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REVIEW

Antimicrobial Resistance in Refugee Camps and Prisons: A Global Scoping Review of Primary Studies on Burden, Risk Factors, Surveillance, and Mitigation Strategies

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Background: AMR is a global health threat, and prisons and refugee camps are high-risk environments for the acquisition and spread of multidrug-resistant organisms (MDROs). This scoping review aims to map the existing evidence on antimicrobial resistance (AMR) in prisons and refugee camps, focusing on burden, risk factors, surveillance, resistance patterns, and mitigation strategies.

Methods: The scoping review followed the Arksey and O'Malley methodology and adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) checklist. Using predefined search terms related to AMR, literature was identified through searches of SCOPUS, PubMed/MEDLINE, Google Scholar, the Directory of Open Access Journals (DOAJ), and grey literature sources, including reports from the World Health Organization (WHO) and the United Nations High Commissioner for Refugees (UNHCR). The literature was screened based on inclusion and exclusion criteria to select relevant studies. Studies were screened based on predefined inclusion and exclusion criteria, and data were extracted into Microsoft Excel for descriptive and thematic analysis.

Results: From 3659 records identified at the initial search, 26 primary studies from 18 countries met the inclusion criteria. Most studies addressed AMR burden (65.4%), followed by risk factors (26.9%), while surveillance and mitigation strategies were each addressed in 3.8% of studies. Key themes were categorized as primary focus, while additional themes were recorded as secondary focus areas. Overall, the studies reported a high prevalence of multidrug-resistant organisms. MRSA colonization reached 15.7% in Swiss refugee canters and 21.3% in Finnish cohorts, while ESBL carriage was as high as 32.9%. Additionally, multidrug-resistant tuberculosis (MDR-TB) prevalence reached 9.5% in Ethiopian prisons. Risk factors included prior hospitalization, self-medication, prolonged antibiotic exposure, treatment interruptions, overcrowding, and poor hygiene Surveillance efforts were limited, and evidence on mitigation strategies was scarce, with only two studies describing antimicrobial stewardship program (ASP) implementation in prison settings in Italy and the United States.

Conclusion: The review shows that overcrowding, inadequate sanitation, interrupted healthcare, and poor stewardship are the main causes of the high incidence of AMR in prison and refugee camps. To protect these susceptible groups and stop the spread of AMR worldwide, it is critically necessary to improve surveillance, infection control, and context-specific mitigation techniques.

Keywords: antimicrobial resistance, refugee camps, prisons

Introduction

Antimicrobial resistance (AMR) remains one of the most pressing threats to global health equity in the 21st century, continually undermining the global capacity to combat infectious diseases and safely perform routine medical procedures.[1] According to the most recent Global Burden of AMR analysis, an estimated 4.95 million deaths were

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associated with bacterial AMR globally in 2019, including 1.27 million deaths directly attributable to resistant infection.[1] Without decisive intervention, AMR is projected to cause up to 10 million deaths annually by 2050, surpassing mortality from cancer and other leading causes.[1] The burden is disproportionately concentrated in resource-limited settings, particularly in sub-Saharan Africa, where 23.5 AMR-attributable deaths per 100,000 population were recorded, among the highest globally.[2,3] This mounting burden is expected to impose devastating economic consequences, including prolonged hospitalization, treatment failures, and increased healthcare costs.[1] Although sub-Saharan Africa is emphasized due to its disproportionately high AMR burden, the scope of this review is global. Africa is emphasized because many displaced populations and resource-limited prison systems are concentrated in LMIC regions, where AMR emergence is most accelerated.[2–4] This review synthesizes primary research from diverse regions, including Europe, the Middle East, Asia, Oceania, and North America, to provide a comprehensive global assessment of AMR in refugee camps and prisons. AMR is driven by the selective pressure of antimicrobial use and misuse across humans, animals, and the environment, creating a complex web of resistance that transcends borders.[5] In low- and middle-income countries (LMICs), particularly within sub-Saharan Africa, the convergence of a high infectious disease burden, fragile health systems, and limited antimicrobial stewardship mechanisms contributes to the accelerated emergence and spread of antimicrobial resistance (AMR).[6,7] Encouragingly, recent modelling suggests that up to 750,000 AMR-related deaths in LMICs could be prevented each year through improved access to existing vaccines, water and sanitation infrastructure, and stronger antimicrobial stewardship programs.[2]

According to Hermsen et al[2] and Cotugno et al,[3] refugees, asylum seekers, and incarcerated individuals bear a disproportionate burden of antimicrobial resistance within the global AMR landscape. This population represent paradigmatic examples of at-risk populations for AMR acquisition and transmission, previous published systematic reviews have shown that migrants, especially refugees and asylum seekers exhibit higher rates of AMR carriage compared to host populations, with estimates of pooled prevalence reaching an alarming 33.0% for any AMR infection or carriage.[5] Several factors contribute to this elevated risk. While displacement disrupts public health interventions such as treatment courses, overcrowded living conditions in camps and transit canters encourage horizontal transmission of resistant organisms. According to a study by Piso et al, 2017,[6] and Aro & Kantele, 2018,[7] MRSA colonization rates have been documented at approximately 10 times higher among refugees compared to host populations, especially with extended-spectrum beta-lactamase (ESBL)-producing Enterobacteriaceae.

