

Migration, Work, and Health: Mapping the Evidence

A systematised review of the global literature on the interrelations between migration, work, and occupational health inequities

Working Paper WP2

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Introduction

The associations between peoples' work and their health have been extensively researched. There is also a substantial body of evidence on links between migration and health. However, little research has been dedicated to interrelations among all three dimensions: migration, work, and health risks and outcomes.

This working paper aims to provide an overview of the current state of knowledge on the interrelations between migration, work, and health. As such, it is intended to inform the Public Health research guidelines that are to be incorporated in the DignityFIRM Research Handbook (D2.3), and to serve as an evidential basis for the DignityFIRM consortium partners' work. To this end, we have mapped the existing evidence on associations between migration, employment/work, and health.

Methods

We conducted **two systematized searches in two databases** (PubMed and Web of Science) for a) published review papers on migration, work, and health (search A), and b) for any academic publications on migration, work, and health in the food supply chain industries (search B).

For search A, our search strategy comprised search terms (incl. synonyms, MeSH terms, truncations) for the concepts "migration", "work", and "health" (for the full list of search terms, see Annex, table 1). We included only academic (peer-reviewed) publications that are systematic or non-systematic reviews, and that were published since 2018 in English language. For reasons of feasibility, we excluded gray literature, empirical and conceptual research, publications in languages other than English, and publications from before 2018 (for a full list of in- and exclusion criteria, see Annex, table 2) – for one exception: due to its fit and relevance, we did include one article from 2007 (1).

For search B, our search strategy comprised search terms for the concepts "migration", "work", "health" and "food supply chain industry" (for full search strings, see Annex, table 3). We included only original empirical research of any research design as well as review papers that were published in academic (peer-reviewed) journals. All other in- and exclusion criteria are identical to those applied in search A (for a full list of in- and exclusion criteria, see Annex, table 4).

The identified literature was screened by one researcher (ME) in a two-stage screening procedure:

First, after removing duplicates, the titles and abstracts of all identified records were screened based on the in-/exclusion criteria to exclude all non-relevant publications. Second, the full texts of the remaining records were retrieved and screened, based on the same in-/exclusion criteria. Of those papers that were included, both researchers (ME, NG) extracted bibliographic information, study characteristics, and main results into an EXCEL table. This data was used (by NG) for the following description of the scope of the existing literature and a narrative synthesis of its main results. An overview of the included papers for search A and search B, respectively, is displayed in slightly condensed form in the annex (table 5 and table 6).

The following paragraphs each summarize the study characteristics and main reported research findings, first for the review of reviews on migration, work, and health (search A), and then for the review of literature on the health risks and health outcomes of migrant workers in food supply chain industries (search B).

Results

Search A: Review of reviews on migration, work, and health

Search A yielded N=931 initial hits. N=906 records were excluded after screening titles and abstracts, and N=7 records after screening the full texts. N=17 review papers were eventually included in the analysis, most of them analysing between 18 and 30 primary studies.

Study characteristics

The included articles were primarily published in journals from the disciplines of occupational and environmental health and public health generally, and less frequently in journals from migration health, migration studies, and work science. Eleven articles have a global geographic scope; six focus on one or several high-income countries, mainly in Europe and North America. Two studies examine the interrelations between work and health among asylum-seekers and refugees; the remaining 15 articles mostly describe migrant workers or labour migrants as their target population. Few articles focus on employed immigrants. (In the following, we will use the term “migrant worker” for better readability. For a reflection on limitations related to definitions and terminologies, see the Discussion section.) One article, each, focuses on farmworkers and on the construction sector. The remaining articles have no specific sectoral focus. Nine articles examine health risks and outcomes generally (incl. physical and mental health), three articles address specifically mental health, and three articles examine interventions for improving migrant workers’ health. The remaining papers focus each on a specific health or social issue (coping with stressors, quality of life).

Synthesis of the reported results

Occupational health outcomes among migrant workers

The included review papers unanimously report high occupational health risks for migrant workers. Migrant workers face a high incidence of injuries, incl. fatal injuries, for example from heavy lifting, falls, dangerous equipment, and exposure to repetitive motion (1–8). They show a high prevalence of occupational illnesses such as respiratory illnesses, dermatitis, and cancers (1,6). A meta-analysis by Hargreaves et al., for example, finds that *“47% of international migrant workers had occupational morbidities, and 22% of migrant workers had reported a workplace injury or accident”* (4, p. e878-879). The authors further indicate that the mortality risk from injuries may be higher among migrant workers compared to non-migrants. The included reviews note frequent occupational exposure to air pollution and toxins such as pesticides, detergents, and biohazards (1,2). For instance, Moyce and Schenker describe detectable levels of pesticides in urine in up to 97% of migrant farmworkers (6).

Migrant workers show high rates of mental health issues such as depression, anxiety, substance consumption, and suicidal thoughts (2,4,6,8–11). A meta-analysis by Hasan et al. 2021, for example, finds a prevalence of 39% for depression and 27% for anxiety (12). Notably, the reviews on work and health among asylum-seekers and refugees point out that being employed is generally good for the mental health of forced migrants; however, this positive potential is significantly moderated by the particular employment and working conditions (5,13).

Determinants of occupational risk among migrant workers

The literature is consistent about the factors that increase occupational health risks for migrant workers: Migrant workers’ precarious status and their relative lack of power vis-à-vis employers and other relevant actors are described as core problems (3,6,10,11) that lead to a cascade of occupational exposures and risks. Power imbalances channel migrant workers into the most dangerous, dirty and degrading (DDD) industries, jobs, and job tasks – for example in terms of weather exposure, ergonomically challenging work, dangerous equipment, and low job prestige (1,2,6) – as well as into precarious employment arrangements (3,6,8,9,11–13). Many reviews point to insufficient or lack of safety training, also in the context of transient jobs and high turnover (1,14). A low safety culture and frequent breaches of occupational safety and health protocols by employers and workers (6,12,14) are also noted in the literature as common factors that increase migrant workers’ occupational health risks. Language barriers further undermine the effectiveness of occupational safety and health measures like trainings, instructions, and warning signs (1,6,14). High levels of time pressure and stress at work are described as further important risk factors; they are related to employment- and work arrangements such as per-piece payment or high line speeds in manufacturing (6). Long, unusual and/or unpredictable work hours further tend to increase the risk for injuries among migrant workers (11,13).

Several reviews report that, oftentimes, migrant workers fear retaliation from employers, managers, and supervisors and thus forego demanding better working conditions or trying to assert their rights (1,11,14). Generally, the rate of exposure to bullying, abuse, and violence is high among migrant workers (2,6,8,11,12). Exposure to discrimination is reported in several studies (2,3,8,13). Inadequate housing conditions have long been described as a widespread problem among migrant workers, since a first study among migrant farmworkers in the USA in 1931 (6,15). Combined, the above factors compound the risks to the physical and mental health of migrant workers.

The included articles are consistent regarding migrant workers' insufficient access to healthcare and social security benefits such as paid leave, compensation, and pensions when ill, injured or disabled (1,7,9–12). Access to other institutional social support such as unionization or legal counseling is similarly problematic (9,11).

There is a lack of systematic data on migrant worker health, inter alia due to their exclusion from routine monitoring mechanisms, the fragmentation of relevant data across different sectors (e.g., health, labour, social affairs), significant problems with underreporting, and low utilization of (i.e., low realized access to) healthcare services. As a result, existing data may underestimate or actually obscure the true scope of migrant workers' health problems (e.g., if low healthcare utilization is mistaken for low need). This lack of data and visibility of migrant workers' health needs, in turn, translates into a paucity of targeted public health attention and efforts (1,15).

Research on resources and interventions to improve migrant workers' conditions is extremely scarce. Some review papers refer to secure legal status, access to health insurance and social benefits, a permanent work contract, full-time employment, and personal resilience as protective factors without specifically analysing data from intervention-studies (12,13,16). Among the three included reviews that explicitly analyse interventions, two focus on individual-level interventions: one review synthesises the effectiveness of health promotion interventions (i.e., interventions addressing health behaviours such as alcohol and substance consumption, diabetes management, oral hygiene)(15). Another one analyses the effectiveness of occupational safety and health trainings (14). Only one review refers to interventions on a structural level (17). It was able to identify only two relevant studies that tested the health effects of improved access to health insurance and social insurance. Both studies show positive associations with migrant workers' health outcomes.

