing is not included in SDG 11; we could map this onto SDG 11 or advocate for a sub-category that currently does not exist, since there are migrant and seasonal farmworkers all over the world • Impact of crowding: forced to socialize w group, privacy, infectious diseases, autonomy, independence • “Man-camp” setup; risks for substances, STIs, mental health issues • Substance use

Table 4.

List of variables captured in the peer reviewed and grey literature on farmworker housing and health—either as part of research, or mentioned in narratives

Categories	List of variables/issues across all the studies
Demographics and social issues	• Age • Race • Sex • Married or living as married • Children/family (accompanying or supporting at a distance) • Country of origin • Indigenous status (framed as linguistic issue) • Language • Education
Legal characteristics	• Immigration status (H2A, citizen or permanent residents, illegal residence in U.S.) • Work authorization (H2A-authorized, authorized, unauthorized)
Housing characteristics	• Crowding – space per person • People per room/sleeping arrangement • Available gathering space • Kitchen facilities (# kitchen violations; list 15) • Bathroom facilities (#people per toilet, per shower) • Interior structural problems • Exterior structural problems • Water quality • Number of violations of regulations • Number of inspections • Storage space • Safety • Feeling of safety/security • Privacy • Physical isolation of housing (“hidden”)
Social characteristics attached to the residence	• Who owns the housing (trespassing issue) • Does farm labor supervisor live with workers? • Who pays the rent; how is it paid (e.g., extracted from paycheck?) • Key to the house—who has one? • Separation of housing from work (forced overtime?) • Temporary/short-term vs long term residence
Other exposure or interacting factors	• Transportation availability • Proximity to services, people, town • Social networks • Separation between work and home (work-life balance)
Adverse health outcomes	• Mental health • Stress • Depression • Anxiety • Alcohol use • Heart disease • Sleep • Infectious diseases • Other chronic diseases (cancer, neurological diseases) • Well-being
Miscellaneous	• Site for Community Health Worker visits • Group training in housing sites (eg, occupational safety and health, pesticide Worker Protection Standard, health) • Site where studies can be done –cohorts, intervention studies • Site for quarantine/isolation in infectious disease • Site to inform workers about their rights