Although prisons and refugee camps differ in administrative control, population mobility, and governance, both share structural conditions that facilitate the emergence and spread of antimicrobial resistance. Overcrowding, poor WASH infrastructure, ventilation issues, insufficient diagnostic capabilities, treatment disruptions, and ineffective antimicrobial stewardship systems are their defining characteristics. These conditions create high-risk environments for the acquisition and transmission of multidrug-resistant organisms. Prisons and refugee camps have been identified by international public health organizations, such as WHO and UNHCR, as institutional settings where AMR and infectious disease transmission are exacerbated because of systemic and environmental limitations.[2,3,8–10] Therefore, it is methodologically appropriate to evaluate prisons and refugee camps within a single analytical framework, while still considering important contextual differences.

Across low- and middle-income countries (LMICs), similar challenges to those seen in sub-Saharan Africa have been reported, especially where health systems are fragile and diagnostic capacity is limited.[11,12] With a growing number of refugee and internally displaced populations at approximately 6.3 million refugees and 21.8 million internally displaced persons as of 2023 residing in overcrowded camps with limited water, sanitation, and hygiene (WASH) infrastructure, a thriving system for pathogen transmission and AMR dissemination has been created.[13] In South Asia and the Middle East, studies have shown overcrowding and healthcare access inconsistency as the case in African refugee camps. Prisons in LMICs face significant challenges due to limited access to adequately equipped healthcare facilities. There is a delay in diagnosis, which leads to persistence of resistance for some pathogens.[14,15] These trends suggest that AMR in prisons and refugee settings should be understood as a broader LMIC challenge rather than a region-specific issue.

Contrarily, some studies from Europe have proven that high-income countries (HICs) face the AMR problems as well, and the AMR risks are linked to migration trends, reception procedures, and integration into national health systems rather than a lack of laboratory capacity.[8,9] Despite having relatively more resources, prisons and reception facilities in

HICs still face challenges such as overprescription, stigma, treatment non-adherence, and high population turnover.[16] In contrast, antimicrobial stock-outs, inadequate diagnoses, and poor infrastructure are major causes of resistance in LMIC environments.[14,17,18]

Understanding AMR in these populations necessitates a global approach due to these geographical variations. While high-income nations also confront operational issues relating to healthcare continuity, surveillance, and stewardship, Sub-Saharan Africa and other LMICs bear the brunt of this burden.[7,19,20] Therefore, AMR in refugee and prison settings should be presented as a diverse, global issue rather than one restricted to specific regions.

Existing studies are often limited in scope, focus on specific pathogens, or lack standardized methodological approaches for meaningful synthesis and comparison.[17,20,21] In this scoping review, we aim to comprehensively map existing evidence and identify knowledge gaps worldwide; synthesize findings from primary studies on AMR prevalence and resistance patterns; characterize risk factors and dynamics of transmission that are specific to these settings; evaluate the current surveillance and control measures; and inform evidence-based recommendations for policy and practice. In addition to mapping the available data, this research aims to pinpoint comparative gaps in AMR surveillance, risk assessment, and mitigation techniques in prison and refugee environments around the world.

Methods

This scoping review follows the five-step methodology designed by Arksey and O'Malley[22] which provide a rigorous framework for reporting findings. This framework was further refined using the methodological recommendations of Levac et al[23] that supplement this framework.

Research Question

The main research question was

> What global primary research evidence exists on the burden, risk factors, surveillance systems, and mitigation strategies related to antimicrobial resistance (AMR) in refugee camps and prison settings?

From the central question, The following sub-questions were explored:

- What does primary research report about the burden of AMR in refugee camps and prisons globally?
- What risk factors for AMR have been identified in these settings?
- What evidence exists on AMR surveillance systems in refugee and prison contexts?
- What mitigation strategies have been evaluated?
- What are the key research gaps?

Literature Identification

A comprehensive literature search was conducted across multiple databases, including SCOPUS, PubMed/MEDLINE, Google Scholar, and DOAJ, to identify relevant primary research studies. Scopus was included to ensure broad international and interdisciplinary coverage, particularly for studies from low- and middle-income countries and non-clinical settings that may not be fully indexed in PubMed. Google Scholar was included to capture additional grey literature and studies not indexed in traditional databases; however, due to its broad retrieval scope, screening was limited to the most relevant results to maintain feasibility and relevance. Reports were systematically searched through organizational websites, including the World Health Organization (WHO) and the United Nations High Commissioner for Refugees (UNHCR), to capture relevant reports not indexed in traditional databases.