Search B: The occupational health of migrant workers in farm-to-fork industries

Search B limited the focus of the literature search specifically to farm-to-fork industries; i.e. agriculture, logistics, warehousing and transportation, manufacturing (food processing), wholesale and retail food sellers, hospitality, delivery, and waste management. It yielded N=330 hits, out of which N=296 records were excluded in the title/abstract-screening and 1 record after screening the full texts. This resulted in N=34 records to be included in the analysis.

Study characteristics

The included papers address almost exclusively migrant farmworkers as their target population (N=31 papers). Two studies focused specifically on child farmworkers and one study on women farmworkers. Only three papers did not focus on farmworkers, one of which looked at the health effects of refugee-centered farming initiatives in the USA (18); one study compared COVID-19-related health risks among foreign- and US-born workers in poultry slaughterhouses (19); and one paper examined refugee entrepreneurship in the food industry in Turkey and the UK (20). Given this skewed distribution, the following synthesis relates largely to study findings on migrant farmworkers' occupational health.

Two-thirds of the included articles (N=23) focus on a US American context (specific states or the USA as a whole); two more articles focus on the USA and Canada. One article has a global geographic scope and six focus on one or several high-income countries and/or regions (e.g. Italy and Spain, Europe, or several countries in Europe, North America, Oceania, and Asia). Only three articles stem from low and middle-income countries; namely Turkey and South Africa. Most articles were published in journals for occupational and environmental health or migrant and minority health, with few other journals representing other disciplines such as sociology, migration studies, social work, nutrition, and demography.

In terms of the social and health issues addressed, the most frequent focus was on occupational health risks and outcomes (N=11 articles) and COVID-19-related health risks (N=7 articles). Five articles tested interventions for the improvement of farmworkers' health; four papers described community-based health promotion initiatives; and three articles each focused on mental/psychosocial health and heat-related injury. Further topics were respiratory health and air pollution, housing, migrant workers' food security, access to health and social support, and legal status/ irregularisation (N=1 article each).

Synthesis of reported research findings

Occupational health outcomes among migrant workers in farm-to-fork industries

The existing literature is consistent about the high risk of poor occupational health outcomes faced by migrant workers. The included articles report high rates of occupational injuries such as traumatic, musculoskeletal, dermatological, and heat injury (21–25). For example, Panikkar & Barrett (2021) report that among a representative sample of dairy farmworkers,

“77% of workers reported being harmed from a musculoskeletal risk... Of these workers, 82% reported having pain in the back or neck from moving or carrying heavy things. Additionally, 58% of workers reported being harmed by repetitive movement and 73% also had pain in the back or neck from repetitive movements.” (27, p. 14)

Only one study (27) finds that migrant farmworkers report less chronic conditions and pains than naturalised citizen workers; and workers with irregular status less than workers with legal status. Yet, this may be due to underreporting and/or low realised access to healthcare among migrant workers and especially under conditions of irregularity.

Occupational illnesses and pre-existing conditions such as infections, asthma, cardiovascular disease, diabetes, and cancers are also described as highly prevalent (23,25,28–31). In particular, several studies note a high risk of acute and chronic respiratory disease and related mortality (23,25,32). In the same context, the included studies describe a high prevalence of exposure to toxins and pollutants such as pesticides, dust, chlorine, and other chemicals and biohazards (23,28,33). The above-noted study by Panikkar & Barrett (2021) among migrant workers employed in dairy farming reads:

“[A]round 83% of workers reported experiencing harm from a chemical or biological risk..., half the workers complained about health concerns due to exposure from iodine, acid, or formaldehyde... The 2019 survey results noted itchy eyes (49%), coughing (47%), headaches (50%), skin rashes (36%), skin burns (32%), allergies (26%), nosebleeds (32%) difficulty breathing (27%), and vision problems (22%).” (27, p. 14)

Several studies report excess rates of SARS-CoV-2 infection among migrant workers (19,32,34,35).

Child farmworkers, including migrant and non-migrant children, are not exempt from the above-described high levels of risk: In a study by Arcury et al., for instance, two thirds (67%) of the included child farmworkers had had an occupational injury in the previous 12 months, and almost half (46%) reported a heat-injury (36). Arnold et al find that one third of the child farmworkers in their study had suffered Green Tobacco Sickness, alongside other injuries and illnesses (37).

The included papers point to a high burden of mental illness, incl. depression, anxiety, substance consumption, and suicidal tendencies (21,25,26,38–40). For example, a study among Latinx farmworkers in the US found one in three study participants to be at high risk for clinical depression (compared to 7,6% in the general population)(30). Importantly, studies on refugee health underscored the positive potential of successful entrepreneurship and of refugee-led farming for the psychosocial wellbeing and integration of refugees (18,20).

Several studies report a generally high risk of harassment and violence for migrant workers. Women and LGTBIQ individuals were found to be at particular risk of sexual harassment and abuse (25,26). Food insecurity, i.e., lack of reliable access to a sufficient quantity of affordable, nutritious food, is reported to be highly prevalent among migrant workers and seasonal workers, with up to 87% of study participants being affected (41,42).

Determinants of migrant workers' occupational health outcomes in farm-to-fork industries

Our findings on the determinants of migrant workers' occupational risk in farm-to-fork industries are similar to those described in the previous section for migrant workers generally. On a structural level, intersecting instances of precarity are described as core causes of high occupational risk; namely, migration-related legal precarity, socio-economic precarity, and precarious employment arrangements.

Several studies relate to migrant workers' precarious legal status and related power differentials as a key factor contributing to the acceptance and normalization of high occupational exposure and risk (21,24,28,38,43). Arnold et al. describe that migrant workers' structural vulnerability throughout their life course entails a lived experience of constant, co-occurring acute and chronic injury, illness, and suffering that is "conceptualized as 'slow death'" (37, p. 13). In a study by Caxaj and Cohen, migrant farmworkers narrate their sense of subjection to poor working conditions, recounting that "there is no-one to enforce the rules" and authorities supposed to protect their rights as workers "either actively or passively helped reinforce coercive power dynamics" (44, p. 8).

Socio-economic precarity includes poor pay, a lack of alternative livelihoods, dependency on the job and/or employer, and financial penalties for lost working hours or minor damages to the produce. By the same token, several studies describe that migrant workers, incl. children farmworkers, tend to toil under intense time pressure, as they work piece-rate and without adequate rest or days off (23,24,26,28,29,33,36). Such economic and time stressors have the potential to directly compromise migrant workers' health and to intensify occupational hazards as they foster the prioritization of speed and efficiency over safety and health (21,23,24,28,29,33,38,42,45).

Precarious employment and the related exclusion from benefits, employment insecurity, lack of unionization, and low job control are noted both as direct stressors and as factors that contribute to high occupational risk (24,25,28,38,45,46). Several studies find that migrant workers are often unable to negotiate safer working conditions for fear of job loss, retaliation, being labelled as unemployable, or being reported (25,28). In a study on Covid-19 among migrant farmworkers in the USA, Matthew et al. (2021) note

"[migrant] farmworkers... avoid testing [for SARS-CoV-2] for fear of losing work... The reality is that if farmworkers test positive, they will be forced to quarantine, and consequently are not able to work, recover lost wages, nor afford the costs of food and housing. Another real fear... was the possibility that... they could be deported... Much of the health advice given to the public during this pandemic is irrelevant or unattainable for farmworkers... For undocumented farmworkers, staying home and away from work means they would be unemployed. They depend on their daily earnings to sustain themselves and their families, meaning they are unable to miss work even if they are infected. Research on farmworker occupational health is replete with underreporting of injuries and farmworkers continuing to work when sick. Missing work during a busy harvesting season could have dire consequences, including retribution by employers, unemployment, and homelessness." (29, p. 10)

As for risk factors on a more proximate level, the included studies unequivocally report harsh working conditions; namely, inherently hazardous worksites and job tasks on the one hand (e.g., ergonomically challenging tasks, forced positions, handling of dangerous machinery and equipment), and on the other hand a low safety climate and lax/non-enforcement of occupational safety and health protocols, incl. limited provision and use of personal protective equipment (23,24,47,48,26,28,29,31,35,38,44,45). Several studies specifically relate to migrant workers' frequent exposure to extreme climatic conditions and inadequate measures to prevent related injury (22,23,29,37,46,48). Alongside harsh working conditions, the literature often refers to inadequate housing conditions – characterised by overcrowding, insufficient sanitary facilities, lack of privacy, etc. - which were raised as particularly problematic during the Covid-19 pandemic, but also beyond (e.g., in the context of extreme climatic conditions) (19,22,28,29,31,34,35,47,49).

