Master of Public Health

Master de Santé Publique

Leveling the playing field: a scoping review of interventions that address the socio-spatial inequalities experienced by migrant populations in High Income Countries

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Master of Public Health
2019-2021

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Acknowledgements

I would first like to extend my gratitude to my professional supervisor, Kemal Arslantas, for allowing me to join the NLRC's Scientific Committee and to be able to learn from him and the many incredible public health professionals working on our team. Thank you so much for this opportunity and for your sage advice and guidance in designing and refining this project. I would also like to thank Kaat Tielens for her insightful feedback on the content and methodology of my thesis—it was invaluable.

Additionally, I would also like to give my biggest thanks to my academic supervisor, Séverine Deguen, for her aid in designing, analyzing, and writing this thesis. I could not have finished without your perceptive reflections and deep well of knowledge regarding the field of environmental health. Your continued patience and sense of humor helped me stay focused and motivated during this very difficult year, thank you!

Finally, I would like to thank my Mom, my friends, and my family for their continued support, and my quarantine roommate for sharing my profound passion for Ben and Jerry's ice cream.

Thank you all—I could not have finished this work without you!

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Glossary of Acronyms

CBPR	Community-based Participatory Research
CEA	Cost-Effectiveness Analysis
COVID-19	Coronavirus Disease 2019
GP	General Practitioner
HIC	High Income Country
HIV	Human Immunodeficiency Virus
HME	Healthy Migrant Effect
LGBTQ	Lesbian, Gay, Bisexual, Transgender, Queer
LHE/LHN	Lay Health Educator/Lay Health Navigator
LMIC	Lower and Middle Income Country
MSM	Men who have Sex with Men
NCD	Non-Communicable Disease
NGO	Non-Governmental Organization
NLRC	Netherlands Red Cross
OECD	Organization of Economic Co-operation and Development
PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analyses Scoping Review
SES	Socio-Economic Status
STI	Sexually Transmitted Infection
UK	United Kingdom
USA	United States of America
WoS	Web of Science

Abstract:

Introduction: Within high income countries, migrants represent a community that exists at the intersection of many environmental, social, and financial inequities associated with poor mental and physical health. While the vulnerability of this population is well documented, applied public health programs, especially in emergency situations, often ignore migrant population needs, and subsequently erode institutional trust and widen existing inequalities.

Methods: Using a systematic scoping review methodology, this analysis collected evidence-based strategies, interventions, stakeholders, and indicators that have been shown to effectively target, serve, and address inequalities in migrant populations. These collected interventions and indicators were then applied to the context of the NLRC and recommendations were created for how the NLRC can better plan, implement, and evaluate programming in migrant populations.

Results: In this review, 3,472 articles relating to migrant health inequalities were screened, and 34 interventions were found to be eligible for inclusion within the review. Social isolation, high burden of disease, and migration stressors were identified as the main vulnerabilities, and language barriers, lack of cultural competency of professionals, discrimination, and low health literacy were all defined as the largest barriers to healthcare access. To address these vulnerabilities and barriers, programs largely employed education and social support programs, and utilized social networks, cultural centers, and medical locations to recruit participants for interventions. Community leaders, volunteers, and faith organizations were most commonly identified as being integral to designing effective, culturally-tailored programming.

Conclusion: The findings from this review demonstrate the complexity and diversity of the migrant experience in HICs, as well as the necessity of involving migrant populations within every level of public health programming. The NLRC can integrate these findings into the organization's design process through community-based participatory research, the recruitment process through social networks, or the implementation process through ethno-culturally matched volunteers and professionals.

Key Words: health, migrant, inequality, environmental health, high-income countries

Résumé

Introduction: Dans les pays riches, les migrants représentent une communauté qui se trouve à l'intersection de nombreuses sources d'inégalités environnementales, sociales et monétaires associées à un état santé mentale et physique dégradé. Bien que la vulnérabilité de cette population soit bien documentée, les programmes de santé publique, en particulier dans les situations d'urgence, ignorent souvent les besoins de la population migrante, ce qui a pour conséquences de diminuer la confiance institutionnelle et d'accroitre les inégalités existantes.

Méthodes: Cette revue de la littérature a rassemblé des stratégies, des interventions, des parties prenantes et des indicateurs qui ont prouvé leur efficacité pour cibler, servir et traiter les inégalités au sein des populations migrantes. Ces interventions et indicateurs ont ensuite été appliqués au contexte du NLRC pour élaborer des recommandations visant à mieux planifier, exécuter et évaluer les programmes destinés aux populations migrantes.

Résultats: Dans cette revue, 3 472 articles relatifs aux inégalités de santé des migrants ont été sélectionnés puis analysés, et 34 interventions ont été jugées éligibles pour répondre à notre questionnement. L'isolement social, la charge de morbidité élevée et les facteurs de stress liés à la migration ont été identifiés comme les principaux facteurs de vulnérabilité, et les barrières linguistiques, le manque de compétence culturelle des professionnels, la discrimination et la faible connaissance de la santé ont tous été définis comme les obstacles les plus importants à l'accès aux soins de santé. Pour prendre en compte ces vulnérabilités et surmonter ces obstacles, les programmes ont largement fait appel à des programmes d'éducation et de soutien social, et ont utilisé les réseaux sociaux, les centres culturels et les centres médicaux pour recruter les participants aux interventions. Les dirigeants communautaires, les bénévoles et les organisations religieuses ont été le plus souvent identifiés comme faisant partie intégrante de la conception de programmes efficaces et culturellement pertinents.

Conclusion: Les résultats de cette revue démontrent la complexité et la diversité de l'expérience des migrants dans les pays riches, ainsi que la nécessité d'impliquer les populations migrantes à tous les niveaux des programmes de santé publique. Le NLRC peut intégrer ces résultats dans le processus de conception de l'organisation par le biais de la recherche participative communautaire, dans le processus de recrutement grâce aux réseaux sociaux, ou dans le processus de mise en œuvre par le biais de bénévoles et de professionnels appariés sur le plan ethnoculturel.

Mots-clés: santé, migrant, inégalité, santé environementale, pays riche

1. Introduction:

1.1 Social Inequalities and Health

Public health has placed greater attention on the social determinants of health throughout the last few decades[1–3]. This concept broadens the view of health and disease progression by going beyond just "downstream" factors like genetics and medical conditions, and instead analyzes how "upstream" factors like physical, social, and natural environments can influence the health of individuals and communities (Figure 1)[2]. The foundation of this theory stems from how social relations and societal structures create inequalities in access to material and non-material resources (preventative medicine, quality housing, stable income, etc.) based on characteristics like socio-economic status (SES), social class, ethnicity, gender, and more[4]. Such inequalities in access result in systemic differences in risk and vulnerability to adverse exposures like pollution, malnutrition, prolonged stress, high alcohol consumption, and social exclusion[3,4].The consequences of these systemic differences reach farther than higher risks of poor health condition, injury, and early death as the inequalities and subsequent health issues detrimentally affect employment rates, productivity, economic potential, and intervention expenditures by organizations and governments[5].

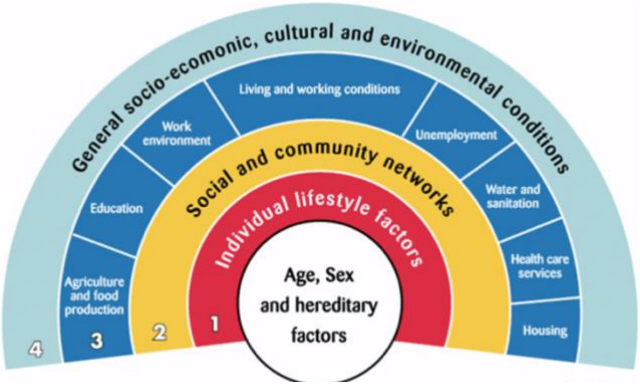


Figure 1: *Social Determinants of Health*

1.2 High Income Countries and Health Inequality

High income countries (HICs) because of their low mortality rates, high average income, and high general health metrics are often not focused on with regards to international public health measures[6,7]. These global efforts often focus on countries with lower average health and wellness metrics, and forgo provision of resources to HICs as they have lower infectious disease, non-communicable disease (NCD), and maternal mortality burdens. However, judging the quality of care and health by analyzing overall metrics may be misleading for HIC contexts, as universally provided services, high average quality of life metrics, and high average incomes mask the lack of access and poor health of the most vulnerable populations[7–9]. In fact, individuals who are of migrant, indigenous, or minority ethnic statuses in HICs like Australia, New Zealand, Canada, and the USA have similar or worse health outcomes than those recorded by countries that are classified as being Lower and Middle Income Countries (LMICs)[10,11]. These existing inequalities were further laid bare by the drastically unequal experiences of minority ethnic, poor, female, and migrant individuals in HICs during the COVID-19 pandemic[12–16]. Therefore, while HICs have overall better health infrastructure and

outcomes for their citizens in comparison to LMICs, those within marginalized or hard-to-reach communities in HICs are not reaping the same benefits.

Specifically, poor health outcomes within migrant populations in comparison to host country populations have been linked to the fact that migrants often live at the intersection of many demographic inequalities[17,18]. When compared to native born HIC individuals, the non-native born are more likely to experience low SES, poor quality housing, overcrowded conditions, homelessness, unstable employment, discrimination, and lack of internet access[16,19]. Due to these physical, environmental, and social circumstances, non-native born individuals and their children have also been found to have less trust in governmental and healthcare systems, further lowering their ability to access important preventative and curative healthcare[19–21]. Spatial segregation, language barriers, fear of legal repercussions, and lack of understanding of the country's governmental bureaucracy lead to even further gaps in access to services [19,22]. Consequently, migrant populations have been found to experience greater risks for communicable and non-communicable disease, poor mental health, occupational injury and hazard, and maternal health issues[23]. Moreover, the social, spatial, political, and environmental experience of non-native born individuals and their offspring make them a group in need of greater attention from a public health and inequality perspective.

These inequalities are even more concerning given the expectations of high migrant health outcomes due to the "healthy migrant effect" (HME). The HME refers to the observation that migrants may have higher average health outcomes than the native populations because the physical and resource requirements of migrating to a new country prevent those of poor health status from completing the journey[24]. In HICs, this effect has been recorded in many migrant groups [25–27]. However, the HME becomes more complicated when analyzed in the long term and by the ethnicity of migrant groups. While at first most migrant groups largely exhibit higher average health statuses than native populations, over the long term mostly North American, European, and wealthy individuals actually have higher incomes, equal trust of the country's institutions, and experience better health outcomes than the native population[28,29]. Individuals from LMICs, non-western countries, or who are impoverished have actually been found to experience poorer health outcomes in the long term in comparison to native populations [20,21,28–31]. Therefore, the higher average health of poor and non-western migrants from the HME was fully erased within just 5-10 years of entering and living within countries considered to have stronger health infrastructures and higher quality of life[25]. Moreover, the mechanisms creating migrant health inequalities intersect with many systems of social stratification including ethnicity, SES, and language to contribute to the poor health and health deterioration observed in migrant communities in HICs.

1.3 The Academic and Applied Divide

While these upstream factors at the root cause of migrant health inequalities are widely documented and understood within public health academia, there remains little consensus on the mechanisms of how these inequities are produced and sustained, and how applied public health interventions can mitigate and reduce them[5,32]. Within the European context, migrant health inequality research and interventions have largely focused on SES as the most important determinant of health outcomes[5]. In contrast, in the USA, Australia, and the UK, more emphasis has been put on the intersection of ethnicity, race, and SES[33–35]. While both approaches highlight important systemic issues within migrant social inequalities, the plethora of research regarding the subject has demonstrated that there are a multiplicity of characteristics and social structures that can interact to detrimentally affect health, including gender, race, citizenship status and more[4,5,17,18,32]. When programs are designed without these diverse forms of social stratification in mind, programs can widen existing inequalities and damage community trust, especially for those living at the intersection of multiple marginalized identities [36,37]. Therefore, by distilling complex health inequalities to one or two primary causes, organizations and governments are preventing their own ability to further understand and address these systemic issues[17,18]. In sum, the gap between academic understanding of social determinants of migrant health and the practical application of these principles into effective interventions must be bridged before migrant health inequalities can become effectively addressed and minimized.

1.4 Application Within the Red Cross

The Red Cross Movement follows the Sphere Association's charter of humanitarian response to prevent and alleviate human suffering and ensure respect for all human beings[38]. Within this objective, the Movement makes clear the aim to protect those within the most vulnerable groups of society[39]. Elaborated within the Protection Principles, the Movement outlines that all programming must ensure the social inclusion, non-violence, and non-discrimination of all individuals.