To ensure a comprehensive and reproducible search strategy, a combination of keywords and Boolean operators was used and adapted for each database. The key search terms included "antimicrobial resistance," "AMR," "refugee camps," "asylum seekers," "migrants," "prisons," "jails," "detainees," "burden," "prevalence," "risk factors," "surveillance," "mitigation," and "stewardship."

In PubMed, the search strategy was structured as follows:

The PubMed search strategy was structured as follows:

("antimicrobial resistance" OR "AMR") AND ("refugee camp*" OR "asylum seeker*" OR migrant* OR "displaced population" OR prison* OR jail* OR detainee*) AND (burden OR prevalence OR surveillance OR "risk factor*" OR mitigation OR stewardship).

The search was restricted to studies published between 2000 and 2025 to capture contemporary evidence on antimicrobial resistance in these settings. Despite efforts to ensure comprehensive coverage, the exclusion of certain databases due to access limitations may have resulted in potential evidence gaps.

Literature Selection

The collected literature was imported into Rayyan software for deduplication and screened based on predefined inclusion and exclusion criteria (Table 1). Two reviewers conducted the screening, and some discrepancies were resolved through discussion. If the issue could not be resolved, a third party was consulted for further resolution.

Table 1 Inclusion and Exclusion Criteria

Selection Criterion	Inclusion	Exclusion
Study design	Primary studies	Non primary studies
Year of publication	2000-2025	Before 2000
Outcome of interest	Studies on AMR prevalence, risk factors, transmission, and interventions in refugee camps and prisons globally	Other things out of scope this study
Accessibility	Abstract and full text assessable	Abstract and full text inaccessible. Abstract accessible, full text inaccessible
Language	English	Other languages besides English

Data Extraction Process

From the included publications, each author independently extracted relevant data using a standardized data extraction form in Microsoft Excel. Study details, including author ID, publication year, country/region, study design, settings (prison/refugee/ camp), AMR, and pathogen focus (burden, risk factors, surveillance, mitigation strategies, etc)., were extracted (Table 2). This facilitated the organization and analysis of the data, allowing for a comprehensive overview of the burden, surveillance, and mitigation strategies of AMR in prisons and refugee camps across the globe as presented in the primary studies.

Data Analysis, Summarizing, and Reporting

A descriptive numerical summary was performed to quantify study characteristics, including frequency by region, study design, and thematic focus. In addition, scholarly publications were categorized and discussed under key themes: burden, risk factors, surveillance, and mitigation strategies. The included studies were independently coded and categorized into thematic domains by two individuals.

Results

A total of 3659 studies were initially identified through electronic database searches and backward citation searches. After removing duplicates, 3031 studies remained for screening. Based on the titles and abstracts, 2904 studies were excluded due to lack of relevance, leaving 127 studies for full-text assessment. Overall, 127 studies were assessed for full-text eligibility, and 101 studies were excluded. The reasons for exclusion included: 37 studies did not address the outcome of interest, 28 studies focused on other aspects of AMR, 12 were published before 2000, 11 were not primary studies, and 13 had unavailable full text despite accessible abstracts. Ultimately, 26 primary studies met the inclusion criteria and were included in this review. The study selection process is illustrated in Figure 1.

Table 2 Summary of All Included Studies

Author (Year)	Country	Study Design	Setting	Focus	Other Focus	Sample Size	Key Findings
Piso et al (2017)[6]	Switzerland	Cross-sectional	Refugee	Burden	Risk factors	261	MRSA 15.7%, ESBL 23.7%; outbreak cluster identified
Aro & Kantele (2018)[7]	Finland	Cross-sectional	Refugee	Burden	Risk factors	447	MDR 45%; MRSA 21.3%, ESBL 32.9%; previous hospitalization and invasive procedures were risk factors
Mellou et al (2021)[24]	Greece	Case series	Refugee	Burden	Surveillance	115	MDR Shigella outbreak linked to overcrowding
Simonek et al (2024)[25]	Greece	Retrospective observational	Refugee	Burden	Surveillance	9601	Seasonal infection peaks and high antibiotic prescribing patterns
Süzük Yıldız (2023)[26]	Türkiye	Cross-sectional	Refugee	Burden	Risk factors	3960	MRSA: refugees 6.7% vs locals 3.2%; ESBL higher in refugees
Nakafeero Simbwa et al (2021)[27]	Uganda	Mixed methods	Refugee	Burden	Risk factors	6890	DR-TB 0.6%; key risk factors: prior treatment, drug stock-outs, congestion
Tuhamize et al (2025)[20]	Uganda	Cross-sectional	Refugee	Burden	Risk factors	89	Carbapenem resistance: 61.8% phenotypic, 22.5% genotypic; KPC predominant
Ali et al (2016)[28]	Ethiopia	Cross-sectional	Prison & Community	Burden	Risk factors	109	MDR-TB 9.5% in prisons vs 2.3% in community
Chisanga et al (2025)[29]	Zambia	Cross-sectional	Prison	Burden		75	MDR Staphylococcus aureus found on prison kitchen surfaces
Tenner et al (2024)[8]	USA	Qualitative	Prison	Risk factors	Mitigation	68	Overprescription, low AMR awareness; ASP integration recommended
Dalwai et al (2025)[30]	South Australia	Pilot surveillance	Prison	Surveillance		49974DDD,115 microbilogical samples (115)	Prison AMR surveillance feasible; 400,000 DDD surveillance gap identified
Mazzoleni et al (2023)[18]	Italy	Retrospective	Prison	Mitigation	Burden	3782	ASP lowered antibiotic consumption by 24%; resistance trends persisted
Silva et al (2025)[31]	Multiple (Refugees in Europe)	Qualitative study	Refugee	Risk factors	–	41	Limited access to healthcare, self-medication, interrupted antibiotic courses, and informal sharing of antibiotics were common; these practices were identified as drivers of inappropriate antimicrobial use among refugees.