A lack of effective occupational safety training and related deficiencies in migrant workers' knowledge of safety measures as well as their respective rights are frequently noted (25,36,48). Several authors highlight the role of language barriers in this context, as they tend to decrease the effectiveness of occupational safety instructions and trainings, thus increasing occupational risks. At the same time, they impact migrant workers' ability to seek support (38,46).

Access barriers to healthcare - incl. geographic barriers, time constraints, costs, and lack of health insurance - amplify migrant workers' health issues by hampering the provision of preventive measures as well as the timely management and treatment of existing problems (21,24–26,28,31,38,47,50). Public health initiatives that are tailored to migrant worker populations are scarce. Also during the Covid-19 pandemic, this population was not sufficiently reached by public health and pandemic measures (29,31,34,35,38).

The five papers that examine interventions to improve migrant farmworkers' health all relate to individual- and community-level interventions. Two studies examine mobile healthcare delivery (34,50); one study tests different remote methods for mental health monitoring (40); one study examines fluid intake and heat injury (22); and one study focuses on health promotion to address obesity and depression (30). Another four studies describe community-based initiatives to understand and address the health needs of migrant farmworkers (21,31,45,47). Yet their recommendations, too, relate mostly to individual and community-level measures such as the establishment of community health multiplier programmes to improve health education and access to healthcare (31), or the leveraging of family-based norms and values to improve health behaviours and cope with discrimination and adverse working conditions (21). In the literature included in this review, few authors call for structural changes, such as minimum wages, a workplace safety net, paid sick leave, or unionization as a lever to improve migrant workers' health (38,45).

Discussion

This working paper aimed to map the existing evidence and knowledge gaps on associations among migration, work, and health generally as well as specifically in farm-to-fork industries, and to synthesise the available information on occupational health risks and outcomes for migrant workers. A lot of the existing research on migrant health focuses on access to healthcare; whereas other determinants of health inequities – such as working and housing conditions or economic arrangements – have received comparably little attention (51). The migrant health literature is furthermore focused on refugee health, tending to overlook other categories of migrants (52–54). The literature on employment, work, and health, in turn, may not always consider migration as a relevant factor, or consider only certain migration-related aspects such as communication barriers (55).

Against this backdrop, this literature review yielded more evidence on migration, work, and health than expected. The fact that our search identified 17 relevant review papers that have been published since 2018 may indicate growing awareness and scholarly attention to questions related to migrants' work-related health. The Covid-19 pandemic may have played a role in bringing this issue to the fore.

Our synthesis of the available evidence on occupational health outcomes among migrant workers consistently indicates a high burden of physical and mental illness. The literature relates these adverse occupational health outcomes to a “spiderweb” of interrelated factors on different levels (individual, workplace, social and health system, labour market, etc.). As a core cause of migrant workers' high occupational risk, the existing literature pinpoints power differentials related to migration-related legal precarity, employment-related precarity, and socio-economic precarity. Further distal and proximate risk factors mostly “cascade” from this core cause. Further instances of marginalization and disempowerment such as female gender, minor age, or LGBTIQ sexual identity and/or orientation intersect with and further amplify the above-described forms of precarity.

This insight is in line with other recent research on inequalities in COVID-19-related health risks for migrants (56). According to our review, it applies equally to migrant workers generally (search A) and to migrant workers in farm-to-fork industries specifically (search B). It should be noted, however, that our literature search barely captured some industries and geographical contexts, despite their relevance due to a high share of migrant workers in the workforce. At the same time, North-American research on migrant farmworkers strongly dominates our analysis of the latter farm-to-fork context. The American farmwork context, however, may have some specifics that do not necessarily apply to all other country contexts or farm-to-fork industries (e.g., exposure to extreme climatic conditions may also apply to delivery drivers but to a lesser extent to workers in hospitality and manufacturing). Importantly, in the USA, agricultural exceptionalism leads to the exclusion of farmworkers from various labour protections (incl. minimum age, work and rest hours,

wages)(57). Also, the USA has not ratified the 1947 ILO Labour Inspection Convention (No. 81), as opposed to most UN member states. The legal basis for enforcing workers' rights and occupational safety and health standards, and child workers' rights in particular, is thus weaker in the USA as compared to most UN member states. Hence, our results may not be "one-to-one" generalizable.

Our mapping exercise also pinpoints large blind spots in the current knowledge on associations between migration, work, and health. First, our search yielded very little evidence on the health of migrant workers working in low- and middle-income countries. As noted above, also some other high-income country contexts, such as the Gulf states or Asian countries, are remarkably underrepresented in our review, despite high numbers of migrant workers. Similarly, we found barely any evidence on some relevant sectors and industries along the food supply chain, despite a high share of migrant workers among their workforce; e.g., manufacturing and food-processing, logistics, hospitality, and delivery. The available literature on migrant worker health in farm-to-fork industries is extremely skewed toward farmworkers and it is overwhelmingly focused on North America. One explanation may be that evidence on other sectoral and country contexts does not exist. Another explanation may be that some of the relevant research is not framed as an issue related to migration, work, and health. For instance, there is a considerable body of research on Covid-19 outbreaks in meat plants (see, e.g., 58–60). Yet, even though the affected workforce is largely composed of migrant workers, the respective studies were not conceived of and indexed as migration-related and, as a result, not captured by our search strategy. On a more general level, this means that a lot of evidence on the essentially interdisciplinary topic of migration-work-health may be "stuck" in disciplinary silos.

Our results highlight the scarcity of intervention-focused research on migrant worker health. What is more, despite the above-described evidence on the structural core causes of migrant workers' poor occupational health outcomes, most existing intervention studies focus on interventions on individual and community levels (e.g., health behaviours, safety culture) and healthcare delivery (e.g., mobile clinics, technological solutions/apps, medical translation). Very few publications describe, let alone test, interventions that tackle the structural determinants of occupational health inequities such as (in)secure employment, unionization, wage levels, or governance and political decision-making in the relevant sectors. Current interventions to mitigate inequitable occupational health outcomes thus arguably miss their socio-economic and socio-political context – and thus probably also their goal, as *"structural problems require structural solutions."* (61,62) For instance, a recent systematic review of the global empirical literature on COVID-19 among migrants, refugees, and internally displaced persons, on the one hand, pinpoints employment- and work-related factors as key determinants of migrants' inequitable social and health outcomes; on the other hand, it shows that systemic interventions such as the *"greater inclusion of migrants in pandemic measures and social support mechanisms during later phases of the pandemic... has led to better social and health outcomes."* It concludes that *"[t]he underutilisation of the domain of work, including occupational safety and health programmes, in addressing the health of migrants is truly a missed opportunity for global health."* (56)

Finally, our synthesis underscores the need for more comprehensive, representative, and high-quality data on migrant worker health. The currently available evidence is limited for several reasons: As noted above, the existing evidence is skewed toward certain health issues, populations, and (sectoral, country) contexts, whereas some contexts and groups remain invisible for a lack of data. Our mapping exercise also highlights problems related to definitions and terminologies: owing to broader differences (e.g., history, immigration regime), migrants are categorized and labelled differently in different contexts, thus impeding comparative research (56).

Migrant workers' low access to healthcare is liable to further amplify the invisibility of migrant workers' health issues, as low utilization of health services and the resulting lack of patient data may be mistaken for a lack of health needs (62,63). Occupational health care – that is, interdisciplinary services that ideally comprise preventive, curative and rehabilitation healthcare, surveillance and assessment of work-related health risks and impacts, information and education on preventive actions as well as counselling on social rights and benefits (such as workers' compensation, pensions) - are particularly lacking, especially for mobile workers and workers in precarious and informal employment relationships (64).