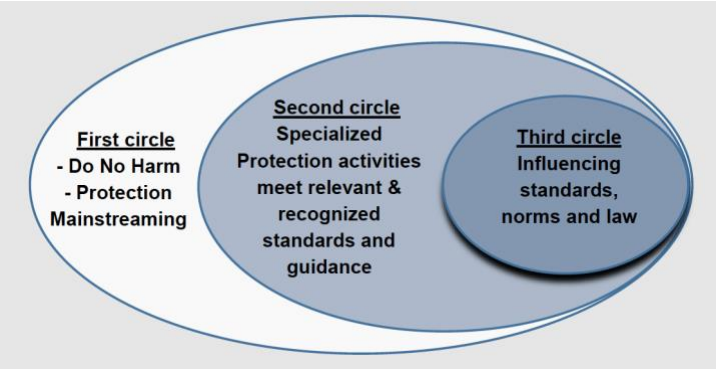


***Figure 2**: Red Cross Circles of Protection Principles*

While these principles are important in addressing the effects of inequalities in public health programming, the Netherlands Red Cross (NLRC) also struggles with the aforementioned difficulties of translating advocacy into practice, especially in complex areas like social inequalities in culturally-diverse, vulnerable groups[1,5,20]. Similarly to many public

health and emergency interventions, programming can be reactive and serve the most vocal communities rather than the most vulnerable. Remedying these gaps and issues with programming is integral for the NLRC's mission alleviating suffering and minimizing health disparities, as the Netherlands, like many HICS, continues to have persistent inequalities in employment, health, discrimination, and housing for those of non-Dutch and non-Western backgrounds[40–43]. Improving programming efficacy will only become more dire as the population of migrants, especially non-Western migrants, in the Netherlands continues to grow[44,45]. Recognizing this need for more structured and intentional programming, the NLRC has set out to create more evidence-based frameworks so as to improve the efficacy, efficiency, and evaluation of how these principles of protection, non-discrimination, and social inclusion are applied in their service provision. This review represents one of these efforts, as it explores how NLRC programming can more effectively address the socio-spatial inequalities experienced by migrant populations in HICs.

2. Rationale

Non-native born individuals, especially those of low SES or minority ethnic background, experience unique social inequalities which result in significantly poorer mental and physical health outcomes when compared with native born individuals. In HIC contexts like the Netherlands, these disparities continue to persist even with country-wide social programs, high average quality of life, and low mortality rates. While research into this topic has increased greatly in the last decade, applied policies and programming have not effectively implemented solutions to minimize the health effects of these complex socio-spatial inequalities. Therefore, this project will work to bridge the divide between academic understanding and practical application by collecting evidence-based strategies proven to mitigate, alleviate, and evaluate the detrimental effects of health inequality in migrant communities in HIC contexts. The synthesized information will provide the NLRC with important information, strategies, and evaluation methodologies to better target and address the needs of this vulnerable population within the Netherlands.

2.1 Aim

Collect current interventional research and evidence-based actions to create materials and recommendations for the NLRC to better implement and review how the organization addresses the social and environmental inequalities faced by migrants within the Netherlands.

2.2 Objectives

1) Identify evidence-based strategies to address migrant inequalities in public health programming in HICs

2) Identify strategies and indicators to evaluate the effectiveness of interventions to address migrant inequality in HICs
3) Contextualize findings on these inequalities, strategies, stakeholders, and indicators and generate programming and strategy recommendations for the NLRC

3. Methodology:

The scoping review strategy is best designed for diverse and emerging fields, making it pertinent for the complex nature of social inequalities and health, as the field is composed of a heterogeneity of study themes, populations, methodologies, and synthesis types[46]. The design was also chosen for its ability to synthesize and map the current state of our understanding of migrant inequalities as well as its potential to identify knowledge gaps and inform practice and policy. The review reports on 5 years of peer-reviewed scientific literature evaluating interventions aimed at addressing social inequalities and health in the migrant community in HICs. An initial literature review of current evidence provided the insight into the scoping review's key words and inclusion criteria (Table1-2). The review aims to outline the current landscape of evidence-based interventions to mitigate the social inequalities experienced by migrants, and thus the review does not undertake a quality appraisal of the studies included within the review.

For analysis, the scoping review was guided by the protocol and methodological framework outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Scoping Review (PRISMA-ScR) guidelines[47]. This framework was utilized to ensure the studies selected are aligned with the research question and that the review accurately and thoroughly mapped the current body of literature pertinent to the review.

Studies were identified using the databases Pubmed and Web of Science (WoS). Pubmed was chosen given its wide range of medical and healthcare related material[48]. However, as the current body of inequalities research is also interdisciplinary and non-medicalized in nature, WoS was chosen to supplement the findings from PubMed. WoS was chosen given its access to more non-biomedical journals and the wider variety of non-medical literature found there[49]. Embase was considered for inclusion, however, in findings from other reviews regarding migrant health, the scope of Embase is restricted to highly medicalized findings with little research regarding socio-spatial inequalities[50]. Therefore, the researcher determined that PubMed and WoS together provided a comprehensive search of both biomedical and sociological interventions aimed at reducing inequalities in migrant populations.

Table 1: Key Words and Search Terms

Important Terms:	Health	Inequality	Migrant
Synonyms in Search:		- Access - Disparity - Inequity	- Immigrant - Refugee - Displaced - Asylum
Search Category	PubMed: Title/Abstract WoS: Topic	PubMed: Title/Abstract WoS: Topic	PubMed: Title WoS: Title
Final Search Terms	(Health) AND (Inequality/ies OR Access OR Disparity/ies OR Inequity/ies) AND (Immigrant OR Refugee OR Displaced OR Asylum)		

The databases in question were searched with the three integral aspects of this project in mind: health, migrants, and inequalities. In order to capture the breadth of potential interventions that are related to these terms within the scope of the review, a form of sensitivity analysis was conducted to determine the key words that were to be used in the database search. Sensitivity analyses were conducted by doing repeated searches with and without a variety of synonyms and important terms for the three main topics (See Table 1, Appendix 1). The key synonyms and important terms were identified through the initial literature search by collecting the most common terms used to write about the three main topics in scientific and grey literature. These searches were then analyzed for their search breadth (i.e. does the addition of the term increase number of results), and for the relevancy of the articles (i.e. does the addition of the term add highly relevant literature or literature outside of the scope of this review).

The keywords as outlined previously were searched within PubMed and WoS (Table 1, see Appendix 2 for full search protocol). The results were limited to items published between January 2016 to April 10th, 2021. The time limitation was instituted due to the growth of the diversity of literature regarding this topic after 2015, likely due to increased migration worldwide due to political and environmental instability[51,52]. Reference lists from excluded literature reviews were surveyed for eligible interventions that were then included into the review. Given the breadth of the literature search and the time constraints of the thesis period, grey literature analysis was not included within this report. This does limit the scope and comprehensiveness of the report, however, the researcher believes that the span of the review and its search terms have sufficiently collected a wide range of interventions for analysis within the limited time period.

Eligibility was determined by the following guidelines to ensure that the included literature were relevant to the scope of the review and overarching research question:

Table 2: Eligibility Criteria and Rationales

Inclusion Criteria	Rationale	Example
Empirical evaluation of an intervention (inclusive of all	To ensure the inclusion of interventions that have proven to	- Focus groups with migrants to discuss health intervention

methodologies: quantitative, qualitative, mixed, etc.)	be effective and well-received by migrant populations	- Randomized controlled trial assessing efficacy of intervention
Intervention targeted towards migrants	To ensure all interventions directly improve the health or access of migrants	- Health education course for migrant mothers
Conducted within HIC (as defined by the Organization for Economic Co-operation Development (OECD) and World Bank)	To ensure interventions are designed to mitigate the unique forms of inequality experienced in HICs	- USA - Japan - Chile - See Appendix 3 for full list
Available in English	To ensure the researcher can fully understand and analyze the literature	- Literature written or translated into English

Furthermore, literature with the following characteristics was excluded:

Table 3: Exclusion Criteria and Rationales

Exclusion Criteria	Rationale	Example
- Review (systematic, literature, scoping, etc.)	Provides no in-depth analysis of an intervention's efficacy, the stakeholders involved, or the evaluation indicators analyzed	- Systematic review of barriers to care experienced by migrant mothers
- Cost-effectiveness Analyses (CEA) (without imbedded efficacy evaluation)		- CEA of immigrant maternal health intervention
Intervention without analysis of migrant outcomes	Does not directly aid migrants, or analyze how the community benefits from the intervention	- Education course for health workers without an analysis of migrant experiences/benefits after the intervention
Evaluation of intervention without comparison (control group, pre/post intervention evaluation, etc.)	Provides no evaluation of if the intervention improved indicators, access, or health	- Evaluation of the acceptability/feasibility of intervention without analysis of efficacy of intervention

All title and abstract screening was guided by the PRISMA-Scr framework[47]. The researcher extracted all relevant titles from PubMed and WoS into a review library in both Zotero referencing system and Excel, and proceeded to remove any duplicate articles. The relevance of the literature was determined by the aforementioned inclusion and exclusion criterion. If the eligibility of the literature could not be determined from the title, the researcher examined the abstracts and full articles to further review and determine their inclusion or exclusion. All determinations were made by the primary researcher SF, however, for articles that needed further verification, the academic and professional supervisors SD and KA were consulted for deliberation and consensus.

A chart for extracting data was created by the primary researcher and approved by supervisors SD and KA. Full data charting information and rationales can be found in Appendix 4. The data was charted by SF, and placed within an Excel spreadsheet for analysis. The charting form contained 23 columns for extracting the following information from all articles:

Table 4: Data Charting Categories and Columns

Category	Article Characteristics	Inequalities Descriptions	Intervention Characteristics	Indicator/Stakeholders Information	Results and Theories
Charting Columns	- PMID - Title - Pub. Date - Country of Study	- Health Inequalities - Barriers to access - Demographic (if specified)	- Name - Type - Assessment Method - Description	- Descriptive Indicators - Efficacy Indicators - Recruitment Strategies - Important Stakeholders	- Main Results - Key Concepts - Issues Identified - Recommendations - Important Information

After collection of the raw data from eligible literature, the primary researcher analyzed each column for similarities in language, concepts, and themes. After identifying main concepts or descriptors used, SF summarized the findings regarding article and intervention characteristics, inequalities, recruitment strategies, as well as stakeholder and indicator information. Interventions were then grouped by Health Category and Intervention Type and analyzed for their structure, strategies, key concepts, and recommendations.

4. Results:

4.1 Selection of Sources

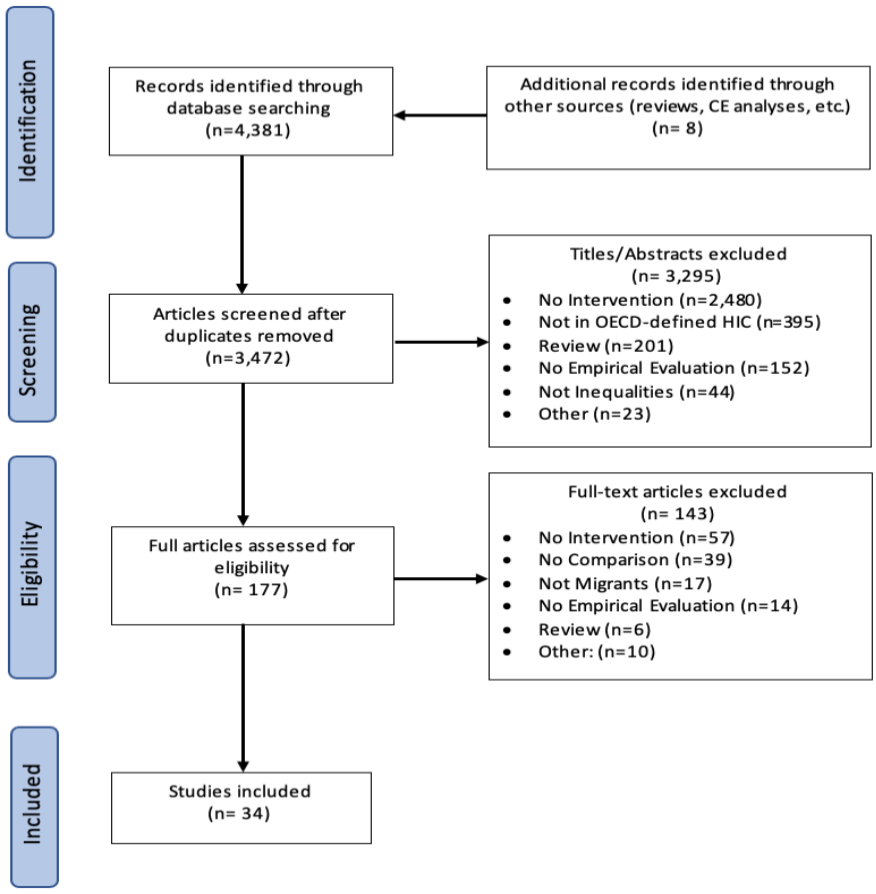


Figure 3: *Flow Chart of Intervention Selection*

4.2 Characteristics of Sources of Evidence

Of the 34 eligible interventions, more than half of included interventions were published after 2019 (Table 5). Additionally, about 53% (n=18) were implemented within the USA, with the second most common location of intervention being Australia (n=4, 12%) (Figure 4). Only in interventions targeting Mental Health did the USA not represent a majority of interventions, with Mental Health interventions largely originating from European countries (Sweden, Germany, UK, and France)[53–59]. The vast majority of all interventions targeted adult populations (82%, n=28), with 9% (n=3) targeting adolescents (Table› 5). Most interventions targeted interventions by gender, with 32% (n=11) targeting only adult men or boys and 27% (n=9) targeting only adult women or girls. The interventions also identified a variety of health issues they aimed to address (Table 5), the most common of which being mental health (n=14, 41%) and general health issues (n=9, 27%). Interventions were classified as general health if they addressed a wide range of inequalities or health issues that did not fit into other categories.