(*Continued*)

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Table 2 (Continued).

Author (Year)	Country	Study Design	Setting	Focus	Other Focus	Sample Size	Key Findings
Kilani et al (2025)[32]	Lebanon	Cross-sectional	Refugee	Burden	Risk factors	362	High prevalence of antimicrobial-resistant uropathogens among refugees; ESBL-producing E. coli predominated; prior antibiotic exposure and overcrowded living conditions were associated with resistance.
Spjeldnæs (2025)[33]	Lebanon	Qualitative study	Refugee	Risk factors	–	28	Refugees reported acting as "self-doctors" due to healthcare barriers; widespread non-prescription antibiotic use and treatment interruption were described, increasing AMR risk.
Hesari et al (2024)[19]	Uganda, Yemen, Colombia	Cross-sectional survey	Refugee	Risk factors	Surveillance	1,286	Inappropriate antimicrobial access and use were common; over-the-counter antibiotic use and incomplete courses were frequent; limited formal surveillance of antimicrobial use in displaced populations.
Nielsen et al (2023)[34]	Denmark	Retrospective observational	Refugee	Burden	Surveillance	3,918	Refugees had different bloodstream infection pathogen distributions compared with host populations, with higher proportions of resistant isolates; findings support targeted surveillance in migrant health services.
Lee et al (2022)[35]	Taiwan (migrant/ refugee population)	Cross-sectional (molecular epidemiology)	Refugee/ Migrant	Burden	Surveillance	172 MRSA isolates	Dominant MRSA sequence types were ST8 (34.9%), ST59 (29.1%), and ST45 (18.6%); high resistance to erythromycin (>70%) and clindamycin (>60%).
Nielsen et al (2022)[36]	Denmark	Retrospective observational	Refugee/ Migrant	Burden	Surveillance	1,278 bloodstream infections	Resistant isolates accounted for 18.4% among refugees vs 11.2% in host population; ESBL-producing E. coli constituted 9.6% of refugee isolates.
Bierhals et al (2021)[37]	Brazil	Retrospective cross-sectional	Prison	Burden	Risk factors	356 TB cases	TB incidence in prison was 2,450 per 100,000; drug-resistant TB detected in 6.2% of tested cases; treatment interruption significantly associated with resistance.
Sloth et al (2019)[38]	Denmark	Cross-sectional	Refugee/ Migrant	Burden	Surveillance	2,146 urine cultures	E. coli resistance to ciprofloxacin was 21.7% and to third-generation cephalosporins 11.4% among refugees; ESBL prevalence 10.2%.
Santos et al (2018)[39]	Portugal	Cross-sectional	Refugee/ Asylum seeker	Burden	Risk factors	120	Asymptomatic carriage of resistant bacteria was 32.5%; ESBL-producing Enterobacterales accounted for 18.3% of isolates.

Mezgebe et al (2024)[40]	Ethiopia	Cross-sectional	Refugee	Burden	Risk factors	384	Smear-positive TB prevalence 6.5%; rifampicin-resistant TB 4.9%; prior TB treatment significantly associated with resistance.
Al Baz et al (2018)[41]	Jordan	Cross-sectional	Refugee	Risk factors	–	1,200 prescriptions	Antibiotics prescribed in 62.4% of consultations; upper respiratory infections accounted for 46.1% of antibiotic use.
Orubu et al (2022)[42]	Jordan	Cross-sectional	Refugee	Risk factors	Surveillance	2,379 encounters	Antibiotics prescribed in 54.2% of visits; adherence to prescribing guidelines was 68.5%.

Abbreviations: DDD, Defined Daily Dose; ASP, Antimicrobial Stewardship Program; ATC, Anatomical Therapeutic Chemical Classification System; CRE, Carbapenem-Resistant Enterobacterales; DR-TB, Drug-Resistant Tuberculosis; ESBL, Extended-Spectrum β-Lactamase; KPC, *Klebsiella pneumoniae* Carbapenemase; MDR, Multidrug-Resistant; MRSA, Methicillin-Resistant *Staphylococcus aureus*.