Moreover, most of the existing research represents a “snapshot” of migrant workers' conditions and health during their employment in a high-income host country; whereas longitudinal studies that could capture the accumulated effects of migrant workers' exposures and risks over the course of the entire migration process and/or in a life course perspective are missing. Without longitudinal studies, however, a lot of the health impacts of migrant workers' conditions – such as delayed and long-term effects, chronic conditions, as well as severe illnesses or injuries that lead to termination of work, inability to work/disability, and repatriation – will remain unseen. To rectify such biases in our current knowledge of migrant workers' health, future research efforts ought to include different phases of migratory processes, incl. studies with returnees, and currently neglected contexts. Particular focus should be on action research and interventions aiming at systemic change as well as on good practices (i.e., generate knowledge on what works to improve migrant workers' conditions).

The considerable number of community-based research initiatives included in this mapping exercise may reflect a positive trend toward participatory research, which will hopefully “spill over” to further contexts beyond the USA. Migrant workers' participation in intervention-focused research will be key to the trustworthiness of research results and their translation into practice. To further expand and improve the available data on migrant worker health, migrant workers ought to be included in public health research, routine health monitoring and surveillance mechanisms, and in health service planning and delivery. Finally, the linkage of different data types and sources (e.g. data from pre-departure and post-return health assessments; or labour market, immigration, and health data) should be explored (65,66), while prioritising data protection and safety.

Limitations

For reasons of feasibility, we limited our literature search in terms of the number of databases, the publication date (2018-2023), the language (English), and the type of publication (peer-reviewed). This may have created bias, as we may have missed out on relevant research; e.g., publications indexed in different databases, publications from non-Anglo-Saxon contexts, and non-academic publications.

The fragmented character of the evidence on migration, work, and health has entailed further challenges and potential limitations for our undertaking: For instance, different publications label their target populations differently. These different labels may reflect “real” differences in terms of migration populations and their migration motives, trajectories and experiences; or they may reflect different constructs related to linguistic and disciplinary traditions or administrative categorizations (as, e.g., regarding the use of migrant worker, immigrant worker, labour migrant, or employed immigrant). It was beyond the scope of our mapping exercise to explore different terminologies and their reasons, or to provide a very nuanced analysis. Instead, for the purpose of this mapping exercise, we applied the term “migrant worker” in a rather sweeping manner - which arguably involves certain inaccuracies.

On a similar note, terminological differences also create challenges for building a search string that is at the same time sensitive and specific. For example, coming from the health sciences, we may not be aware of common terminologies used in other disciplines in relation to employment/work or to different industries in the food supply chain. As a result, our search string may lack some relevant search terms and may thus not have captured all relevant publications. Moreover, some relevant publications may not be indexed as migration-, work- and health-related (e.g., if epidemiological studies on a certain workforce do not consider migration status, despite a high share of migrant workers; or if social science studies on migrants’ experience of violence at work do not consider health effects) and may thus not have been identified by our search strategy. As noted above, our analysis of migrant workers’ occupational health outcomes and risks in farm-to-fork industries was dominated by research on farmworkers and by research in the North American context, leaving other contexts underrepresented.

Despite these limitations, we believe that our mapping exercise provides a solid overview of the current state of knowledge on migration, work, and health. We maintain that our results on the structural determinants of occupational health inequities for migrant workers apply to a diverse range of industries and geographical contexts, despite potential differences and particularities. The consistency of the research results reported by the included articles further indicates the trustworthiness of our analysis.

Conclusions

Based on 17 review papers on migration, work, and health and on 34 publications on the health of migrant workers in farm-to-fork industries, this literature review shows that migrant workers display high rates of work-related physical and mental illness and injury. These adverse occupational health outcomes are attributed to interrelated structural and social determinants. Power differentials, related to migration-related, employment-related, and socio-economic precarity are consistently described as core causes of migrant workers' high occupational risk. Further risk factors - such as the delegation of inherently dangerous, dirty, or demeaning job tasks, low safety culture, inadequate housing, and lack of access to social benefits and support - mostly cascade from these core causes. This insight applies to migrant workers generally and to migrant workers in farm-to-fork industries specifically.

The current body of evidence shows major blind spots (e.g., regarding data from middle- and low-income countries, certain industries and geographic regions, intervention-focused research) and data limitations (e.g., comparability of data, longitudinal studies). Future research should contribute to the mitigation of evidence gaps, work toward overcoming disciplinary silos, and focus on the generation of evidence that can inform interventions that effectively address the structural determinants of migrant workers' occupational health inequities while considering their agency and priorities.

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Annex

Table 1) Search A (review of reviews) – list of search terms

Concept	Search terms (connect with OR within each block)	
Work	Employ* Employment work* worker* working* labor* labour* Occupation* precarious work conditions working conditions temporary contingent seasonal worker labour exploitation high risk sectors Working Poor Wage* Income exploit* blue collar slave*	related MeSH-Terms: employment work working conditions occupational groups social problems risk working poor income
AND		
Migration	migra* migration migrant regular migra* irregular migra* undocument* migra* economic migra* immigrant immigra* “emigrants and immigrants” economic immigra* emigrant emigra* refugee refuge* asylum-seeker asyl* foreign* non-native transient	related MeSH-Terms: “emigrants and immigrants” “emigration and immigration” refugees “transients and migrants” human migration



	<p>“transient and migrants” traffick* forced migra* human migration oversea* stateless “residence status” foreign-born noncitizen “newly arrived” “new arrival” “recent entrant” “non national” “non-national”</p>	
AND		
Health	<p>Mental disorder* health health status occupational health occupational exposure occupational disease occupational health and safety occupational injuries rural health health care services accessibility social determinants of health employee health work-related health health disparities injur* disease* exposure* accident* hygiene safety medicine trauma* fatalit* death* syndrom* risk* disabilit* morbidity* mortality* infect* disorder* pain* ache* mental* psychosocial</p>	<p>related MeSH-Terms: Mental health health health status occupational health occupational exposure occupational diseases occupational injuries rural health health services social determinants of health socioeconomic disparities in health health care disparities health status disparities health inequities hygiene safety medicine affect</p>



	mood problem* wellbeing well-being	
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Table 2) Search A (review of reviews) – in-/exclusion criteria

	include	exclude
Target population	Migrant populations (incl. labour migrants, seasonal migrant workers, asylum-seekers, refugees, undocumented migrants)	Non-migrant populations, unclear populations, reference to migrants without stratified results
Intervention/Exposure	Working or previous work in the destination country	Non-work or -employment-related exposures
Outcome	Occupational health outcomes and/or occupational health risks	Health outcomes that are unrelated to work or employment
Geographic area	Global	-
Date of publication	Papers published since Jan. 2018	Papers published before Jan. 2018
Type of publication	Peer-reviewed	Non-peer-reviewed, gray literature, journalistic work
Study type/Research design	Systematic and non-systematic reviews	Empirical research, conceptual papers, editorials, commentaries
Language	English	Languages other than English

Table 3) Search B (migration, work, and health in farm-to-fork industries) – list of search terms

Concept	Search terms (connect with OR within each block)	
Work	As above (Table 1)	
AND		
Migration	As above (Table 1)	
AND		
Health	As above (Table 1)	
AND		
Farm to fork industry	crops farm* farmers farming meat* meat factory meat industry industr* agricultur* agriculture agricultural workers agricultural exploitation agro-industrial sector agri-food industry abattoirs	related MeSH-Terms: crops, agricultural farmers agriculture farms meat industry abattoirs food food processing industry food industry food handling food supply meat packing industry

	food food factory food industry food Handling food processing food-processing industry food supply supply chain meat-packing industry	
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Table 4) Search B (migration, work, and health in farm-to-fork industries) – in-/exclusion criteria

	include	exclude
Target population	Migrant populations (incl. labour migrants, seasonal migrant workers, asylum-seekers, refugees, undocumented migrants)	Non-migrant populations, unclear populations, reference to migrants without stratified results
Intervention/Exposure	Working or previous work in the destination country	Non-work or -employment-related exposures
Outcome	Occupational health outcomes and/or occupational health risks	Health outcomes that are unrelated to work or employment
Geographic area	Global	-
Date of publication	Papers published since Jan. 2018	Papers published before Jan. 2018
Type of publication	Peer-reviewed	Non-peer-reviewed, gray literature, journalistic work
Study type/Research design	Empirical research (any research design), systematic and non-systematic reviews	Conceptual papers, editorials, commentaries
Language	English	Languages other than English