Table 5: Characteristics of Interventions

	Number (%) of Interventions
Publication Year	
2016	7 (21)
2017	2 (6)
2018	5 (15)
2019	10 (29)
2020	9 (27)
2021	1 (3)
Age Group	
Adults	28 (82)
Adolescents	3 (9)
All	3 (9)
Gender	
Not Specified	14 (41)
Men/Boys	11 (32)
Women/Girls	9 (27)
Health Category	
Mental Health	14 (41)
General Health	9 (27)
NCD	4 (12)
Infectious Disease	4 (12)
Nutrition	3 (9)

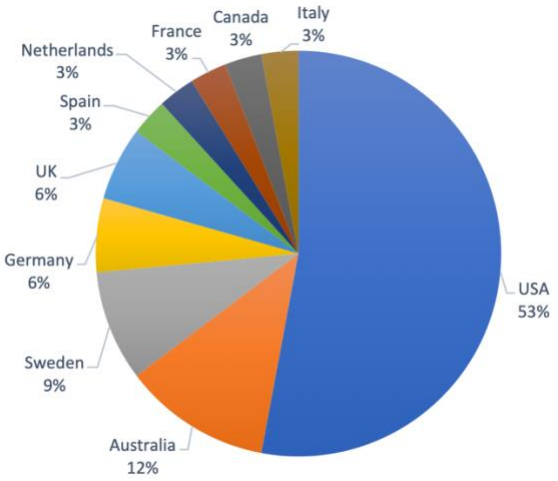


Figure 4: *Review Interventions by Country of Study (%)*

With regard to program type, 68% of interventions (n=23) aimed to address disparities related to these health categories through educational programming components like parent training or psycho-education for traumatized adolescents (Table 6)[56,60]. Social support components were also common (n=12, 35%), like group discussions regarding sexual health or assimilation into host countries[61,62]. 50% (n=17) of interventions utilized multiple types of components concurrently (i.e. multi-program interventions) (Appendix 5.1). A common example of multi-program interventions were interventions that utilized educational and social components simultaneously (n=4), providing for a dual pronged approach in addressing access barriers: education for minimizing knowledge barriers and social support

for minimizing social isolation and exclusion[56,63–65]. Screening components (n=5, 15%) were employed to increase early detection of infectious diseases like Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) as well as NCDs like cancer and diabetes[66–70]. Most screening programs were implemented in combination with other components, like a mammogram and pap smear program implemented with an education program to improve knowledge and cultural acceptance of screening procedures[69].

Table 6: Intervention Program Components

Program Type	Number (%) of Int. with program type
Education	23 (68)
Social Support	12 (35)
Screening	5 (15)
Health Navigation	4 (12)
Therapy	3 (9)
Sport/Exercise	3 (9)
Art	3 (9)
Other	2 (6)
Multi-Program	**17 (50)**

4.3 Vulnerabilities and Barriers:

Table 7: Vulnerabilities and Barriers Identified in Intervention Rationales
(Abridged table, full version in Appendix 6)

	Number (%) Interventions Identifying Issue
Vulnerabilities to Poor Health	
Social Isolation	11 (32)
High Burden of Disease	10 (29)
Migration Stressors	7 (21)
Experiences of Violence	6 (18)
Acculturation Stress	5 (15)
Lack of Social Support	5 (15)
Delay of Care	3 (9)
Low Self Advocacy	2 (6)
Barriers to Access	
General Barriers	
Language	14 (41)
Health Literacy	11 (32)
Financial Barriers	10 (29)
No Access to Preventative Services	10 (29)
Legal Status	4 (12)
Lack of Employment	3 (9)
Lack of Understanding of Health System	2 (6)
Cultural Barriers	
Overall	19 (56)
Cultural Competency of Professionals	12 (35)
Mental Health Stigma	6 (18)
Perceived Cultural Relevancy	5 (15)
Discrimination	
Overall	16 (47)
Racial	6 (18)
Social Exclusion	5 (15)
Gender	4 (12)
Sexual/LGBTQ	2 (6)
Environmental Barriers	
Obesogenic Environment	3 (9)
Transportation Barriers	2 (6)
Geographic Barriers	1 (3)

In the rationale for creating interventions, authors identified the most important vulnerabilities placing migrant populations at increased risk for poor health and wellness outcomes (Table 7, full list in Appendix 6). Social isolation (n=11, 32%) and lack of social support systems (n=5, 15%) were not only identified as deteriorating mental health outcomes and lowering resiliency to hardship, but also hurting physical health outcomes (NCDs, Infectious Disease, Nutrition, General Health) due to the link between poor mental health, lack of social and financial support, and delays in seeking preventative or curative care[54,56,59,62–64,71–79]. The stressors and traumas incurred during the migration process were cited in 21% (n=7) of interventions as creating high burdens of mental health issues, and 15% (n=5) emphasized the detrimental effects of stressors associated with acculturation into host-country societies (discrimination, social exclusion, pressure to assimilate) that can cause similar physical and emotional trauma to the migration process[55,63,71,76,79].

With regards to barriers to accessing care in host HICs, the most common barriers cited by interventions were forms of cultural barriers (n=19, 56%), discrimination (n=16, 47%), and language barriers (n=14, 41%) (Table 7). The most cited cultural barriers were lack of cultural competency of health professionals (n=12, 35%), mental health stigma (n=6, 18%), and low perceived cultural relevance of programs (n=5, 15%); all of which were linked with migrant populations having less trust in health institutions, lower usage of health services, and lower understanding of health systems[53,55–57,60,65–69,75,80,81]. Forms of discrimination (i.e. race, gender, sexual orientation) and lack of host-country language proficiency were also cited as reducing trust, comfort, and ability to access healthcare and assistance in general[53,55,57–59,62–64,67,68,71,73,75–84]. Other common forms of barriers to access were clustered based on type of health category (i.e. mental health, nutrition, etc.). For example, environmental barriers were not cited in most articles (n=7, 21%), however, all articles discussing nutrition cited environmental barriers, like obesogenic environments or geographic barriers, as preventing access to healthful and nutritious foods[72–74]. Full list of barriers to access can be found in Appendix 6.

While migrant populations have been proven to be more at risk for health inequalities compared to native individuals, within the umbrella of migrants there were seven extremely vulnerable populations identified (Table 8). Those with low language proficiency and literacy (n=14, 41%) and women (n=12, 35%) were the most cited as being at risk of health disparities. Racial minorities (n=6, 18%) and sexual minorities (n=2, 6%) (i.e. LGBTQ individuals , men who have sex with men (MSM), transgender women)

Table 8: Vulnerable Groups Identified in Interventions

Vulnerable Group	Number (%) Interventions Identifying Group
Low Host Language Proficiency/Literacy	14 (41)
Women	12 (35)
Racial Minorities	6 (18)
Children	4 (12)
Insecure Residency	4 (12)
LGBTQ	2 (6)

were also found to be more vulnerable due to their experiences of cumulative stressors regarding gender-based violence, societal stigma, social exclusion, and discrimination[58,59,62,63,75,77,78,83]. Children, specifically young, migration-traumatized, or unaccompanied children, were also cited as being of greater vulnerability (n=4, 12%)[56,58,62,83]. Finally, those with insecure residency status (n=4, 12%) were also found to be more vulnerable given their lack of access to many preventative medical services, increased mental health stressors (fear of deportation, etc.), and distrust and fear of government and medical authorities[70,75,77,79].

4.4 Recruitment Tactics and Locations:

For recruitment of participants, interventions employed a variety of recruitment tactics (Table 9). Most common in interventions across all health categories was tapping into social networks (n=10, 29%) through snowballing, word of mouth, and the networks of community or cultural leaders[55,60,61,71,72,74,77,79–81]. The latter of these tactics was found to be especially valuable as it allowed for the implicit moral approval of the intervention by cultural gatekeepers[59,77,79]. Consequently, this approval allowed for greater retention and participation from individuals, especially for taboo topics (i.e. sexual and mental health) and for women who may need the approval of male members for participation[59,77,79]. Flyers placed in community centers, ethnic grocery stores, and General Practitioner (GP) offices were also employed for recruitment across all intervention types (n=7, 21%) [60,61,66,69,74,80,85]. Referrals from GPs, community leaders, and intervention workers were also cited as important tactics for successfully recruiting a variety of migrant populations (n=4, 12%) [62,74,80]. While a diversity of tactics were utilized to recruit participants, all were designed with migrant language and varying levels of literacy in mind.

Table 9: Recruitment Tactics Identified

Recruitment Tactics	Number (%) of Interventions Using Tactic
In-Person	
Social Networks	10 (29)
Referral	4 (12)
Home visits	2 (6)
Street Outreach	1 (3)
Announcements	1 (3)
Written	
Flyers	7 (21)
Letters	4 (12)
Newsletters	1 (3)
Listservs	1 (3)
Virtual	
Social media	2 (6)
Telephone calls	1 (3)
Emails	1 (3)

With regards to recruitment locations, overall types of medical locations were mentioned the most often as an area of recruitment (Figure 5, See Appendix 7 for full list of recruitment locations). The most common medical locations for recruitment were GP offices (n=4, 12%) and mental healthcare facilities (n=3, 9%). While, overall, medical locations were used most often, when analyzed by health category, every category but Infectious Disease interventions most commonly utilized social or cultural hubs as recruitment locations. The most important social locations were faith-based organizations (n=8, 24%) (i.e. temples, churches,

mosques, etc.) and community centers[1] (n=3, 9%)[53,59,60,64,66,68,69,71–73,86]. Other locations of note were governmental, residential, and educational locations. Educational locations, like language courses (n=1, 3%) and university campuses (n=1, 3%), were identified as areas not only for the recruitment of participants but for volunteers and Lay Health Educators and Navigators (LHE/Ns) as well [63,86]. Such locations were found to be highly effective as they often contain many individuals with native language ability and a desire to aid culturally similar community members. For identification of more diverse or more socially excluded populations, utilizing residential areas like settlement camps (n=2, 6%) or migrant-dense neighborhoods (n=3, 9%) as recruitment locations provided greater access to individuals from more disadvantaged backgrounds who may not have the knowledge, social capital, or financial ability to access community, medical, or educational spaces[61,68,73,83,84].

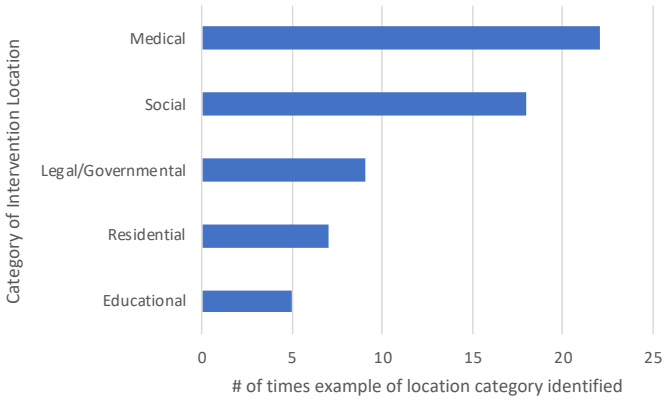


Figure 5: *Bar Graph of Categories of Recruitment Location. Full breakdown of recruitment location in Appendix 7.*

4.5 Stakeholders:

Each intervention identified important stakeholders in the development, rollout, and sustainability of their strategies (Full list of Stakeholders in Appendix 8). Overall, social stakeholders, like community leaders (n=10, 29%), LHE/Ns (n=5, 15%), and faith organizations (n=5, 15%), were the most commonly cited stakeholders, especially in the development and sustainability of interventions (Figure 6, Appendix 8)[59,60,64,66,68,69,71–73,81]. Female community members and individuals with charismatic personalities, whether in leadership roles or in general, were also cited as being important stakeholders as they on average have stronger ties and influence with families, churches, and community groups[73,79]. Almost all intervention health categories cited such social stakeholders as their most important

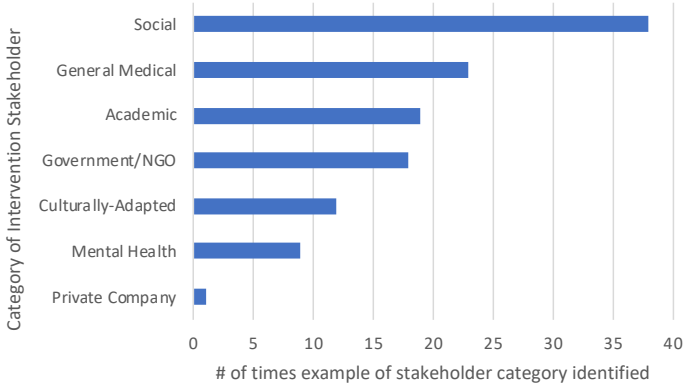


Figure 6: *Bar Graph of Intervention Stakeholder Categories. Full breakdown of stakeholders in Appendix 8.*

[1] Community center is defined in this review as public locations for migrant-dense or culturally similar communities to have activities, classes, and information disseminated.

sources of cultural knowledge for intervention development, recruitment locations, and the most effective builder of community trust and buy-in for interventions [53,59,60,63,64,66,68,69,71–73,76,77,79,81,82,86]. The only health category to not identify social stakeholders as their primary source of support were Infectious Disease interventions which relied more heavily on medical and governmental stakeholders[61,67,70,79]. Medical stakeholders were also commonly cited as important sources of assistance in all other health categories, especially regarding the rollout of interventions. While GPs were identified as important stakeholders, the most commonly cited medical stakeholders were nurses (n=6, 18%)[55,58,65,70,80,83]. Nurses were identified as providing more patient-centered care, and as having more knowledge regarding the social and environmental factors affecting patient health compared to physicians [55,65].