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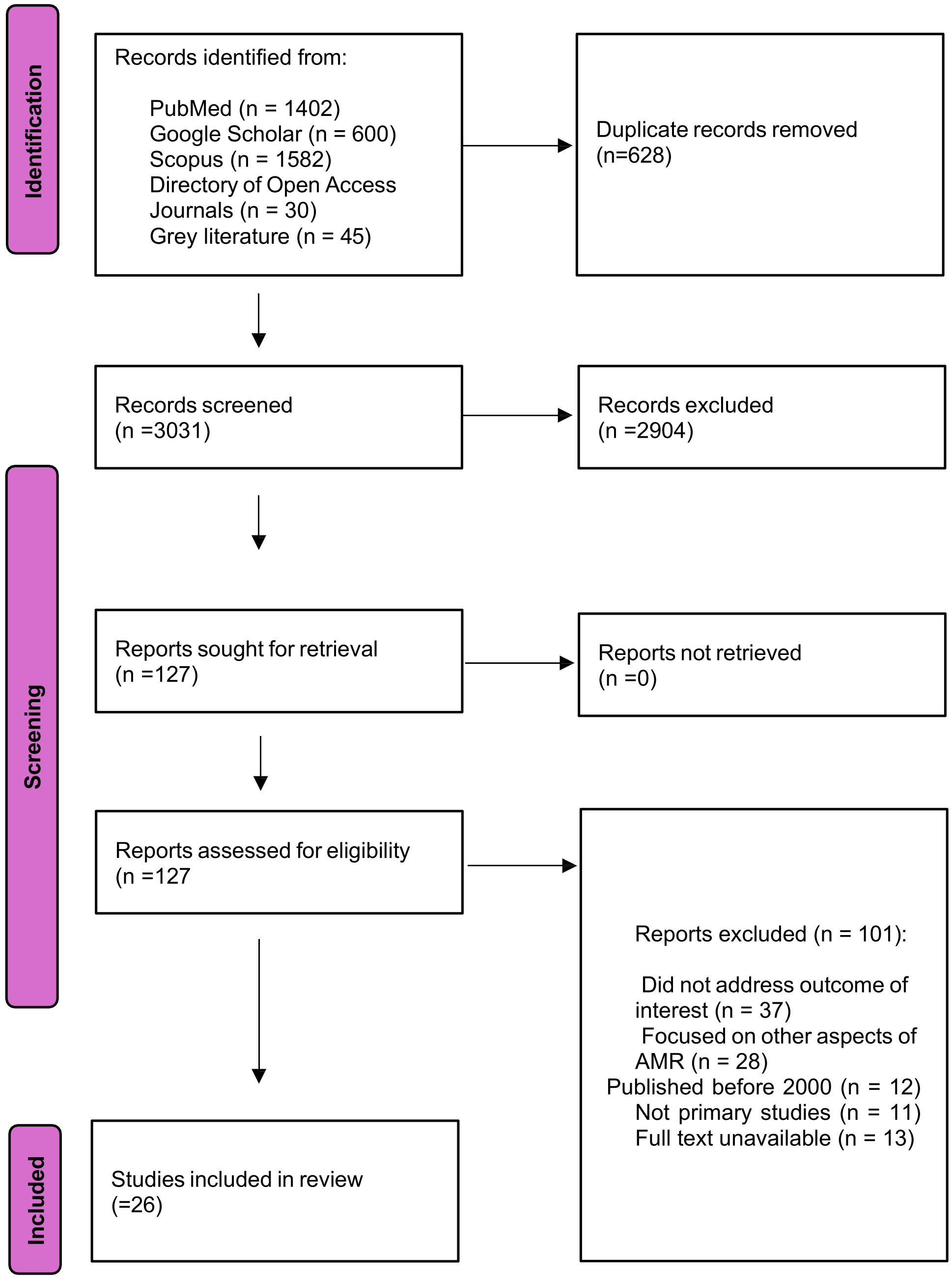

Figure 1 PRISMA flow diagram of study selection. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Characteristics of Included Studies

In this scoping review, 26 primary studies from 18 different countries published between 2015 and 2025 were included. The geographical distribution of included studies reflects a global scope, with the highest concentration originating from Europe (34.6%, n=9), including studies from Denmark, Finland, Greece, Italy, and Portugal.[6,7,18,24–26,36,38] This was followed by the African region (23%, n=6), with contributions from Ethiopia, Uganda, and Zambia.[20,27–29,40,43] The Middle East (Jordan and Lebanon) accounted for 15.4% (n=4) of the studies,[32,33,41,42] while the remaining research was distributed across Asia (Taiwan) 3.8% (n=1), South America (Brazil) 3.8% (n=1),[35,37] North America (USA) 3.8% (n=1),[8] and Oceania (South Australia) 3.8% (n=1).[30] Additionally, 7.7% (n=2) of the studies were multi-country analyses involving Uganda, Yemen, and Colombia.[19,31]