Table 5) Overview of the included reviews on migration, work, and health (Search A), incl. bibliographic information and main reported results

Author, year	Title	Main results
Ahonen et al, 2007	Immigrant populations, work and health - a systematic literature review	This review finds that immigrant workers face high risks related to occupational exposures, injuries, and illnesses. Many included studies examined occupational injuries, probably because administrative data about injuries often exist, if incompletely. Factors contributing to these risks include inadequate safety training, marginalization, incomplete surveillance of foreign worker populations, and challenges accessing care and compensation. Studies propose similar reasons for these trends, including the relegation of immigrants to the most dangerous jobs and the most dangerous tasks, lack of safety training, the transient nature of much of the work, fear of reprisal, and linguistic and cultural complexities that may eliminate or severely minimize the existence and effectiveness of training. The review highlights the scarcity and fragmented nature of evidence on immigrant workers' occupational health.
Aktas et al, 2021	Migrant workers occupational health research: an OMEGA-NET	Migrant workers often face precarious employment in hazardous industries and undesirable jobs. They are vulnerable to mental health issues, workplace accidents, discrimination, workplace bullying, and violence. Healthcare and domestic workers, in particular, were at heightened risk during the COVID-19 pandemic, especially if they have been residing in dormitory-style accommodations and hold multiple jobs.
Arici et al, 2019	Occupational Health and Safety of Immigrant Workers in Italy and Spain: A Scoping Review	Compared to natives, immigrant workers in Italy and Spain face a higher prevalence of manual labour, low-skilled jobs, temporary or informal employment, low wages, discrimination, physical demands, poor working conditions, and exposure to ergonomic and psychosocial hazards.
Bloss et al, 2022	Advancing the Health of Migrant and Seasonal Farmworkers in the United States: Identifying Gaps in the Existing Literature, 2021	The existing evidence on health promotion among marginalized populations is limited. Only 8.2% of records evaluate health promotion efforts for farmworkers. Maternal and child health, nutrition, pesticides, education, infectious disease, and injury prevention dominate the literature. Mental health, drug use, living conditions/sanitation, oral health, and heat/sun safety receive minimal attention. The literature on farmworker health lacks information on internet access, mobile usage, and telehealth services. Some literature focuses on Community Health Workers, primarily for educational interventions in pesticide safety and health care access.
Cho et al, 2023	Health-related quality of life of migrant workers: a systematic literature review.	The study investigated various factors influencing Health-related Quality of Life (HRQoL) of migrant workers in Korea, incl. general characteristics (age, monthly income, and length of residence), physical and psychological health, and social. It finds, among other things, that higher income, longer periods of residence in Korea, a higher standard of living in the city, enhanced social support and positive health behaviours are associated with improved HRQoL.
Evagora-Campbell et al, 2022	Promoting labour migrant health equity through action on the structural determinants: A systematic review	This review found only two studies that test structural level-interventions for improving labour migrant health. These studies focused on financial interventions for Chinese internal migrants. Zhang et al. (2020) found that health insurance increased healthcare utilization, decreased poor health outcomes, and improved preventive services uptake, especially among women. Guan (2019) observed that unemployment, pension, and workplace injury insurances were linked to higher self-reported health status. Both studies highlight the importance of insurance in improving healthcare access and

		outcomes for migrant workers, particularly emphasizing its impact on preventive service utilization and overall health status.
Hargreaves et al, 2019	Occupational health outcomes among international migrant workers: a systematic review and meta-analysis	This systematic review and meta-analysis reveals high rates of morbidity, injury, and accidents among international migrant workers, particularly those in manual labour with low wages, long hours, and undocumented status. Around 47% of migrant workers experience occupational morbidities, and 22% report workplace injuries. While some studies show no difference in health outcomes between migrant and native workers, others indicate higher risks for migrants. The review also suggests higher mortality rates from injuries among migrant workers compared to non-migrant workers. Consistent with prior research, migrant workers face substantial health risks due to their workplace environment. Self-perceived health among migrant workers is generally poorer compared to native populations, aligning with these findings.
Hasan et al, 2021	Prevalence of common mental health issues among migrant workers: A systematic review and meta-analysis	The meta-analysis reveals a significant increase in depression and anxiety prevalence among migrant workers, with rates of 38.98% and 27.31%, respectively, compared to a decade ago. Refugees exhibit similar rates, while first-generation migrants show varying rates. Various factors contribute to mental health issues among migrant workers, including psychological, occupational, biological, environmental, and social factors. Psychological factors like resilience and emotional intelligence correlate with better mental well-being, while longer durations of stay and occupational stressors worsen mental health. During COVID-19, job stressors exacerbate mental health issues for migrant workers, highlighting the impact of economic struggles and low job security.
Herold et al, 2023	Relationship between working conditions and mental health of migrants and refugees/asylum seekers vs. natives in Europe: a systematic review	This systematic review compares working conditions of migrants and refugees with natives in European host countries and their impact on mental health. Migrants often face disadvantages in organizational conditions, including low-skilled jobs, overqualification, fixed-term contracts, shift work, and lower rewards. They also encounter discrimination at work. However, their working schedules, physical demands, and work resources are similar to natives. Regarding mental health, lower-skilled employment, high work demands, night shifts, and discrimination negatively affect both migrants and natives. Education-occupation mismatch is especially detrimental to migrants' mental health. Factors with positive health effects include high rewards, work resources, permanent contracts, and full-time work for migrants, while long work hours pose risks.
Jaramillo et al, 2021	The measure of precarious employment and its impact on the mental health of workers: A systematic review 2007-2020	This systematic review explores the impact of precarious employment on workers' mental health. Precarious conditions include job instability, legal vulnerability, low wages, and extended hours. Workers in such conditions exhibit higher risks of depressive symptoms, distress, and suicidal thoughts, regardless of the approach to measuring precariousness. Youth, women, people with low levels of education, and immigrants are the groups most frequently and severely affected by precariousness.
Lai et al, 2022	The relationship between employment and health for people from refugee and asylum-seeking backgrounds: A systematic review of quantitative studies	The review finds that employment generally benefits refugee mental health, with salaried refugees reporting lower distress and higher life satisfaction. However, refugees face increased occupational hazards and injury risks compared to natives. Vice versa, poor general health and mental disorders hinder refugee employment, and discrimination in the job market negatively affects mental health. Asylum seekers, lacking work rights, face heightened psychiatric morbidity and severe maternal health risks, leading to a sense of shame and lack of autonomy. Overall, lack of work rights significantly impact health and well-being.