Other important stakeholder groups were governmental/non-governmental organizations (NGOs), academic, and culturally-adapted stakeholders (Figure 6, Appendix 8). The most cited governmental stakeholders were social workers (n=5, 15%) and asylum resettlement services (n=3, 9%) given their unique access and knowledge regarding migrant daily life and welfare[55–57,63,82,84,86]. Academic stakeholders were also cited as lucrative for identifying volunteers to staff intervention activities. For example, teachers (n=3, 9%), undergraduate/graduate students (n=3, 9%), and universities (n=2, 6%) were commonly cited as they are an effective source for identifying LHEs or volunteers who may also be training in medicine, public health, psychology, or social work[54,68,74,82,84,86]. Finally, culturally-adapted stakeholders ranged from migrant-specific clinics (n=2, 6%) to multi-lingual and ethnically diverse staff (n=4, 12%) to medical and legal interpreters (n=5, 15%). Such individuals provided excellent sources of information regarding medical capacity, as well as tailored aid and care that increased the participation and retention of migrant populations[58,59,61,63,65,67,72,74,78,80].

4.6 Indicators:

Descriptive indicators were taken in almost every intervention to describe the demographics, living situation, and SES of participants involved in programming (n=31, 91%) (Full list in Appendix 9). While intervention indicators aiming to assess the perception of the program (usability, satisfaction, acceptability), program fidelity (use of intervention, retention), and efficacy (health improvement, knowledge improvement, behavior change) were important in understanding both the impact and perception of interventions, collecting demographic data in conjunction with traditional outcome metrics proved important in better understanding how the benefits of the intervention, or lack thereof, were spread across sub-populations (by gender, low income, racial group, etc.)[53,62,63,70,71,73,77,86]. Such findings were integral to identifying inequalities in access or issues with program design and rollout, as well as creating

solutions to further bridge gaps to better serve all sub-populations within the migrant population.

5. Discussion:

In this review, over 3,000 articles relating to migrant health inequalities were screened, and 34 interventions were located that successfully reduced migrant health inequalities and improved health outcomes. From these interventions, the main barriers, programs, recruitment tactics, stakeholders, and indicators were collected to collate evidence-based strategies to combat the social and geographic inequalities experienced by migrant populations in HICs. This information was collected with the final goal of utilizing these findings to improve NLRC programming targeting migrant populations in the Netherlands. Overall, mental and general health issues were most cited as requiring attention, with social isolation, high burden of disease, and migration stressors being identified as the main vulnerabilities to poor mental and physical health outcomes. Discrimination, lack of host language ability, and lack of cultural competency of professionals were also found to be the main barriers to accessing existing services.

In order to combat these vulnerabilities and barriers, most interventions utilized educational programming and social support components—with many using a combination of tactics (Appendix 5.1). To increase the trust of participants and thus increase participation and retention, interventions utilized social networks for recruitment, as well as GP offices and cultural hubs. Diverse stakeholders were also included during the design and implementation process in order to increase cultural relevancy of the intervention as well as the cultural competency of the professionals responsible for the intervention. Such stakeholders included faith and community leaders, LHEs, and nurses given their deeper knowledge of individual cultures, languages, and life experiences of migrant participants. Similarly, the efficacy indicators collected from the eligible interventions often emphasized the need for culturally-adapted assessments, especially for more subjective health concerns like mental health and experiences of violence. Finally, the vast majority of interventions made clear the need for collecting demographic data on both participants and professionals/volunteers as well, in order to have the ability to analyze if there exist ethnic or socioeconomic inequalities within the interventions themselves.

For future NLRC programming, these findings indicate that the common conception of migrant inequalities as resulting from only low SES, traumatic migration experiences, or lack of legal access to host country systems does not capture the complexity of the migrant experience in HICs. For instance, lack of cultural competency of health professionals and discrimination were mentioned more often than legal barriers to accessing services. Additionally, lack of health system and legal knowledge, language barriers, poor trust of institutions, and low perceived cultural relevance of programs were all also important barriers

to access unrelated to legal or migration status. Therefore, while migration trauma and exclusion from provided services remain highly important issues for the NLRC to focus on, for many migrants the issues in access lie more in traumatic experiences within the host country and the cultural, linguistic, and bureaucratic barriers to accessing services for which they are legally eligible. In sum, in order to address the many inequalities experienced by migrants in HICS, health interventions must take into account not only the barriers for undocumented or migration-traumatized individuals, but also address the many medical, social, and geographical issues facing migrants within host countries.

In order to address the aforementioned vulnerabilities and barriers, implement successful programs, and effectively improve migrant health outcomes, this review found seven main strategies for the NLRC to adopt, ranked by importance and feasibility of implementation:

1) Cultural Adaptation as a necessity
2) Peer-education through LHE/Ns
3) Potential of multi-level interventions
4) Community-based Participatory Research for cultural adaptation
5) Mental Health as a priority
6) Faith organizations as integral partners
7) Descriptive indicators as barometers for efficacy

5.1 Cultural Adaptation

One of the most important concepts identified within this review that must be integrated into NLRC programming is cultural adaptation. Three of the main vulnerabilities and barriers to access were directly linked with a lack of culturally adapted services: low cultural relevance of programming, low cultural competency of professionals, and the stressors of acculturation into the host country society. By meaningfully adapting interventions to the relevant cultural contexts of potential intervention participants, interventions overcame these barriers and observed increased comfort of participants, retention within the program, and overall efficacy[57–59,65,71,75,76,84]. Interventions accomplished these goals through culturally adapted measurement tactics and content strategies, as well as the celebration of cultural differences.

With regards to measurement tactics, mental health interventions often utilized pre-validated, culturally-adapted versions of questionnaires and measurement tools to evaluate the symptoms, conditions, and comparisons between baseline and post-intervention mental health statuses (Appendix 10). These measurement tools had been adapted to the linguistic and cultural background of their target population, and then subsequently validated in their efficacy and accuracy at detecting outcomes[87,88]. When such pre-validated tools were unavailable, Im et al. had their unvalidated questionnaires and interview guides sent to community leaders and LHEs for feedback on the phrasing, content, and complexity of the measurement tools[81]. In a more common attempt to overcome accessibility issues, over half of interventions (n=19, 56%) utilized diverse mediums for delivering their questions (verbal

interviews, focus groups, interpreter-assisted surveys, etc.), with some identifying written questionnaires and Likert scales as being potentially exclusionary to those without the literacy, numeracy, or host-language proficiency to understand or complete them properly[63,67,78,81].

Interventions also found great success in culturally adapting intervention content by relating information (recruitment, navigation, education, etc.) with identifiable and important cultural practices. For a nutrition program, instead of using western food pyramids and nutrition information to improve knowledge of healthful practices, the intervention utilized a culturally specific cooking class to demonstrate how to cook Iraqi food healthily utilizing host country food items[65]. These forms of cultural adaptation were found to be especially powerful for lifestyle interventions as they better improve long term habits and practices[65,73,75]. Interventions also aimed to be more culturally competent by including culturally relevant understandings, interpretations, or manifestations of health conditions. Many cultures, especially more collectivist cultures, perceive and experience health conditions in ways the differ from traditional western manifestations[59,64,85]. For example, one intervention adapted their stress reduction intervention after many participants described their stress as physical manifestations rather than mental[64]. Such differences in description and perception of health conditions can be identified through feedback and consultation with diverse stakeholders, community leaders, LHEs, and participants themselves.

Finally, interventions also achieved cultural adaption through the concept of bi-culturalism. Bi-culturalism refers to the existence and celebration of multiple cultures within a person, place, or situation[60]. Interventions accomplished this through the integration of participants' cultures throughout all components of the intervention: meals being halal/kosher, multi-faith prayers and blessings, multiple language offerings, culturally diverse professionals, etc. [58,68,73,75,84]. Adding such inclusive components and encouraging participants to celebrate their cultural heritage reduced harmful acculturative stressors to assimilate into host-country expectations and also lowered feelings of social isolation. The minimization of these acculturative stressors also lead to increased comfort with intervention professionals, retention rates, sustainability, as well as overall efficacy[58,68,73,75,84]. Moreover, purposefully tailoring the design, content, and evaluation structures of interventions to better fit and celebrate migrant participants' cultural backgrounds improves almost all metrics for intervention investment, efficacy, and sustainability.

Table 10: Recommendations for Cultural Adaptation

	Recommendations
Intervention Design/Content	-Tailor all intervention content and materials to the specific ethnicity, cultural background, language, and faith of desired participants -Consult and gain feedback on all aspects of intervention from community leaders, community members, and professionals of diverse linguistic and cultural backgrounds to ensure content is applicable and relevant -Emphasize the inclusion and celebration of migrant cultural backgrounds

	-Include culturally relevant foods, prayer, dancing, etc. when appropriate -Prioritize the inclusion of professionals and facilitators of similar cultural and linguistic backgrounds to migrant participants
Intervention Evaluation	-Use pre-validated adapted evaluation tools when available -Especially for mental health interventions (Appendix 10) -Informally validate all unvalidated questionnaires and interview guides with community leaders, diverse professionals, and participants for language corrections, moral approval, content changes, and wording feedback -Employ diverse mediums for evaluation to accommodate for those of low language proficiency, literacy, and numeracy -Verbal and in-person methods to supplement written and Likert scale assessments
Advantages	-Increase program relevancy, retention, participation, and efficacy -Reduce social isolation and resiliency, and increase comfort and commitment
Disadvantages	-Time consuming to conduct consultation with stakeholders
Application Areas	-Important for all programs that aim to involve migrant populations -Especially important for lifestyle and mental health programs

5.2 Peer-based Education and LHEs

Peer-based education and navigation, otherwise referred to as LHEs or LHNs, provided low-cost, culturally-tailored social, medical, and legal guidance for intervention participants in this review[63,66,68,73,76,79,81,86]. LHE/N interventions involved "training the trainer" programs, in which professionals trained lay individuals to provide baseline or low-complexity educational information or navigation services to target populations. In this way, LHE/Ns acted as liaisons between professionals and target participants in order to reach more isolated groups, mitigate the mistrust of healthcare services common amongst marginalized populations, and relieve bureaucratic pressure from overstretched medical and legal services[63,66,68,73,76,79,81,86].

Within this review, these LHE/N programs were cited as one of the most successful ways of bridging the barriers and difficulties associated with accessing health and legal services. LHE/Ns within these programs often facilitated traditional educational seminars or social support groups with participants[66,73,81]. These seminars involved role plays, nutritional information sharing, skills demonstrations (condoms, etc), and education on mental health coping mechanisms. Additionally, LHNs were often employed for medical or legal service navigation to improve knowledge of individual rights and how to access services[68,76,86]. These LHNs facilitated communication between professionals and migrants through translation or advocacy work, provided legal or medical referrals to appropriate organizations or professionals, or simply introduced migrant participants to host country health systems and housing programs.

In contrast to these more traditional LHE/N programs, two programs employed a more embedded and casual LHE/N approach by training individuals or leaders within group settings (church groups, soccer teams, etc.) to be informal educators and promoters [63,79]. These LHE/Ns would provide general information regarding screening programs or health programs

during social times or individually rather than formal classroom or professional settings. These informal advocates therefore served as sources of information and advice for groups and individuals within their own social and familial circles, providing a broader diffusion of information across communities[63,79]. These more informal programs were found to be very effective in hyper-masculine spaces when addressing highly stigmatized health issues (HIV, sexually transmitted infections (STIs), safe MSM sex practices) as they reduced the visibility of participation and allowed for more discretion due to the more informal education environments.

While differing in topic or strategy, all LHE/N programs in this review were explicit in their desire for all LHE/Ns to be of the same or relevant linguistic and/or ethno-cultural background as the migrant participants they aided[63,66,68,73,76,79,81,86]. Interventions cited that ethno-culturally-matched LHE/Ns had the ability to mitigate the barriers of cultural relevance and competency that reduced access and retention in traditional health programs. Matched LHE/Ns tailored information and advice through their own cultural lens to increase the perceived pertinence and applicability to the migrant participants they worked with[63,66,68,73,76,79,81,86]. Additionally, matched LHE/Ns had a more robust understanding of the many cultural norms, stigmas, or conceptions of health that affected migrant participant's relationship with the health program. This cultural understanding was shown to decrease wariness and fear of discrimination which subsequently lead to more participant engagement, retention, and confidence[63,66,68,73,76,79,81,86]. Thus, LHE/Ns became excellent middle men for facilitating a wide variety of important intervention needs: effective information sharing between professionals and participants of differing ethno-cultural backgrounds, navigators of convoluted host-country bureaucracy, and sources of important input for cultural adaptation.

With regards to recruitment and stakeholders, students and young professionals represented some of the most important stakeholders for LHE/N programs within the review. Universities, especially, proved to be useful for recruitment of LHE/Ns as they have a potential volunteer base of more diverse ethnicities and cultural backgrounds than the general public due to demographic trends and international students[68,86]. Educational recruitment locations also provided LHE/Ns currently in training for medical or social disciplines, as LHE/Ns were often graduate or undergraduate medical, physiotherapy, public health, or social work students. University students thus represent a population with disproportionately more time, knowledge-base, and pertinent cultural background to be successful, culturally-adapted LHE/Ns.