In terms of country-specific frequency, Denmark contributed the highest number of studies 11.5% (n=3), followed by Ethiopia, Greece, Jordan, Lebanon, and Uganda, which each contributed 7.7% (n=2). All other nations represented 3.8% (n=1) of the total literature, Table 3. In study designs, cross-sectional studies were the predominant method, accounting for 57.7% (n=15) of the included literature. The distribution of study designs is presented in Figure 2. Retrospective observational studies accounted for 15.4% (n=4), followed by qualitative studies at 11.5% (n=3). Other methodologies included case series, mixed-methods, pilot surveillance, and retrospective analyses, each representing 3.8% (n=1) of the total. The thematic focus of the studies was categorized into four main areas. The distribution of studies by primary focus is shown in Figure 3. Most of the literature focused on the burden of AMR, addressed by 17 studies (65.4%). Risk factors were a significant secondary focus, explored in 7 studies (26.9%). Surveillance and mitigation and other strategies were less represented, each being the primary focus of only 1 study (3.8% each).

Burden of Antimicrobial Resistance

Across the included studies, a consistently high burden of antimicrobial resistance was observed in both refugee and prison settings. Significant colonization rates were found in European refugee cohorts, such as MRSA (15.7%) and ESBL-producing Enterobacteriaceae (23.7%) in Switzerland.[6] Similar results were found in Finland, where 45% of refugees had MDR bacteria, including MRSA (21.3%) and ESBL (32.9%).[7] Evidence from Greece, where seasonal surveillance revealed persistent antibiotic use and an outbreak of MDR Shigella,[24,25] further demonstrated how

Table 3 Distribution of Publication by Region

Countries	Frequency	Percent	Valid Percent	Cumulative Percent
Denmark	3	11.5	11.5	11.5
Ethiopia	2	7.7	7.7	19.2
Greece	2	7.7	7.7	26.9
Jordan	2	7.7	7.7	34.6
Lebanon	2	7.7	7.7	42.3
Multi-country (Uganda, Yemen, Colombia)	2	7.7	7.7	50.0
Uganda	2	7.7	7.7	57.7
Brazil	1	3.8	3.8	61.5
Finland	1	3.8	3.8	65.3
Italy	1	3.8	3.8	69.1
Portugal	1	3.8	3.8	72.9
South Australia	1	3.8	3.8	76.7
Switzerland	1	3.8	3.8	80.5
Taiwan	1	3.8	3.8	84.3
Türkiye	1	3.8	3.8	88.1
USA	1	3.8	3.8	91.9
United Kingdom	1	3.8	3.8	95.7
Zambia	1	3.8	3.8	100.0
Total	26	100.0	100.0	

Notes: Percentages are calculated based on the total number of primary studies meeting the inclusion criteria (N=26). "Multi-country" refers to studies where the methodology was applied across more than one national territory simultaneously. Frequency represents the number of distinct primary research papers identified per country.

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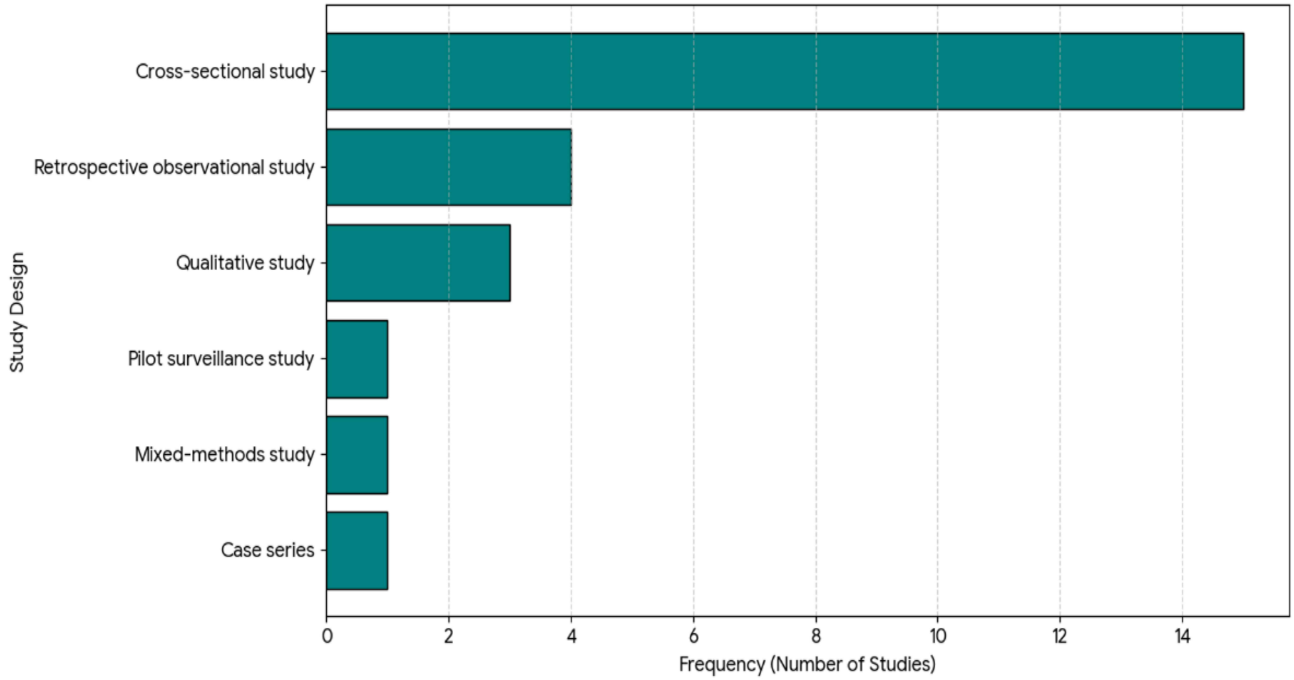

Figure 2 Study design of included studies.