Mak et al, 2020	Coping with Migration-Related Stressors: A Systematic Review of the Literature	Migrants face various stressors such as job insecurity, legal status, stigma, family issues, and health concerns, often gender-specific. Both genders struggle with job and migrant status-related stressors, and job competition. Females also deal with stigma related to migration and childcare management. Access to healthcare, especially for injuries and maternal/child health, is limited. Common coping strategies include problem-solving, seeking support, and accommodation. Females tend to seek more support. Some coping methods create vulnerability; e.g. alcohol consumption serves as both stressor and coping mechanism.
Moyce & Schenker, 2018	Migrant workers occupational health and safety	Immigrant workers face various health risks due to occupational hazards, often exacerbated by precarious employment conditions. Many work in industries with increased exposure to environmental toxins, such as pesticides in agriculture and chemicals in cleaning, nail salons, and construction. Physical demands contribute to high rates of injuries and fatalities, especially in agriculture and construction. Precarious employment leads to stress, unsafe working conditions, and fear of job loss or deportation. Despite existing safety regulations, compliance and access to training may be limited. Abuse and exploitation in the workplace further jeopardize immigrant workers' mental and physical health, with implications for long-term well-being. Globalization has also led to an increase in human trafficking, exposing victims to severe abuses and health consequences.
Ornek et al, 2022	Precarious employment and migrant workers' mental health: a systematic review of quantitative and qualitative studies	The included studies examined various precarious work conditions and their association with mental health issues. Quantitative results showed high prevalence of precarious employment, with factors like non-permanent contracts, low income, lack of health insurance, unfair treatment, and job insecurity. Mental health problems commonly reported were stress, depression, anxiety, and sleep problems. Precarious conditions like job insecurity, low income, disrespectful employer behaviour, undocumented status, long working hours, discrimination, and fear of deportation significantly impacted mental health. Disempowerment was evident due to lack of union representation, uncertain pay, language barriers, and insufficient knowledge about labour rights. Overall, these findings underscored the detrimental effects of precarious work conditions on mental health, emphasizing the urgent need for improved labour protections and support for vulnerable immigrant workers.
Pega et al, 2021	Health service use and health outcomes among international migrant workers compared with non-migrant workers: A systematic review and meta-analysis	Compared to non-migrant workers, migrant workers had lower health service utilization and higher rates of occupational injuries. Subgroup analysis by WHO regions showed increased risk across all regions, notably in the Eastern Mediterranean and Western Pacific.
Peiró et al, 2020	Safety Training for Migrant Workers in the Construction Industry: A Systematic Review and Future Research Agenda	The systematic review found limited research on safety training for migrant construction workers. Intervention studies showed improvements in knowledge acquisition and specific safety indicators but lacked focus on long-term behaviour maintenance. Language barriers hindered learning, addressed through native language training and peer support. Learning principles for effective training included native language instruction, involvement in training design, peer-led training, and contextualized content. Official support and community engagement enhanced safety outcomes. Encouraging agentic roles for migrants and improving working conditions are crucial for effective safety training and overall well-being in the construction sector.

Sterud et al, 2018	A systematic review of working conditions and occupational health among immigrants in Europe and Canada	Immigrant workers face a higher risk of work injuries, bullying, and discrimination compared to natives. While psychosocial working conditions are similar, immigrants often have lower job autonomy and fewer development opportunities. Temporary work and overqualification are common, especially among recent immigrants. Few studies address physical and chemical exposures in immigrant workplaces. Immigrants report poorer self-rated health and mental distress and have higher rates of sick leave and disability pension claims than natives. Evidence linking these issues to occupational factors is limited but suggests a potential contribution.
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Table 6) Overview of the included studies on migration, work, and health in farm-to-fork industries (Search B), incl. bibliographic information and main results

Author, year	Title	Main results
Accorsi et al, 2020	Sleeping Within Six Feet - Challenging Oregon's Labor Housing COVID-19 Guidelines	The text is a brief scientific critique of the living conditions of farmworkers in Oregon at the onset of the COVID-19 pandemic. It criticizes that governmental measures follow "rule of thumb" guidelines instead of aligning with the latest scientific knowledge, such as social distancing. The article urges policymakers to enact new regulations to ensure safe housing and working conditions for farmworkers.
Al-Bazz et al, 2022	Food Security of Temporary Foreign Farm Workers under the Seasonal Agricultural Worker Program in Canada and the United States: A Scoping Review	This scoping review summarizes factors associated with food insecurity among Temporary Foreign Workers (TFWs) in Canadian and US American Seasonal Agricultural Worker Programs. It found limited literature on the food security of TFWs. Most existing studies show TFWs as living in precarious circumstances that could quickly change due to regulations and employer decisions beyond their control, which was conducive to food insecurity. Reported food insecurity prevalence ranged from 28% to 87%. The review notes a lack of qualitative studies capturing the lived experiences of TFWs and stakeholders.
Arcury et al, 2020	Occupational Injuries of Latinx Child Farmworkers in North Carolina: Associations with Work Safety Culture	In this study on child farmworkers, nearly 18% of child farmworkers were migrant workers, with 59.9% working alongside adult relatives. Two-thirds reported work injuries over the past year, with 45.5% reporting heat-related illness. Safety training was limited, with 40.6% trained in tool use, 24.3% around machinery, and 26.0% in pesticide safety. Psychological assessments showed mixed feelings toward supervisors' safety efforts; e.g. 21.8% felt their supervisors were only interested in doing the job fast and cheaply. Appropriate clothing didn't correlate with injury occurrence, but safety training did. Those trained in tool use, machinery safety, or pesticide safety had higher odds of reporting injuries. Pesticide safety training also increased odds of reporting any injury, incl. heat-related illness.
Arcury et al, 2022	The Abysmal Organization of Work and Work Safety Culture Experienced by North Carolina Latinx Women in Farmworker Families	This study shows that Latinx women in North Carolina farmworker families face bad work safety climates. Most women indicate that their supervisors prioritize speed and cost over safety. They experience job instability, often changing roles, and having seasonal or temporary work. Many work over 40 hours weekly for low pay, with few benefits. They lack job control, skill variety, and face high psychological demands. Their work is fast-paced and repetitive, with limited learning

		opportunities. Current farmworkers perceive lower safety climates compared to non-farmworkers, with low decision latitude and high psychological demands.
Aris Escarena, 2022	From the migration crisis to the COVID-19 pandemic, (im)possible regularization of migrants in Italy and Spain	This study finds that the rise of migrant camps in southern Italy, notably around Rosarno, facilitated by governmental response during the refugee crisis, created hubs for precarious labour, notably in agriculture. Migrants face collusion between authorities, employers, and bureaucrats, leading to administrative instability and reliance on shadow economies. Despite regularization opportunities, employers perpetuate informal labour practices. Camps, functioning as governance devices, sustain differential inclusion dynamics, exacerbating labour exploitation and hindering pandemic control efforts. Similar issues arise in Spain, where camps serve as sites for differential inclusion and hinder policy efficacy, emphasizing the need for systemic interventions to address labour exploitation and access to basic services.
Arnold et al, 2021	Structural Vulnerability and Occupational Injury Among Latinx Child Farmworkers in North Carolina	In this study, the majority of child farmworkers report experiencing various injuries, ranging from minor scratches to serious cuts and heat-related ailments. Common injuries include cuts, sunburns, and Green Tobacco Sickness (GTS). Exposure to pesticides was recognized, with some child farmworkers reporting acute effects like headaches. Many children witnessed injuries among co-workers, often due to slips, falls, and accidents involving trucks or trailers. Despite risks, injury prevention measures were often reactive, implemented after incidents occurred. These findings underscore the pervasive dangers of agricultural work, especially for developing children. The children's perspectives further provide insight into the normalization of risk in farmwork; and they highlight the ongoing, multifaceted nature of farmworker suffering beyond singular injury events.
Caxaj et al, 2023	Health, social and legal supports for migrant agricultural workers in France, Italy, Spain, Germany, Canada, Australia and New Zealand: a scoping review	This review finds that research on social support for migrant agricultural workers (MAWs) is limited, but various articles provide insights into their experiences and needs. Structural factors like political and economic conditions shape MAWs' circumstances, often leading to precarious labour and limited access to rights and healthcare. COVID-19 exacerbated existing vulnerabilities, especially concerning dangerous working conditions. Language barriers and gaps in knowledge of rights hinder access to support and healthcare. Initiatives promoting mental health literacy and targeted health and safety training are emerging, aiming to address poor working conditions and improve workers' well-being. Training programs should address language and literacy barriers to ensure effectiveness. Housing requires stronger oversight. Collaborative efforts involving government and communities are necessary to enhance support systems for MAWs.
Caxaj & Cohen, 2019	"I Will Not Leave My Body Here": Migrant Farmworkers' Health and Safety Amidst a Climate of Coercion	This study explores migrant agricultural workers' workplace experiences and their impact on health and safety. In the interviews, migrant workers described ways in which authorities intended to protect them either actively or passively helped reinforce coercive power dynamics and/or failed to deliver on protections. Workers described feeling powerless due to lack of enforcement and support, as well as limited visibility and presence of supports and authorities ensuring adequate health and safety standards in the workplace. Workers thus felt that the onus to workplace hazards was solely on them. The study underscores how authorities fail to empower workers to assert their rights as a systemic challenge to ensuring adequate health and safety standards in agricultural workplaces.
Cifci & Atsiz, 2021	Understanding the Role of Refugees' Entrepreneurship Motives and	This study identified three critical factors affecting refugee entrepreneurs: integration motives, integration domains, and integration challenges. Seven push and five pull motives for starting a business in the food industry emerged. Additionally, mental health issues were highlighted as significant challenges, with resilience playing a key role in overcoming these