Lastly, LHE/N programs not only provide an important strategy for better reaching and aiding migrant populations, but also provide an opportunity to establish deployable networks in emergency situations as well. For example, the Irish Red Cross employed a highly successful LHE intervention in prisons to control the spread of TB and conduct health

promotion programs[89]. This established infrastructure became invaluable upon the onset of the COVID-19 pandemic, as the Irish prison system employed these LHEs to also inform prison populations regarding infection containment and prevention measures. This coordinated effort allowed the Irish prison system to record no COVID-19 transmission until October 2020, an impressive feat given that many countries saw their prisons immediately become the epicenter of COVID-19 outbreaks[89–93]. Moreover, LHE/N programs have the potential to not only be health promoters and navigators, but an on-hand resource to disseminate information and guidance during times of emergency as well.

Table 11: Recommendations for LHE/Ns

	Recommendations
Intervention Design/Content	-Prioritize training volunteers to act as LHE/Ns for identified health issues -Have recruited LHE/Ns act as cultural consultants for cultural adaptation of intervention content and implementation strategies
Intervention Recruitment	-Capitalize on LHE/N social networks for recruitment of participants -Recruit LHE/Ns from universities and community organizations -Prioritize culturally and linguistically relevant individuals to migrant populations -Individuals of Turkish, Surinamese, Moroccan, Aruban, etc. descent[45] -Create strong relationships with universities and clubs so they become consistent sources of LHE/Ns
Intervention Implementation	-Match all LHE/Ns by linguistic and ethno-cultural background of migrant participants
Advantages	-NLRC already has large, established networks of volunteers and satellite organizations perfect for training and creating LHE/N networks -LHE/N programs are cheap as programs run on volunteers and are largely self-sustaining following LHE/N training -Increased cultural competency of intervention providers as matched-LHE/Ns will have cultural and language abilities -Versatile strategy that proved to be successful for health, legal, and bureaucratic issues
Disadvantages	-Front-ended resource requirements for establishing programs and training LHE/Ns
Potential Application Areas	-LHE-run education and support groups for all health subjects -LHNs placed in medical, legal, and intervention locations to assist with bureaucracy and translation services -Imbedded LHE/Ns in social groups for stigmatized health issues -Emergency deployment of LHE/N networks for information and resource dissemination (COVID-19 vaccine information, sanitary measures, social safety nets, etc.)

5.3 Multi-level Interventions

Multi-level program structures were also commonly employed in order to address social and spatial inequalities affecting migrant health. Multi-level program structures constitute interventions which employ a combination of program topics or components within the same intervention (i.e. medical and legal information, education and screening programs, etc.)[94]. By employing varying strategies, the intervention can address many sources of inequality (language, mental health, environmental, legal, etc.) within a single intervention. In utilizing multiple strategies and addressing multiple barriers, multi-level interventions also necessitate

trans-disciplinary design and therefore often address not just the medical but also the social determinants of health[95]. This ability to address multiple barriers or vulnerabilities allows multi-level interventions to confront the intersecting barriers that result in migrant health inequalities. In sum, multi-level strategies require a level of program breadth and complexity that better addresses and reflects the breadth and complexity of socio-spatial health inequalities.

In fact, over half of interventions (n=22, 65%) within this review employed multi-level approaches (Appendix 5). Of these multi-level interventions all employed at least one of two strategies: multiple topics or multiple program types. Multi-topic interventions utilized one form of program, often education, but provided educational material on multiple subjects (i.e. sex education and housing information) (Appendix 5.2). This multi-topic strategy was most commonly employed in education programs to provide information on upstream health determinants along with traditional health promotion[72,73,81–83]. For example, an educational nutrition program that focused on providing information on portion sizes, healthy eating, and diabetes, also provided information and explanations of migrant rights to medical and legal services[73]. In another case, a health system navigation program provided assistance locating general and mental health services as well as guidance on symptom communication and cultural differences in medical care[82]. Thus, employing a multi-topic program allowed for interventions to address multiple areas of vulnerability, resulting in an intervention that better addressed the many ways migrant populations can be disadvantaged.

In contrast to multi-topic interventions, the more common multi-level strategy was multi-program: interventions that employ multiple different components in tandem (education, screening, social support, etc.) (Appendix 5.1). For example, a group therapy intervention also involved a South Asian dance class and women's walking group[75]. Participants were thus able to engage in therapy to address mental health disparities, as well as have the mental health benefits of a culturally-adapted, socially-supportive, fitness program. A more traditional combination of interventions involved breast cancer education regarding health risks and screening information in conjunction with a free breast exam and medical consultation[69]. This multi-level strategy thus addressed both health literacy and access barriers concurrently by providing culturally adapted information regarding breast exams as well as a free on-site medical consultation. Multi-program strategies therefore present the opportunity to address multiple health barriers within a specific health topic, thereby allowing for a more holistic approach to addressing health disparities.

Multi-program strategies can also allow for the trial of non-health or novel programs. For example, one intervention supplemented a social support group to combat poor mental health outcomes in migrant women by also providing each participant with a free mobile phone[77]. Another supplemented an education course on healthy lifestyles by providing money to participants so they could afford fitness appropriate clothing and shoes[65]. These novel

approaches of providing resource and monetary assistance lowered systemic and financial barriers to full participation and boosted the participant's ability to fully reap the benefits of the social support intervention[65,77]. This trial of novel programs could be utilized for other non-traditional programs found within this review like a mobile grocery store food truck, a transportation collaboration with Uber, or a new-born health video education program[74,78,83,85]. While these programs were not implemented as multi-program interventions, they have the potential to bolster the effectiveness of more traditional educational, screening, and health promotion programs through the removal of financial, geographic, and language barriers. Moreover, multi-level strategies provide opportunities for the mixing of methodologies and the trial of non-traditional approaches to create more comprehensive and effective interventions.

While many programs found success in combining one or two subjects and programs together within one intervention, other interventions employed multi-level approaches on a broader scale: health fairs and culturally-specific health clinics[63,67,68]. These two strategies provide one-stop, centralized events or places that can cater to the specific needs of migrant populations. The health fair within this review was able to combine the strategies of LHE/Ns, education programs, free screenings, medical and legal referrals, and social support all within one intervention because of the centralized nature of a one-time, one-location event[68]. This event represented an integral source of health information for participants and addressed cultural, insurance, language, and financial barriers all in one, with the added benefit of cultural celebration through food and community interaction. Culturally-specific health clinics, on the other hand, can provide a similar breadth of programming but represent a more sustained presence within the community[63,67]. Just like the health fair, these clinics can tailor all programs for the migrant population and their unique needs and chronic stressors (migration, racism, discrimination, homophobia), while also remaining open and available year round. In fact, Schepisi et al. found that in comparison to a mobile health clinic for TB identification and treatment, a culturally-specific health clinic was the most effective and accepted by migrant participants likely due to its consistent presence within the community[67]. Moreover, health fairs offer a multi-level intervention opportunity for a wide variety of health services, social programs and cultural celebration, while culturally-specific health clinics represent a more resource intensive but potentially more effective strategy to accomplish a similar goal.

Table 12: Recommendations for Multi-level Interventions

	Recommendations
Intervention Design	-Combine multi-disciplinary components and approaches to address multiple barriers and disparities within the same intervention -Include either multiple topics or programs together that address diverse forms of inequalities or barriers (Examples in Appendix 5) -Collaborate with health clinics that cater to migrant populations or are located within migrant-dense neighborhoods to bolster or expand offered or existing programming -Create or join large health fairs geared towards the migrant community

Advantages	-Address multiple inequalities and barriers making interventions more successful -Better aid most vulnerable migrant communities (women, LGBTQ, etc.) who experience diverse forms of discrimination, inequality, and social isolation and benefit the most from intersectional interventions
Disadvantages	-Multi-disciplinary programming requires more collaboration between NLRC teams, managers, and departments -Health fairs and health clinics require high monetary, planning, and time resources
Application Areas	-Have NLRC teams addressing Nutrition, Legal Rights, and Undocumented Healthcare collaborate to expand each team's programming to include information regarding the other topics/programs or include aspects of each intervention together -Expand health-focused education programs to include social support groups, resource provisions, sports programs, Dutch language classes, etc. -Expand health-focused programs to include topics regarding employment assistance, legal assistance, Dutch bureaucracy navigation, etc. -Provide LHE/Ns or other resources to clinics in migrant-dense areas to bolster translation resources, education programs, and healthcare navigation ability

5.4 Community-based Participatory Research

One tactic to accomplish cultural adaptation is community-based participatory research (CBPR), which refers to the full involvement of important community stakeholders in all aspects of intervention development, implementation, and evaluation[96]. CBPR emphasizes the collaboration with communities, so that interventions address locally-identified concerns with strategies created by and for community members[96–98]. In contrast to other community-based research tactics, CBPR involves and imbeds community members within all stages of interventions, from development to implementation. CBPR thus requires the full input of communities into not only what they believe are the issues needing to be addressed, but also what strategies they believe would be best to address them and what goals they desire from the intervention[96–98]. Within this review, 15% (n=5) of interventions utilized CBPR in order to identify important health issues, improve cultural adaptation, and strengthen their efficacy[61,62,79,81,86]. This meaningful involvement allowed for greater tailoring and cultural adaptation of interventions to fit community needs, which resulted in interventions that employed the tactic observing increased trust and engagement from communities of interest.

While all interventions that employed CBPR cited the strategy as being integral to proper identification of community needs, CBPR proved to be especially effective for more complex and stigmatized issues like sexual and mental health. These issues often have multiple cultural norms or culturally-specific stigmas attached to them, and thus benefit the most from incorporating community voices into all aspects of intervention development and implementation[61,62,79,81,86]. For example, through direct community involvement from organizations, leaders, and members, an intervention aiming to improve the sexual health and burden of HIV in Latina migrant populations in the USA found that simply providing condoms and sexual health education resources were not perceived to be helpful or effective by the

community[61]. Migrant women and migrant camp workers explained that self-efficacy and lack of ability to negotiate safe sex practices were upstream barriers to implementing safe sex practices into their lives. Following further partnership and consultation into the design of the intervention, the authors introduced role playing and group exercises into an existing sex education course that allowed for women to practice partner communication and safe sex negotiation strategies in conjunction with learning about HIV screening and sexual health information[61]. This dual approach resulted in significantly increased safe sex practices, condom use, as well as knowledge levels regarding HIV. In this case and others within this review, the meaningful involvement of community members through the CBPR process allowed for better identification of not only health barriers but of strategies to combat those barriers as well.

In addition to improving the cultural adaptation and community engagement in interventions, CBPR can also increase the sustainability and long term effects of an intervention. The highly involved nature of CBPR necessitates that community organizations and members have a deep knowledge of the process, methodology, and rollout strategies of the intervention, which often requires that community members are trained in the methods of intervention implementation. This considerable training and engagement of residents and organizations, while resource intensive in the initial phase of rollout, reaped benefits in the long term as programs that utilized CBPR observed these stakeholders remaining dedicated and involved in research and community action years after their initial training[79,81]. One intervention saw their LHE networks and community center stakeholders even expand their mental health workshop to include language courses, driving lessons, and citizenship classes[81]. Therefore, the large investment of time and resources necessitated by the CPBR process improves intervention longevity through the cultivation of community ownership, emphasis on self-sustaining programming, and focus on strengthening community networks.

Table 13: Recommendations for CBPR

	Recommendations
Intervention Design/Content	-Place community members, leaders, and LHEs in prominent roles within design, implementation, and evaluation decisions -Collaboration in identifying: -What community needs are -What strategies they perceive as useful -What is perceived as a successful program -Ensure these stakeholders have a level of comfort and in-depth knowledge of program structures and strategies to feasibly continue to run and implement interventions alone
Advantages	-Highly successful strategy to ensure effective cultural adaptation -Increases community buy-in and sustainability of intervention
Disadvantages	-Costly and time consuming
Application Areas	-Applicable to all programs that aim to involve migrant populations -Due to cost and resource constraints, most useful for stigmatized health areas -Sexual health, women's health, mental health

5.5 Mental Healthcare

Of the interventions within this review, 53% (n=18) cited mental health as the most or one of the most important health issues needing to be addressed[53–60,62,64,71,72,77,80,81,84–86]. However, mental healthcare can be more difficult to access due to financial barriers, cultural stigmas, and the high threshold for access (i.e. only those with severe symptoms are eligible for psycho-therapy)[54,56–58,60,71,77,80,85]. Additionally, without prompt treatment of mild to moderate symptoms, a person's mental health can severely deteriorate, especially under the previously mentioned stressors associated with the migrant experience (i.e. acculturation, social isolation, discrimination, etc.). Due to these issues, the mental health components and interventions within this review emphasized the need for mental health to not only be centered as a serious public health issue, but to work to make mental healthcare more accessible to migrant groups.

One of the strategies employed to subvert mental health barriers were step-wise programs. Step-wise programs provide both informal and formal mental healthcare options for those with mild to severe symptoms[57,63]. Step-wise interventions often employed social support groups lead by culturally-relevant facilitators for those with mild or moderate symptoms, and psycho-therapy and treatment options with trained mental health professionals for those with more serious or severe symptoms. By providing multiple entry routes, step-wise programs allowed for those with mild symptoms to have their needs addressed and addressed early, leading to better efficacy rates for treatment and the prevention of escalation into more severe symptoms[57,63]. For those with more severe symptoms, step-wise care provided them more attention and resources leading to more focused and integrative care. Additionally, the multiple levels of care can act as a screening tool to identify those who are at-risk or in need of more involved care[57,63]. Moreover, step-wise mental healthcare can assure that those with mild symptoms will still receive care, while also providing the space for those with serious symptoms to have more targeted care.