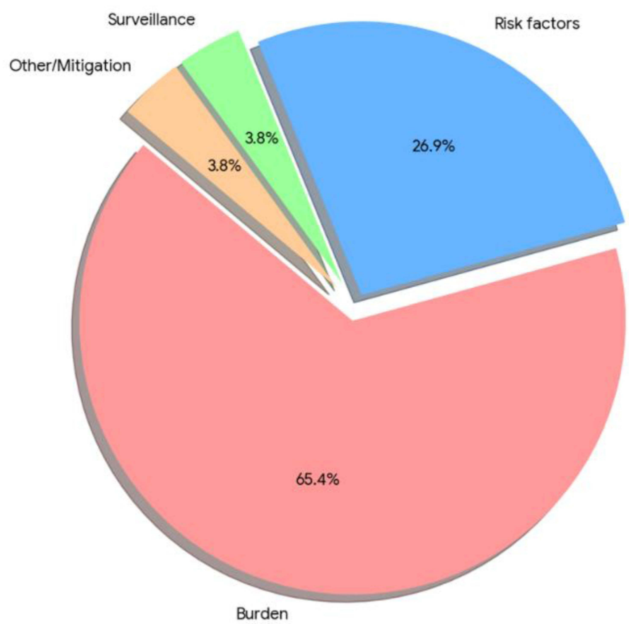

Figure 3 Distribution of studies by focus.

overcrowded reception centres facilitate transmission. Critical pathogens were involved in resistance in African settings. For example, uropathogens in Uganda had high phenotypic (61.8%) and genotypic (22.5%) carbapenem resistance,[20] and *rifampicin-resistant TB was detected in 6 of 221 cases (2.7%)*,[27] and 2.7% of screened individuals had rifampicin. Similar patterns were observed in Turkey, where MRSA colonization was higher among refugees (6.7%) than among locals;[26] the frequency of MRSA in Turkey was higher among refugees (6.7%) than among natives (3.2%).

On the other hand, studies conducted in prisons have also shown an increased burden. According to Ali et al,[28] the prevalence of MDR-TB was higher in Ethiopian prisons (9.5%) than in the surrounding community (2.3%). Furthermore, multidrug-resistant *S. aureus* was also found in Zambian prison kitchens.[29] Despite a decrease in antibiotic use, the percentage of resistant isolates in Milan prison facilities in Italy rose from 0.39% to 1.75% between 2019 and 2021.[18]

Risk Factors

Clinical and exposure-related factors were major risk factors. Multidrug-resistant organism colonization was significantly correlated with past hospitalization, surgery, and antibiotic use among refugees in Finland.[7] In Uganda, carbapenem resistance in uropathogens was considerably raised by self-medication, the administration of antibiotics prior to laboratory diagnosis, and extended exposure (>5 months).[20] History of prior treatment was a significant predictor of drug-resistant TB in the prison environment.[27]

Social and structural influences were found to be reliable factors in addition to individual exposures. Conditions for the spread of resistant strains were brought about by overcrowding in jails and refugee reception facilities.[24,28] In nomadic and refugee groups, treatment interruptions and low adherence were caused by drug stock-outs and disjointed services.[27] Prison environments were shown to have systemic flaws, such as excessive overall antimicrobial consumption and inadequate surveillance.[30] Neglected hygiene problems were also highlighted by environmental contamination, such as resistant *S. aureus* found on prison kitchen surfaces.[29] Low awareness of AMR, pressures to overprescribe, vaccine mistrust, stigma, substance use, and poor provider attitudes in prison healthcare staff and residents exacerbate risks of non-adherence to TB treatment and were also documented as major risk factors of AMR in USA prison settings.[8]

Surveillance

Across the literature, researchers have been using different methods to integrate antimicrobial resistance (AMR) surveillance systems in prison and refugee camps. Using routine supply data converted to WHO-defined daily doses (DDD), a pilot program in South Australia showed that antimicrobial usage surveillance in prisons may be adapted from hospital-based systems to track trends over time.[30] The use of entry-point surveillance for infection prevention and control was shown by intake colonization screening in Finland, Turkey, and Switzerland, which found increased carriage of MRSA and ESBL-producing organisms in refugee contexts.[6,7,26]