	Challenges in Integration: Evidence From the Food Industry	obstacles. Successful entrepreneurship aids in refugees' integration, providing income, purpose, and self-sufficiency. The study emphasizes the need for clear regulatory policies granting refugees rights to participate in competitive business environments. Such policies could prevent marginalization and ensure fair competition with local entrepreneurs, supporting permanent legal integration.
Clarke et al, 2021	A Narrative Review of Occupational Air Pollution and Respiratory Health in Farmworkers	This review summarizes the existing evidence on respiratory health among farmworkers. The COVID-19 pandemic highlighted underlying risk factors for respiratory infections in this population. The twelve studies reviewed are mostly from North America and Europe; they show that farmworkers exposed to high levels of respirable dust had higher rates of respiratory issues like chronic bronchitis, asthma, and decreased lung function.
Corwin et al, 2021	A Mobile Primary Care Clinic Mitigates an Early COVID-19 Outbreak Among Migrant Farmworkers in Iowa	This report details an early COVID-19 outbreak among migrant farmworkers in Iowa and highlights a mobile federally qualified health center's response. Despite high infection rates among Latinx migrant farmworkers and the known vulnerability of this population, initially, no county or state process existed for screening or testing farmworkers and neither for quarantine, isolation or housing. The clinic transitioned to telemedicine primary care visits, later incorporating in-person care. It provided pandemic-related support to agricultural employers and workers, focusing on testing, education, and mitigation strategies like isolation and quarantine upon arrival.
Dudley, 2020	Reaching Invisible and Unprotected Workers on Farms during the Coronavirus Pandemic	This report notes that rural health departments often lacked the language and cultural skills to serve farmworkers during the COVID-19 pandemic. E.g., testing and vaccination campaigns that required photo IDs deterred undocumented workers fearing deportation. Federal funds went to inexperienced organizations, complicating access to care. Social distancing on farms was nearly impossible, and workers lacked face coverings. The report describes a community-based initiative, the Cornell Farmworker Program, which provided health education and support farmworkers and hundreds of farmers, e.g. through multilingual COVID-19 videos and visual fact sheets.
de Gruchy, 2019	Responding to the health needs of migrant farm workers in South Africa: Opportunities and challenges for sustainable community-based responses	This paper shows community-based interventions to improve access to healthcare for rural, migrant farming communities such as peer-to-peer health education. It pinpoints that most such initiatives are unsustainable due to non-state efforts and fragmented state policies. It supports including migration and health in government policies, stressing the need for sustainable practices and recognizing healthcare workers' needs and motivations.
Foss et al, 2023	Cultivating Integration via Placemaking: an ArcGIS StoryMap and Inventory of Refugee-Centered Farming Organizations in the USA	This study shows that refugee "third sector" organizations in the USA use agriculture to help refugees rebuild their lives, relying on volunteers and donations. These initiatives create inclusive spaces, fostering social relationships between refugees and long-term residents.
Hagen et al, 2020	A Systematic Review and Meta-Analysis of Depression among Farming Populations Worldwide	This review shows that depression is more prevalent among migrant farmworkers than non-migrant farmers; and migrant farmworkers' mean depression scale score was higher compared to non-migrant farmworkers. It notes that some studies have adapted depression scales to account for the farming context, especially for migrants facing language and circumstantial barriers. Revising screening tools also for non-migrant farmers might improve overall depression estimates.

Hamilton et al, 2018	Immigrant Legal Status and Health-Legal Status Disparities in Chronic Conditions and Musculoskeletal Pain Among Mexican-Born Farm Workers in the United States	Analysing health records of Mexican-born farmworkers in the US from 2000 to 2015, this study finds that unauthorized workers reported fewer chronic conditions and less pain compared to authorized workers. Naturalized citizens had more chronic conditions than lawful permanent residents, who in turn had more than unauthorized immigrants. The authors claim that this contradicts previous studies that showed legal status disparities in mental health and healthcare access, and that this study indicates few legal status differences in physical health, sometimes showing better outcomes for unauthorized immigrants.
Handal et al, 2020	"Essential" but Expendable: Farmworkers During the COVID-19 Pandemic—The Michigan Farmworker Project	This study shows that farmworkers – most of whom are migrants - endure physically and mentally demanding conditions, including long hours, limited breaks, unpredictable schedules, subminimum wages, and unsafe work environments. These conditions, coupled with poor sanitation, inadequate protective equipment, and crowded housing, heighten the risk of COVID-19 infection. Farmworkers face unequal power dynamics, making it difficult to report symptoms or unsafe conditions due to fear of job loss, being labelled unemployable, or reported to Immigration and Customs Enforcement. Poor ventilation, exposure to chemicals, and preexisting health conditions further exacerbate their vulnerability. Housing conditions are overcrowded and poorly maintained, increasing infection risks. The combination of these factors fosters a culture of silence and mistreatment, making the pandemic particularly dangerous for farmworkers.
Ho et al, 2022	Peer Support and Mental Health of Migrant Domestic Workers: A Scoping Review	This scoping review synthesized evidence on peer support among migrant domestic workers, highlighting its importance in relieving psychological distress and improving mental well-being. It found that mutual aid is the most popular form of peer support, preferred over formal mental healthcare. Existing formal support services often fail to meet migrant domestic workers' mental health needs.
Liebman et al, 2021	Farmworkers and COVID-19: Community-Based Partnerships to Address Health and Safety	Farmworkers often lack basic occupational protections, exacerbating poverty and poor health. Historically excluded from labour laws like the right to organize, minimum wage, and paid sick leave, farmworkers may feel forced to work when ill due to fear of lost wages. COVID-19 outbreaks highlight the need for these social protections as essential public health measures. This paper describes community-based approaches in Maine and California, which involve diverse partnerships and build long-term relationships and trust, as a template for effectively supporting farmworkers. It concludes that such partnerships and robust COVID-19 regulations are crucial to protect farmworkers while they contribute to the US food system.
Linville et al, 2020	Latinx Immigrant Farmworker Community Health Promotion: A Needs Assessment	This study assesses the needs 250 Latinx farmworker communities in Oregon. It finds high exposure to psychosocial stressors, poverty, arduous working conditions, and documentation pressures as well as barriers to accessing quality healthcare. The study highlights the need for comprehensive health promotion approaches that address cultural values and blend spiritual, emotional, and physical health. It recommends that interventions engage families, leverage cultural strengths, and empower parents to teach health-promoting skills. The study also notes a shortage of culturally competent, bilingual interventions.
Marcom et al, 2020	Working along the Continuum: North Carolina's Collaborative Response to COVID-19 for Migrant & Seasonal Farmworkers	This report shows that the COVID-19 response for migrant and seasonal farmworkers faces various complex challenges including congregate activities, inconsistent health information and communication, limited housing, testing barriers, lack of internet, and insufficient personal protective equipment. A migrant health and housing workgroup was convened to