While psycho-therapy and more involved mental health interventions are most effective at treating PTSD, depression, and other mental health issues, the resources required for diagnosis and treatment are incredibly high[57,63]. Therefore, interventions within this review stressed the importance of lower cost, informal approaches, especially group-based approaches[54–57,62,63,71,72,77,80]. These group programs were structured in a variety of ways: psycho-education groups, social support groups, art groups, and sports teams. These informal, group sessions allowed for the discussion and sharing of a diversity of issues regarding mental health (i.e. food insecurity, violence, depression, empowerment, social isolation, etc.)[54–57,62,63,71,72,77,80]. The sharing of these experiences with those of a similar cultural and linguistic background allowed for discussions and education seminars to not only create safe spaces to share difficult experiences, but also provide healthy coping strategies

and the introduction of social support networks. One intervention also employed structured dialogue within the social support group intervention to allow for group facilitators to intentionally introduce more personal or stigmatized issues in order to prompt the discussion and subsequent processing of trauma related to those subjects[72]. Provision of informal groups or education cohorts can also reduce the accumulation of stressors that lead to high morbidity or severe mental health manifestations in migrant groups, as multiple interventions found that these group support programs were effective at preventing the symptoms of distress and further deterioration of mental health consequences[54,56,57,62,63,72,77,80]. Group approaches thus represent a low-cost way to address the scarcity and difficulty of qualifying for mental health care services through the introduction of more accessible and informal options.

Table 14: Recommendations for Mental Health

	Recommendations
Intervention Design/Content	-Expand mental healthcare programs offered -Make mental healthcare programs step-wise -Informal sessions open to all with no symptom requirements -support groups, sports activities, art programs -Formal sessions tailored for those with severe symptoms -psycho-therapy, family-based therapy -Prioritize creation of informal group sessions -share and speak about topics like migration trauma, discrimination, depression, social isolation, acculturation pressures, and gender violence -utilize structured dialogue to steer conversation towards more difficult topics -Create spaces for specific gender, language, and/or cultural backgrounds -separate groups by gender, language, and cultural background -ensure all therapists and facilitators are bilingual and preferably of similar ethno-cultural background -at minimum provide linguistically matched interpreters
Advantages	-Lower barriers to receiving mental health treatment -Increase provision of early intervention which minimizes symptom progression -Increase comfort and participation in interventions
Disadvantages	-Formal mental health interventions remain incredibly costly
Application Areas	-Step-wise programs or informal group sessions addressing common mental health issues and vulnerabilities can represent stand-alone interventions or additions -Due to cost and resource constraints, informal group sessions and activities run by training facilitators or LHE/Ns represent least costly application

5.6 Faith-based organizations

Faith organizations proved to be an effective asset for interventions within the review to address socio-spatial inequalities. In total, almost one third of interventions (n=10, 29%) utilized faith organizations and leadership to gain access to participants, to promote recruitment, or to use the physical buildings as sites for implementing the interventions themselves[59,60,64,66,68,69,71–73,81]. Faith organizations were central community institutions for both religious and non-religious services, and often represented the main agencies aiming to meet the social, mental, and physical health needs within marginalized communities. Community

members and faith leaders within these organizations also proved to be powerful stakeholders for health and human rights, aiding in health promotion, infection prevention, and more[59,66,68,72]. Importantly, these faith leaders provided moral approval of programs addressing stigmatized health issues like mental health, HIV screening, and women's health[59,66,68,72,77]. This moral approval is integral to intervention success as it increased uptake, especially for women, and decreased common misconceptions and stigma regarding mammograms, STI testing, and depression and anxiety. With regards to recruitment, faith organizations had powerful tools including social programs, announcements during religious services, and referrals from leaders and organizers[64,71,72,81]. Altogether, faith organizations represented an integral and lucrative partner for designing, implementing, and recruiting participants for this review's interventions.

While faith organizations represented a common and effective resource in this review, all but two interventions that included faith organizations were conducted in the USA[60,66,68,69,71–73,81]. This reflects a broader and widely-held hesitancy with partnering or working within faith organizations and networks due to possible ideological differences and conflicts of interest[99,100]. This hesitancy is born out of longstanding issues involving some religious institutions' views and practices regarding women, LGBTQ individuals, and sexual health, as well as the need for large aid organizations to remain impartial[99–101]. Although some religiously-aligned organizations may promote ideologies that are antithetical to public health or organizational principles, many religious organizations remain dedicated to health equity and the promotion of quality care in their communities[99,100,102]. These vital community centers provide such large scale opportunities for partnerships and greater access to at-risk individuals that they should not be excluded from stakeholder status because some religious organizations hold more radical viewpoints.

Table 15: Recommendations for Faith Organizations

	Recommendations
Intervention Design	-Include faith leaders and members into design process -top religious affiliations in the Netherlands: Christian, Muslim, Hindu, Buddhist[103] -Gain moral approval of faith leadership for all interventions (when possible)
Intervention Recruitment	-Utilize leadership referrals for recruiting stakeholders, LHE/Ns, and participants -Utilize reach of faith groups by advertising in religious bulletins, announcements during services, social networks, or flyers in faith groups
Intervention Implementation	-Aid important existing programs already being completed by faith organizations -provide NLRC resources and expertise to already existing programming
Advantages	-Increase recruitment, participation, and retention in programs -Reduce costs of creating and implementing programs by supporting existing programs
Disadvantages	-Potential conflicts of interest with faith organizations
Application Areas	-Partnerships to increase relevancy, retention, moral approval of interventions -Partnerships to increase recruitment of participants, LHE/Ns, and stakeholders -Partnerships to identify potential existing programs for the NLRC to collaborate with

5.7 Demographic Data Collection

Demographic data (sex, ethnicity, race, language SES, etc.) was taken in almost every intervention. This information was utilized for a wide variety of purposes, most commonly to analyze if all participants were equally benefitting from the program. This information allowed for one intervention to observe that men were dropping out at a higher rate than women, and thus their strategies in the future would aim to implement new tactics to better retain men[63]. Through ethnicity and language ability data, a TB intervention discovered that individuals of certain ethnicities and language abilities were being misdiagnosed and provided improper care at a higher rate because care staff were not providing verbal diagnostics for those of low literacy or multi-language diagnostics for those without host language ability[70]. In addition to identifying inequalities, demographic information regarding gender, ethnicity, and sexuality were also utilized to match LHE/Ns with participants of similar identities[63,66,68,73,76,81]. Taking the demographic information of both participants and volunteers thus allowed for researchers to analyze if any inequities existed within their intervention, and also gave the authors the ability to match professionals and participants by ethno-cultural background.

While all interventions obtained demographic data from their participants, many organizations, especially European organizations and nations, remain hesitant to collect data regarding ethnicity or race[104–106]. This hesitancy is born from historical traumas regarding the classification of Jewish, Roma, and LGBTQ individuals during the Holocaust. Although this hesitation is understandable, individuals of non-Western ethnicities and non-White races experience marginalization and discrimination from ethnic majorities in European countries that result in the many health barriers discussed in this review[23,35,42,52,106]. Without collection of this demographic data, organizations and countries do not know where, when, or which groups may be experiencing worse health and wellness outcomes. Therefore, not collecting demographic data on participants and volunteers does not lead to less discrimination but simply reduces our ability to measure it.

Table 16: Recommendations for Demographic Data

	Recommendations
Intervention Recruitment	-Emphasize recruitment of volunteers, stakeholders, and LHE/Ns of diverse ethno-cultural and linguistic backgrounds
Intervention Implementation	-Whenever possible match interpreters, LHE/Ns, and professionals by linguistic and ethno-cultural background
Intervention Evaluation	-Collect data on gender, age, ethnicity/race, country of origin, native language, SES -Analyze if any groups are benefiting more/less from program, perceiving the program as more/less helpful, or being disproportionately included/excluded -Evaluate if demographics of participants reflects demographics of volunteers and program operators
Advantages	-Diverse volunteers, therapists, LHE/Ns, and professionals increase efficacy of programs -Provides ability to analyze if inequalities exist in interventions, and provides insight on what changes should be made
Disadvantages	-Taking ethnicity and racial data can be sensitive subjects for participants and volunteers

Application Areas	-All programs can benefit from evaluation of outcomes by demographic indicators -Especially applicable for programs that benefit from ethno-cultural matching -LHE/N, mental health professionals, interpreters, etc.

5.8 Concluding Recommendations

Table 17: Concluding Recommendations for NLRC

	Recommendations
Intervention Design	-Culturally adapt all intervention content and materials to the specific ethnicity, cultural background, language, and faith of desired participants using: -CBPR when resources available -Pre-validated, culturally adapted questionnaires when available -LHE/Ns, community members, and faith leaders as cultural consultants and partners -Create LHE/N training programs for variety of health subjects: -Dutch health system navigation -COVID-19 safety and vaccination education -Mental health, sexual health, housing, employment, social services eduation
Intervention Content	-Prioritize multi-level interventions in all NLRC Teams: -Multi-disciplinary intervention topics or structures -Trials of new or non-traditional programs -Step-wise mental health interventions -Employ group social support sessions as supplements to NLRC interventions -For both step-wise mental health programs and general health and legal programs
Intervention Recruitment	-Capitalize on LHE/N and faith-based social networks -Recruit LHE/Ns from universities and community organizations
Intervention Implementation	-Match interpreters, LHE/Ns, and professionals by linguistic and ethno-cultural background of migrant participants
Intervention Evaluation	-Employ diverse mediums for evaluation to accommodate for those of low language proficiency, literacy, and numeracy -Analyze efficacy metrics by demographic background (gender, ethnicity, etc.) -Evaluate demographic diversity of volunteers, LHE/Ns, and program operators

6. Strengths and Limitations:

This review contains both strengths and limitations. Firstly, this review may be limited by the lack of diversity in intervention countries included. The review is heavily dominated by interventions conducted in the USA (53%, n=18). Additionally, all articles in the review are from three continents: North America (n=19, 56%), Europe (n=11, 32%), and Australia (n=4, 12%). This may be due to different cultural vocabulary regarding inequalities and health, or due to the exclusion of non-English research articles. However, this outcome is also likely due to these three regions receiving many more migrants than other OECD-defined HICs like Chile, Japan, and South Korea, and therefore conducting more research on migrant health experiences[51,107]. For a more comprehensive report on migrant inequalities worldwide, a review could be conducted in non-OECD HICs and LMICs, focusing particularly on countries with large migrant populations like Lebanon, Sudan, and Turkey[51,107,108]. Additionally, the review was limited by the general nature of vocabulary regarding health inequalities, and the inability to include all potential words within the search strategy. While limiting the scope of

the review, the chosen search terms were still extensive enough to provide a comprehensive collection of interventions which addressed health barriers ranging from social exclusion to transportation to HIV stigma.

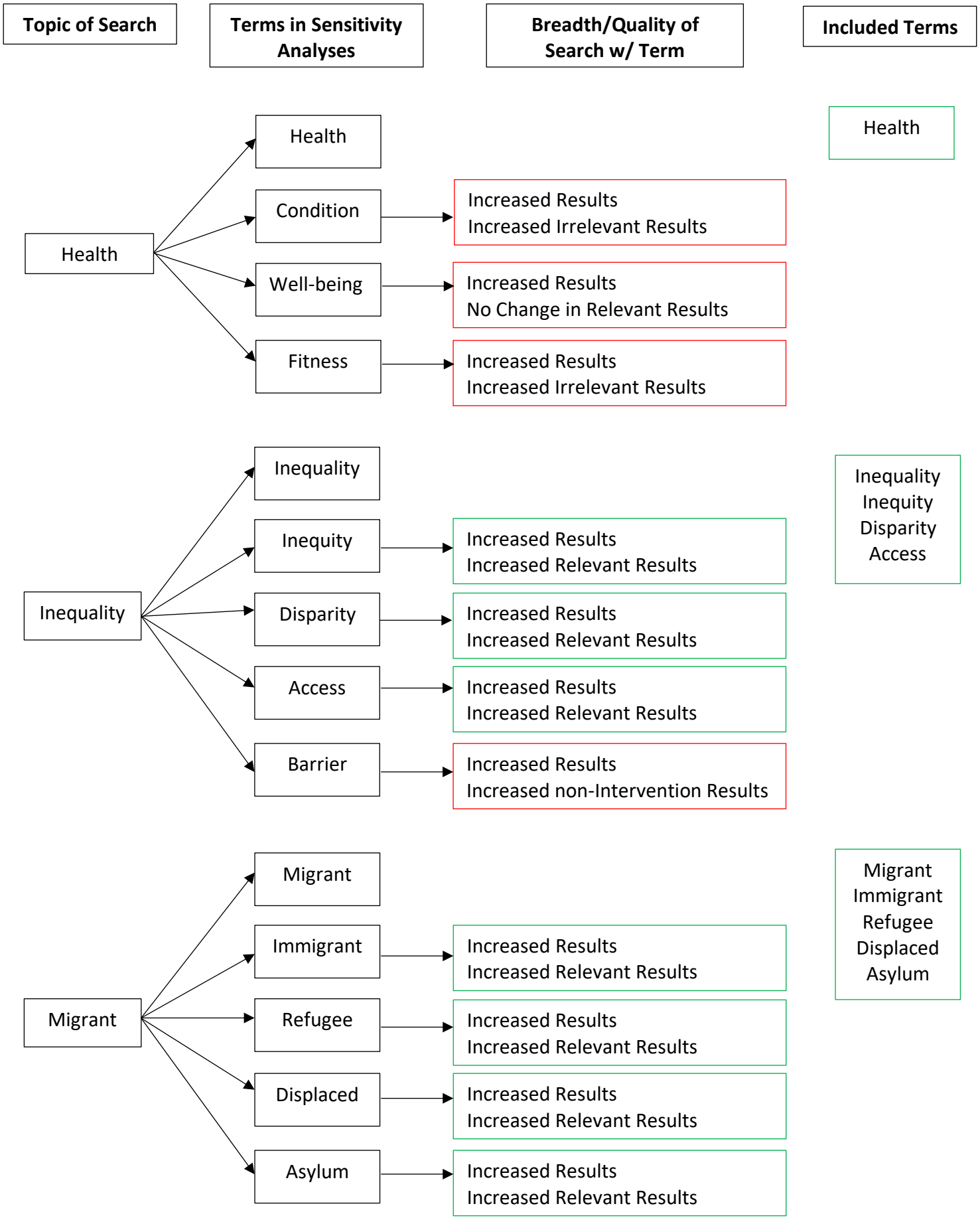
Furthermore, this review represents a strong contribution to the field of health inequalities, as inequities relating to the migrant experience in HICs deserve more focused research. Additionally, this review is the first to emphasize the need to collect evidence-based interventions to bridge the divide between academic and applied migrant socio-spatial inequalities work in HICs. The broad scope of the review allowed for the analysis of a diversity of issues, interventions, and strategies to combat these inequalities, and provides the NLRC with important first steps to tailoring their policies and programs to better address the needs of this vulnerable and at-risk population. Importantly, this breadth allowed the analysis to minimize the limitations of previous research which attempts to distill migrant inequalities into one or two concepts (SES, race, etc.)[17,18]. Altogether, this review collates and provides innovative and inter-disciplinary guidelines for improving the design, implementation, and evaluation of migrant health interventions that moves the field closer to creating effective frameworks for addressing the needs of this vulnerable population.