		collaboratively develop strategies to address these issues. Continued efforts are needed, impacting policy, practice, and research.
Matthew et al, 2021	The Novel Coronavirus and Undocumented Farmworkers in the United States	This study shows that undocumented farmworkers faced severe challenges during the COVID-19 pandemic, including fear of deportation, job loss, and inability to afford quarantine. Their crowded living conditions, inadequate personal protective equipment, and lack of proper sanitation increase virus transmission risk. They often avoid testing to keep working, despite the risk of spreading COVID-19. Health advice is often unattainable, and missing work can lead to unemployment and homelessness. Legal and economic barriers hinder access to healthcare, as they lack insurance and are excluded from relief programs like the Coronavirus Aid, Relief, and Economic Security Act. Poor working conditions, exposure to pesticides, and underlying health issues heighten their vulnerability to severe COVID-19 complications. The spread among farmworkers can easily extend to broader communities due to their mobility across the U.S.A.
Messeri et al, 2019	Heat Stress Perception among Native and Migrant Workers in Italian Industries—Case Studies from the Construction and Agricultural Sectors	This study explores how socio-cultural factors influence heat-stress perception at work, especially among immigrant and ethnic minorities. Immigrants often undertake physically demanding jobs, prevalent in sectors like construction and agriculture, with longer outdoor hours during summertime. Migrants report less heat and productivity drop compared to natives, possibly due to higher heat tolerance or social desirability bias. Language barriers hinder safety training. Measures should target migrants, considering language, cultural, and religious aspects, promoting safety training and personal protective equipment use.
Mizelle et al, 2022	Fluid Intake and Hydration Status Among North Carolina Farmworkers. A Mixed Methods Study	This study of North Carolina farmworkers investigated their fluid intake perceptions, hydration levels, and heat exposure. Results showed worsening hydration throughout the workday, with all workers becoming dehydrated or severely dehydrated and excessive heat exposure during shifts. The study revealed challenges in workplace protection and access to water. Farmworkers cited extreme temperatures and workplace exploitation as barriers to staying hydrated. They reported limited breaks and inconsistent hydration education. Macro-level factors like payment systems and housing conditions further impacted hydration.
Panikkar & Barrett, 2021	Precarious Essential Work, Immigrant Dairy Farmworkers, and Occupational Health Experiences in Vermont	This study shows that migrant dairy farm workers confront numerous work-related health hazards. Long work hours with limited breaks disrupt their sleep patterns. They face constant exposure to various chemicals, leading to adverse health effects like dizziness and nausea, exacerbated by insufficient access to safety equipment. They lack adequate health care access, with only 16% having health insurance. Workplace injuries are prevalent, with 30% experiencing harm in a 2014 survey, primarily from animal-related incidents and musculoskeletal strains. Moreover, they endure mental health strains, including stress and depression, often exacerbated by social isolation and sexual harassment. This study underscores the systemic inequities faced by essential migrant dairy workers and the urgent need for improved working conditions, healthcare access, and safety measures.
Pintor et al, 2018	Exploring the Role of Depression as a Moderator of a Workplace Obesity Intervention for Latino Immigrant Farmworkers	This study suggests that baseline depression may influence the effectiveness of obesity interventions among Latina farmworkers, particularly women. Participants with baseline depression didn't show significant improvement compared to controls in weight loss interventions. Obesity and depression often coexist, making interventions challenging, especially for immigrant farmworkers facing structural vulnerabilities and chronic stress. High depression rates hindered treatment

		effectiveness, with stress being a major obstacle to sustained weight loss. Efforts addressing mental health and providing coping resources alongside obesity interventions could improve outcomes.
Quandt et al, 2021	COVID-19 Pandemic Among Immigrant Latinx Farmworker and Non-farmworker Families: A Rural–Urban Comparison of Economic, Educational, Healthcare, and Immigration Concerns	This survey compared rural Latinx farmworker families with urban Latinx non-farmworker families during the COVID-19 pandemic. Rural women reported higher unemployment and fewer workplace safety accommodations than urban women, leading to economic worries. Urban women faced more food insecurity and struggled with children's education at home. While urban women were satisfied with school communication, rural women expressed concerns. Urban women also voiced more community climate concerns regarding racism and immigration. These findings underscore the diverse experiences among Latinx families during the pandemic.
Ramos et al, 2020	Identifying “Vulnerable Agricultural Populations” at Risk for Occupational Injuries and Illnesses: A European Perspective	Understanding vulnerable populations in European agriculture is crucial for enhancing safety culture, managing risks, and promoting well-being. Collaborating to adapt existing resources can address local concerns. Identified vulnerable groups include foreign-born farmworkers, migrant workers, beginning farmers, farming families, and those with disabilities. These categories overlap, increasing individuals' risk. Working together allows tailoring strategies for optimal safety and health outcomes across Europe.
Rubenstein et al, 2020	Factors That Might Affect SARS-CoV-2 Transmission Among Foreign-Born and U.S.-Born Poultry Facility Workers — Maryland, May 2020	This study shows that poultry processing workers in two Maryland facilities face various risks for SARS-CoV-2 transmission, mainly structural factors, especially among foreign-born workers. Common features like shared transportation and larger household sizes contribute to these risks. Workplace-specific structural factors, such as fixed job assignments on production floors, increase exposure. Engineering and administrative controls like modified workstations, ventilation, and staggered schedules could mitigate transmission risks, benefiting all workers, including foreign-born individuals.
Salman et al, 2021	Modeling mobile health service delivery to Syrian migrant farm workers using call record data	Agriculture offers income opportunities for Syrian refugees in Turkey, but their access to healthcare is limited. This case study suggests improvements of Syrian farmworkers' healthcare in Turkey through mobile service delivery and centralized planning for better resource efficiency. This approach was demonstrated in two provinces, utilizing mobile call records to maximize service coverage.
Sexsmith et al, 2022	Latino/a farmworkers' concerns about safety and health in the Pennsylvania mushroom industry	In this study, Latino/a farmworkers in U.S. mushroom farms report various occupational hazards, including poor infrastructure and demanding work conditions. Slip and fall incidents are common. Workers also experience discomfort from cold temperatures, leading to health issues like aches and colds. Chemical exposure, physical demands, and the piece rate payment system pose additional risks, with back pain being a prominent complaint. Pressure to work quickly, driven by the piece rate system, increases injury risk.
Smith et al, 2020	Knowledge of Heat-Related Illness First Aid and Self-Reported Hydration and Heat-Related Illness Symptoms in Migrant Farmworkers	In this study, over 50% of farmworkers – most of them Hispanics - answered Heat Related Injury (HRI) first aid questions incorrectly. The mean liquid intake was significantly less than the recommended amount. Around 68% of the participants reported experiencing at least one HRI symptom, with heavy sweating being the most prevalent, followed by cramps, headache, dizziness and nausea.
Soper, 2021	Workplace Preference among Farmworkers: Piece Rate, Pesticides, and the Perspective of Fruit and vegetable Harvesters	This study finds that farmworkers prioritize income when choosing between working in conventional or organic fields. Piece rate pay incentivizes higher productivity, especially in organic farming where prices per piece are higher. Despite concerns over pesticide exposure, income remains the primary motivator. None of the 65 interviewed farmworkers prioritize health concerns over earning potential.

Tsai et al, 2023	A Small Randomized Controlled Trial of Three Remote Methods to Collect Mental Health Data from Migrant Farmworker Adults	This study tested various methodologies for monitoring mental health among migrant farmworkers. While mental health issues were relatively low, alcohol use problems were notable. Farmworkers, mainly in their 30s, reported low incomes and significant agricultural work experience. Despite low stress levels and moderate social support initially, stress and alcohol use increased over 2 months, contrasting with declining anxiety and PTSD symptoms.
Urrego et al, 2022	The Health of Migrant Agricultural Workers in Europe: A Scoping Review	The review synthesises the existing research on the health of migrant agricultural workers across Europe. Most studies stemmed from Spain and most studies used cross-sectional designs. The majority of workers were male, aged 25 to 40. Mediterranean countries mainly hosted migrants from Africa, Eastern Europe, and Latin America, while Northern countries received workers from places like Poland and Ukraine. Length of stay varied by origin and destination. Poor working conditions, including temporary contracts and lack of permanent housing, were common. Workers faced health issues such as musculoskeletal disorders, dermatitis, infections, and occupational injuries. Mental health problems like anxiety and depression were prevalent, exacerbated by work conditions and social challenges. Barriers to healthcare access included legal status, language, and discrimination. NGOs and migrant associations played crucial roles in providing support and advocacy for workers.

Migration, Work, and Health: Mapping the Evidence

A systematised review of the global literature on the interrelations between migration, work, and occupational health inequities

ABOUT DignityFIRM

Towards becoming sustainable and resilient societies we must address the structural contradictions between our societies' exclusion of migrant workers and their substantive role in producing our food.

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