7. Conclusion:

The results of this study provide the NLRC with important vulnerabilities and barriers to focus on, as well as recruitment strategies, stakeholders, evidence-based intervention styles, and evaluation methods to integrate into their programming. Future NLRC actions should be sculpted to reflect both the cultural diversity of migrant populations in the Netherlands, as well as the diversity of inequalities that migrant populations and sub-populations experience in HICs. These results also highlighted the importance of mental health and social support, and the need to address the detrimental impact of acculturative stressors like discrimination and assimilation pressures. Most importantly, this review demonstrates the necessity of integrating migrant populations into all aspects of programming designed to help them; whether in the design process during CBPR, the recruitment process through social networks, or the implementation process through ethno-culturally matched LHE/Ns and professionals. Altogether, the recommendations within this review capture simple, applicable strategies for improving health interventions within this population, and represents the first step to better understanding how and why public health interventions have yet to adequately and effectively address migrant inequalities in HICs.

Appendices:

Appendix 1: Key Word Sensitivity Analysis



Appendix 2: Search Strategy

PubMed:
(health[Title/Abstract]) AND (((((((inequality[Title/Abstract]) OR (inequalities[Title/Abstract])) OR (inequity[Title/Abstract])) OR (inequities[Title/Abstract])) OR (access[Title/Abstract])) OR (disparity[Title/Abstract])) OR (disparities[Title/Abstract]))) AND (((((migrant[Title]) OR (refugee[Title])) OR (immigrant[Title])) OR (undocumented[Title])) OR (displaced[Title])) OR (asylum[Title])

Filtered for:
- English
- Articles published after 1/1/2016

Web of Science:
(health[TS]) AND (((((((inequality[TS]) OR (inequalities[TS])) OR (inequity[TS])) OR (inequities[TS])) OR (access[TS])) OR (disparity[TS])) OR (disparities[TS]))) AND (((((migrant[TI]) OR (refugee[TI])) OR (immigrant[TI])) OR (undocumented[TI])) OR (displaced[TI])) OR (asylum[TI])

Filtered for:
- English
- Articles published after 1/1/2016
- OECD-defined HIC countries (Appendix 3)

Appendix 3 : OECD-defined HICs[109]

- Australia
- Austria
- Belgium
- Canada
- Chile
- Czech Republic
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Israel
- Italy
- Japan
- Latvia
- Lithuania
- Luxembourg
- Netherland, the
- New Zeeland
- Norway
- Poland
- Portugal
- Slovak Republic
- Slovenia
- South Korea
- Spain
- Sweden
- Switzerland
- United Kingdom
- United States

Appendix 4: Data Charting

Data Charted	Rationale	Example
Article Characteristics: - PMID - Web Link - Title - Authors - Publication Date - Country	- Information to identify and find article - Information to categorize the origin and date of dissemination	- 30973115 - URL - Full Article Title - Nickerson, A; … - 15/04/2019 - Australia
Inequalities Addressed: - Health Category/Inequality - Barriers Identified - Demographic (if specified)	- Inequality/ies identified that require attention - Barriers to accessing health/resources - Group of migrants identified as being particularly at-risk/in need of attention	- Mental Health, Infectious Disease, etc. - Language Barrier - Adult Women
Intervention Characteristics: - Name of Intervention - Intervention Type - Intervention Description	- Name to identify intervention (if provided) - Intervention type to identify trends in types of interventions found and find similarities in NLRC programs - Description to outline length, content, and style of intervention	- Ventanillas de Salud - Screening Program - 11 module course on mental health stigma, self-stigma for PTSD, help seeking behavior
Stakeholder Information: - Place of Recruitment - Stakeholders	- To identify lucrative places for the recruitment and contacting of migrant populations - To identify important stakeholder to contact in order to improve the design and implementation of interventions	- Church services - Medical Students
Indicator Information: - Assessment Method - Descriptive Indicators - Intervention Indicators	-To collect forms of intervention assessment strategies, as well as the indicators collected to describe participants and the efficacy of the intervention	- Online assessment pre- and post-intervention with 1 month follow up - Age, Ethnicity, etc. - # of doctors visits, etc
Main Results	- Long form description of results from intervention - Any key concepts regarding the intervention, the community, or the theories used for the intervention	-Intervention participants showed less increased self-stigma for help seeking in post follow up
Key Concepts	- To collect any important theories, tactics, or frameworks utilized in the design or rollout of interventions	- Community-based Participatory Research methods - Structured dialogue sessions

Issues Identified	- To identify any issues encountered in intervention implementation that the NLRC can learn from	- Low literacy level affected understanding of Likert Scale - Men not improving significantly in parental training programs
Recommendations	- To synthesize the main recommendations of the research to guide future NLRC programs	- separate sessions by gender - utilize lay health educators for health promotion
Important Information	- to collect any major takeaways, conclusions, or strategies from each intervention	- stepped-care options to accommodate for patients with less and more severe symptoms

Appendix 5: Multi-level Interventions

Appendix 5.1 Multi-Program Interventions

Title	Program Types
Mental Health	
Distribution and evaluation of sense of coherence among older immigrants before and after a health promotion intervention - results from the RCT study promoting aging migrants' capability[55]	- Education Program - Social Support Group
Evaluation of a Trauma-Focused Group Intervention for Unaccompanied Young Refugees: A Pilot Study[56]	- Education Program -psycho-education course - Social Support Group
Randomized Controlled Trial of a Multilevel Intervention to Address Social Determinants of Refugee Mental Health[86]	- Education Program -LHE - Social Support Group
A Mental Health Intervention Strategy for Low-Income, Trauma-Exposed Latina Immigrants in Primary Care: A Preliminary Study[80]	- Art Program -general crafts - Social Support Group
Where PYD Meets CBPR: A Photovoice Program for Latino Immigrant Youth[62]	- Art Program -Photography - Social Support Group
Implementing a Need-Adapted Stepped-Care Model for Mental Health of Refugees: Preliminary Data of the State-Funded Project RefuKey[57]	- Health Navigator Program - Stepped Mental Health Services -formal and formal psychosocial counseling
Peer support groups, mobile phones and refugee women in Melbourne[77]	- Resource Provision - free mobile phone - Social Support Group
War, trauma and culture: working with Tamil refugees and asylum seekers using culturally adapted CBT[59]	- Education Program - psycho-education course - Social Support Group - Therapy
General Health	
Salutogenic health promotion program for migrant women at risk of social exclusion[64]	- Education Program - Social Support Group
A Faith-Based Intervention to Reduce Blood Pressure in Underserved Metropolitan New York Immigrant Communities[66]	- Education Program - LHE - Screening Program
Hay que seguir en la lucha: An FQHC's Community Health Action Approach to Promoting Latinx Immigrants' Individual and Community Resilience[63]	- Education Program - LHE - Social Support Group - Therapy
Promoting positive development among youth from refugee and migrant backgrounds: The case of Kicking Goals Together[84]	- Education Program - Social Support Group - Sports Program - soccer
APA Health CARE: A Student-Led Initiative Addressing Health Care Barriers Faced by the Asian and Pacific Islander American Immigrant Population in Los Angeles[68]	- Education - LHE - Health Fair - Screening Program
NCDs	
Group Dance and Motivational Coaching for Walking: A Physical Activity Program for South Asian Indian Immigrant Women Residing in the United States[75]	- Education Program - Sports Program - walking group and dance class

Increasing Mammography Uptake Through Academic-Community Partnerships Targeting Immigrant and Refugee Communities in Milwaukee[69]	- Education Program - Screening Program
Long-Term Impact of a Culturally Tailored Patient	- Education Program
Navigation Program on Disparities in Breast Cancer Screening in Refugee Women After the Program's End[76]	- Health Navigator Program - LHN
Effects of a culturally adapted lifestyle intervention on cardio-metabolic outcomes: a randomized controlled trial in Iraqi immigrants to Sweden at high risk for Type 2 diabetes [65]	- Education Program - cooking class - Resource Provision - money for clothing, shoes, fitness classes - Social Support Group

Appendix 5.2: Multi-Topic Interventions

Title	Topic Types
Nutrition	
A Cluster-Randomized Controlled Trial to Evaluate a Community-Based Healthy Eating and Nutrition Label Interpretation Intervention Among Latinx Immigrant Mothers and Their Daughters[73]	- Healthy Eating (portion sizes) - Nutrition Label Interpretation - Diabetes - Legal rights
Addressing Syndemic Health Disparities Among Latin Immigrants Using Peer Support[72]	- Culturally-appropriate healthy foods - Empowerment - Social relationships - Mental health and food choice
General Health	
Building Social Capital Through a Peer-Led Community Health Workshop: A Pilot with the Bhutanese Refugee Community[81]	- Healthy eating - Daily stressors of resettlement - Sensitive topics (violence, discrimination, etc.) - Mental health within the community - Coping mechanisms
Development and pilot testing of a health education program to improve immigrants' access to Canadian health services[82]	- Host-country health system information - GPs, sexual health, mental health - Symptom communication - Information on preventative healthcare
Leaving Paper Behind: Improving Healthcare Navigation by Latino Immigrant Parents Through Video-Based Education[83]	- Newborn care -fever criteria, etc. - Rights to interpretation services - Healthcare navigation - Insurance information - Health seeking behavior

Appendix 6: Full List of Identified Vulnerabilities and Barriers

	Number (%) Interventions Identifying Issue
Vulnerabilities to Poor Health	
Social Isolation	11 (32)
High Burden of Disease	10 (29)
Migration Stressors	7 (21)
Experiences of Violence	6 (18)
Acculturation Stress	5 (15)
Lack of Social Support	5 (15)
Delay of Care	3 (9)
Low Self Advocacy	2 (6)
Low Resiliency	1 (3)
Poor Housing	1 (3)
Low Primary Care Usage	1 (3)
Barriers to Access	
General Barriers	
Language	14 (41)
Health Literacy	11 (32)
Financial Barriers	10 (29)
No Access to Preventative Services	10 (29)
Legal Status	4 (12)
Lack of Employment	3 (9)
Lack of Understanding of Health System	2 (6)
Lack of Trust in Institutions	1 (3)
Hectic Work-Schedules	1 (3)
Cultural Barriers	
Overall	19 (56)
Cultural Competency of Professionals	12 (35)
Mental Health Stigma	6 (18)
Perceived Cultural Relevancy	5 (15)
Discrimination	
Overall	16 (47)
Racial	6 (18)
Social Exclusion	5 (15)
Gender	4 (12)
Sexual/LGBTQ	2 (6)
Environmental Barriers	
Obesogenic Environment	3 (9)
Transportation Barriers	2 (6)
Geographic Barriers	1 (3)

Appendix 7: Full List of Recruitment Locations

Recruitment Locations	Number (%) of Interventions Mentioning Recruitment Location
Medical	
GP Offices	4 (12)
Mental Health Clinics	3 (9)
Healthcare Clinics (general)	3 (9)
Hospitals	2 (6)
Free Health Screening	2 (6)
Community Health Clinic	2 (6)
Electronic Health Records	2 (6)
Mobile Vaccine Clinics	1 (3)
Refugee-only clinics	1 (3)
Health Fair	1 (3)
Public Health Service Center	1 (3)
Social	
Faith-based Orgs.	8 (24)
Community Centers	3 (9)
Cultural Events (festivals, etc.)	3 (9)
Community Events	2 (6)
Sports teams	1 (3)
Ethnic Grocery Stores	1 (3)
Legal/NGO	
Official Resident Register	3 (9)
Employment Placement NGO	2 (6)
Refugee Casework Services	1 (3)
Legal Firms	1 (3)
Refugee Resettlement Org.	1 (3)
Child Welfare Agency	1 (3)
Residential	
Migrant-dense Neighborhoods	3 (9)
Settlement Camps	2 (6)
Asylum Accommodation Center	2 (6)
Academic:	
Elementary/Middle/High Schools	2 (6)
Language Classes	1 (3)
Adult-education Schools	1 (3)
Master’s Schools	1 (3)

Appendix 8: Full List of Stakeholders

Stakeholders	# of Interventions Citing Stakeholder (%)
Social	
Community/Cultural Leadership	10 (30)
Faith Organizations	5 (15)
Community/Cultural Organizations	5 (15)
LHEs/Volunteers	5 (15)
Friends/Families (social networks)	4 (12)
Sports Leagues	1 (3)
Local Artists	1 (3)
Female Community Members	1 (3)
Diverse Neighborhoods (members, leaders)	1 (3)
Dance Instructors	1 (3)
Social Medica Page Admin	1 (3)
Immigrant Youth Center	1 (3)
Ethnic Grocers	1 (3)
Medical	
Nurses	6 (18)
GPs	5 (15)
Healthcare Facilities (general)	3 (9)
Occupational Therapist	2 (6)
Mobile Health NGOs	1 (3)
Physician (general)	1 (3)
Medical Technical Assistants	1 (3)
Pediatricians	1 (3)
Hospital	1 (3)
Immigrant Health Center	1 (3)
Health Fair	1 (3)
Physiotherapist	1 (3)
Academic	
Teachers/Professors	3 (9)
Undergraduate Students	3 (9)
University	2 (6)
Master's Students	2 (6)
Occupational Health Students	2 (6)
Medical students	1 (3)
Nursing students	1 (3)
School Administrators	1 (3)
Cultural Anthropologists	1 (3)
Language teachers	1 (3)
Governmental	
Social Workers	5 (15)
Refugee Settlement Service	3 (9)
Government Agencies (general)	3 (9)
Health and Equity Ministry	2 (6)
Asylum Accommodation Center	1 (3)
Office of Community Health	1 (3)
Child Welfare Agencies	1 (3)
Migrant Camp Workers	1 (3)

Culturally-Adapted	
Translators/Interpreters	5 (15)
Refugee-only Health Clinics	2 (6)
Culturally-competent nurses (ethnicity/language)	1 (3)
Bi-lingual health workers	1 (3)
Clinics in diverse neighborhoods	1 (3)
Multi-lingual health navigators	1 (3)
Transcultural Therapists	1 (3)
Mental Health	
Mental Health Professionals (general)	6 (18)
Psychologists	2 (6)
Family therapist	1 (3)
Private Companies/NGO	
Ride-share companies	1 (3)
Migrant Aid Organizations	1 (3)

Appendix 9: Full List of Descriptive Indicators

Indicators	Number (%) of Interventions Using Indicator
Identity	
Age	27 (79)
Country of Origin	17 (50)
Gender	12 (35)
Ethnicity	6 (18)
Sex	4 (12)
Racial Identity	3 (9)
Sexual Identity	3 (9)
Religion	1 (3)
Education	
Education Level	16 (47)
Enrollment Status (school)	1 (3)
Legal Status	
Residency Status (citizen, resident, etc.)	8 (34)
Health Service Registration	5 (15)
Migration Status (migrant, child of, etc.)	2 (6)
Family	
Family Size	8 (24)
Marital Status	6 (18)
Prop. Of Time Spent with Family	1 (3)
Language	
Language	10 (30)
Host-Country Language Proficiency	3 (9)
Desire for Interpreter	1 (3)
Employment	
Employment Status	6 (18)
Income (annual/monthly)	6 (18)
Work Schedule	1 (3)
Perception of Economic Status	1 (3)
Housing	
Location (prefecture, region, etc.)	4 (12)
Hosing Situation (house, camp, etc.)	4 (12)

Appendix 10: Validated, Culturally-Adapted, Mental Health Assessment Tools

Assessment Title	Assessment Subject
General Health	
Warwick Edinburgh Mental Well-being scale	- General well-being
World Health Organization Quality of Life Questionnaire	- Quality of life - Social and environmental health
Short form-36	- Quality of life
Anxiety and Depression	
Patient Health Questionaire-9	- Depression severity
Center for Epidemiologic Studies Depression Scale	- Depression
Hopkins Symptom Checklist-25	- Depression - Anxiety
Generalized Anxiety Disorder-7	- Generalized anxiety disorder
PTSD and Trauma	
Harvard Trauma Questionnaire (HTQ)	- Traumatization
Posttraumatic Diagnostic Scale (PDS)	- PTSD symptom severity
PTSD Checklist for DSM-5	- PTSD symptoms - Depression
DSM-5 Child and Adolescent Trauma Screen (CATs)	- Trauma checklist - PTSS frequency
Refugee Health Screener-15	- Symptoms of distress
Stressful Life Events Screening Questionnaire	- Trauma exposure
Impact of events scale revised (IES-R)	
Social Support	
Multi-sector Social Support Inventory Scale	- Social support
Duke-UNC-11 Social Support Questionnaire	- Perceived social support
Medical Outcomes Study Social Support Survey	- Perceived social support
Multi-dimensional scale of perceived social support	- Perceived social support
Acculturation, Discrimination, and Ajustment	
Post-migration Living Difficulties Checklist	- Post-migration issues and barriers
Three Item Scale for Perceived Discrimination	- Perceived discrimination
Language, Identity, and Behavior Acculturation scale	- Acculturation
Work and Social Adjustment Scale (WSAS)	- Acculturation
Rosenberg's Self-esteem Scale	-Self-esteem
Self-Stigma	
-Self Stigma for Depression Scale	- Self-stigma
-Self Stigma of Seeking help Scale	- Self-stigma
Other	
Perceived Stress Scale-10	- Stress
Sense of Coherence-13 (SOC-13)	- Sense of coherence
Symptom Checklist 90	- Somatization - Psychoticism

Bird's Screening Criteria of Externalizing Behaviors	- Externalizing behavior
Symptom Catastrophizing Scale	- Catastrophizing of symptoms

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Data Extraction Table*

*Due to the large nature of the dataset (23 data columns by 34 interventions), the full dataset was far too large to fit within a word document. Therefore, this table represents 50% (n=17) of the interventions within the review, and 6 of the most important data columns used in analysis.

Author	Health Category/ies	Barriers and Vulnerabilities	Program Type	Recruitment (Location/Tactics)	Stakeholders	Descriptive Indicators
Pfeiffer, E	Mental Health	-mental health stigma -lack of basic psychosocial support -cultural barriers (lack of cultural competence) -migration stressors -common experiences of violence	social support psycho-education program multi-level (program)	Child welfare program	child welfare agencies child mental health services social workers	housing situation (group home, apartment, etc)
Daniel, M	NCDs (CVD, Diabetes)	-financial barriers -cultural barriers (lack of cultural competence) -legal status -language barriers -social isolation -discrimination (general, gender, sexual)	-food truck -other	-referral by food truck manager -multilingual flyers -social networks (snowball sampling)	-(ngo) The Asylum Seeker Resource Center -NGO providing (employment, health and advocacy help to asylum seekers) -food truck community volunteers -undergraduate/masters students -(interpreters) government-operated translation services	-employment status -educational attainment -legal status (visa) -time in host country -age -geography (postal code)
Trilesnik, B	Mental Health	-discrimination (racial) -cultural barriers (lack of perceived relevancy) -language barriers -health literacy -environmental (transportation barriers) -financial barriers -work schedule barriers -educational barriers	-mental health care services (therapy) -social support -education program (lay health p) -multi-level (program)	-electronic health records -healthcare settings -community health clinics	-mental health therapists -community members -culturally competent clinics (language, culture) -social workers	-migration status -legal status (citizenship) -employment status -age -gender -cis/trans identity -sexual orientation -country of origin
Kamaraju S	NCDs (Cancer) (Women's Health)	-high burden of disease -health literacy -cultural barriers (lack of cultural competence) -low access to prevention services	-health navigator program -mental health (stepped) multi-level (program)	-mental health counseling centers	-mental health workers (clinical psychologists psychiatrists psychotherapists) -social workers -(government agency) ministry of social affairs	-gender -age -country of origin -legal status (residency) -marital status -educational level
Spruijt I	Infectious Disease (TB)	-legal status -health literacy l-ack of understanding of health system	-screening program -education program -multi-level (program)	-community centers -ethnic grocery stores -emails	-community centers -ethnic grocery stores -immigrant social media pages -faith-based organizations	-age -geography (city/county of residence) -racial identity

		-low GP usage -delay of care -low access to prevention services		-social media -multi-lingual flyers		-ethnicity -language -legal status (citizenship) -access to primary care provider -health service registration (insurance status)
Valenzuela-Araujo, D	General Health	-language barriers -financial barriers -delay of care -health literacy -discrimination (racial) -common experiences of violence	-screening program treatment	-asylum accommodation centers -public health service clinic	-(government agency) Central Agency for the Reception of Asylum Seekers -nurses (tb specific) -physician (tb specific -medical technical assistants	-gender -country of origin -age -educational level -housing situation -time in host country
Rodriguez-Torres, SA	NCDs (Cancer) (Women's Health)	-migration stressors social isolation -discrimination (gender) -acculturative stress -high burden of disease	-education program -multi-level (topic)	-primary care clinic in racially diverse neighborhood	-pediatricians -physicians -pediatric nurse practitioners	-education level -age -gender -racial identity -ethnicity -educational attainment -country of origin -time in host country -host lang proficiency -family size (number of children in household) -languages spoken at home
Liamputtong P	Mental Health	-discrimination (racial) -social isolation -insecure employment -cultural barriers -financial barriers -legal status	-educational program -health navigator program (lay health n) -multi-level (program)	-hospital	-lay health navigators -community leaders -healthcare facility	-age -racial identity -health service registration (insurance status) -number of clinic visits in past 3 years -language
Pink, MA	General Health (Ment. Health)	-migration disrupting development -discrimination -cultural barriers -lack of understanding of health system -premature termination of treatment -common experiences of violence	-social support -free mobile phone -multi-level (programs)	-referral community leaders of different ethnic groups -social networks -verbal information session -multi-lingual	-community leaders -friends/family	-country of origin -time in host country
Carretier, E	Mental Health	-discrimination (racial, social exclusion) -high burden of disease	-sports (soccer) -education program	-settlement camps	-university -refugee resettlement organization	-age -country of origin -language

		-post-migration stressors -language barriers -delay of treatment -common experiences of violence -low access to prevention services	-social support -multi-level (program)			
Goodkind, JR	Mental Health	-environmental (transportation barriers)	-mental health services (psycho-therapy)	-mental health center for adolescents	-transcultural psychotherapists -mental health therapists -nurses -family members -interpreters	-age -sex -family size (number of members In household) -country of origin -migration status (generation of) -interpreter needed
Vais, S	General Health (Women's Health)	-discrimination (racial, gender, social exclusion) -social isolation -cultural barriers -migration stressors	-social support -education program (lay health e) multi-level (program)	-refugee resettlement agencies -Register of refugee households	-community organizations -universities -undergraduate students -refugee resettlement organization	-age -geography (region) -country of origin -gender -marital status -time in host country -educational level -family size (number of children)
Bonmati-Tomas, A	General Health (Ment. Health)	-health literacy -educational barriers -financial barriers -low access to prevention services -discrimination (gender, general) -language barriers -employment barriers -social isolation	-non-emergency medical transport -other	-electronic health records	-refugee health clinic -hospitals -private rideshare companies	-age -distance from clinic -primary language -country of origin -time in host country -time with clinic -purpose of visit
Rojas, P	Infectious Disease (HIV) (Sexual Health)	-high burden of disease -machismo -lack of access to prevention services -environmental (geographic barriers)	-education program -social support -multi-level (program)	-Employment/job placement program -faith-based organizations	-faith-based organizations (worship and charity orgs)	-age -country of birth -ethnicity -geography (geo area) -years of education -time in host country -number of years away from home country -marital status -family size (number of children) -living situation -family size (number of dependent family members)

						-proportion of time dedicated to family -employment status -perception of economic situation
Rhodes, SD	Infectious Disease (HIV) (Sexual Health)	-migration stressors -acculturation stressors -discrimination (general) -social isolation -environmental (poor housing quality) -legal status -common experiences of violence	-education program	-diverse neighborhood settings -health fairs -migrant camps -street outreach activities -social networks -home visits -telephone calls -letters -flyers	-health fairs -migrant camp workers -bi-lingual interpreters	-marital status -income (total 6 month) -age -time in host country -legal status (documentation) -educational level
Bahu, M	Mental Health	-discrimination (racial, social exclusion) -social isolation -cultural barriers	-education program (lay health p)	-recreational soccer teams -social networks from LHEs	-community leaders -charismatic individuals within community groups -soccer teams	-age -country of origin -educational level -time in host country -income (annual salary) -employment status -sexual orientation -self-reported sex with men in past year
Andrade, E	Mental Health	-discrimination (racial, social exclusion) -social isolation -cultural barriers	-mental health service (therapy) -psycho-education program -social support multi-level (program)	-faith-based organizations	-faith-based organizations -community development volunteers -community leaders -local GPs -culturally competent therapists (multi-lingual)	-age -gender -religion -housing situation -legal status (residency) -host lang proficiency