In Moria camp, syndromic and prescriptive surveillance done with seasonal disease and patterns of antibiotic use proved a practical stand-in for stewardship in the absence of laboratory capacity.[25] Meanwhile, outbreak investigations in Greek reception centres that found clusters of multidrug-resistant Shigella were an example of event-based surveillance.[24] Other modalities included pathogen-focused laboratory surveillance, where studies in Ethiopia and Uganda documented drug resistance in tuberculosis,[20,28] and environmental monitoring, where multidrug-resistant *Staphylococcus aureus* was found in Zambian prison kitchens[29] and genotypic screening in Ugandan refugee settlements identified carbapenem-producing uropathogens.[20]

Some studies show the viability and significance of microbiological surveillance in these settings, notwithstanding structural constraints. Compared to populations in the host nation, vulnerable groups' bloodstream infection surveillance revealed different pathogen distributions and resistance profiles.[34,36] High levels of fluoroquinolone and beta-lactam resistance were found in resistance pattern analysis of E. coli isolates from camp environments.[38] Additionally, a variety of antibiotic resistance genes were found to be circulating within the refugee microbiota by resistome profiling investigations, highlighting the silent spread of resistance determinants beyond illnesses that are clinically evident.[19]

Mitigation Strategies

In Italy, Mazzoleni et al[18] documented the introduction of an antimicrobial stewardship program (ASP) in four Milanese prisons. Prevalence of resistant bacteria rose to 1.75% in 2021, almost four times higher than in 2019, even though global antibiotic consumption decreased by 24% between 2019 and 2021. The creation of a prison-specific antibiotic formulary, prescribing guidelines, and obligatory approval procedures for important antibiotics were all part of the interdisciplinary ASP that was created in response.[18] Other included studies made indirect references to mitigation, such as education initiatives in USA prisons[8] and stewardship adaptations in refugee camps in Greece.[25]

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Even though few studies assessed structured antimicrobial stewardship treatments. Other actionable information for infection management measures is provided by molecular epidemiology studies that reveal dominant MRSA sequence types in correctional facilities[35] and ESBL dissemination patterns in refugee camps.[44] Public health response planning was guided by drug resistance monitoring for tuberculosis in prison environments.[43] Furthermore, research on informal use pathways and antibiotic access,[19,31] emphasizes the necessity of targeted stewardship programs and controlled antimicrobial distribution.

Discussion

The findings of this review indicate a consistently high prevalence of multidrug-resistant organisms (MDROs) across both refugee and prison settings.[6,7,24,28,29] The findings suggest that AMR patterns in these settings exceed those observed in surrounding communities, rather than simply mirroring them, and This pattern is likely driven by persistent transmission within overcrowded and high-turnover populations. A meta-analysis has documented the prevalence of AMR in migrants is almost twice that of host populations.[2] Additionally, MDR-TB in prisons has been shown to be significantly higher than in the surrounding communities, particularly in LMICs with limited TB programs.[9,45] Even in high-income countries, resources alone are insufficient to control AMR due to persistent colonization in reception settings.[17] To avoid cross-border spillover into national health systems, AMR must be contained in these situations. Additionally, these results confirm that refugee camps and prisons are not isolated silos but function as epidemiological reservoirs that drive resistance spillover into the broader community. Consequently, failing to address AMR in these settings compromises national health security and necessitates the mandatory inclusion of these populations in the WHO GLASS reporting framework to ensure global transparency.

Studies revealed structural factors like overcrowding, sanitation gaps, and treatment disruption,[8,27] as well as clinical factors like past hospitalization, extended antibiotic exposure, and incomplete treatment.[7,20] These findings suggest that AMR in prison and refugee settings is primarily driven by structural determinants, including inadequate infrastructure, disrupted care pathways, and weak antimicrobial governance systems.[15,21] This shows that AMR in these settings is a systemic governance failure rather than a purely clinical issue. Policy interventions must therefore shift from individual-level antibiotic stewardship to structural reforms, such as legislating minimum WASH standards and ensuring “equivalence of care” for incarcerated and displaced persons to eliminate the environmental selection pressures that drive MDROs.[46] One of the studies has shown that structured antimicrobial monitoring, surveillance, and mitigation actions are still scarce.[30] To lessen AMR amplification in both situations, system-wide strengthening including WASH, intake screening, and integrated stewardship is necessary.

Regarding AMR risk factors, both clinical exposures and structural conditions emerged as major contributors across settings. In countries such as Finland and Uganda, key factors included prior hospitalization, surgical procedures, self-medication, antibiotic use before laboratory confirmation, and prolonged exposure (greater than five months).[7,19] Additionally, rifampicin-resistant TB in refugee camps was predicted by prior treatment and drug stock-outs.[40] This confirms that disrupted care pathways and inappropriate antimicrobial practices directly contribute to the selection and persistence of resistance. Evidence from included studies indicates that over-the-counter medication without prescription, the use of leftover drugs, sharing medicines within households, and prolonged waiting times for medical consultations are major contributors to AMR in refugee camps.[41,42]

Environmental and structural factors were consistently identified as key drivers of AMR transmission. Overcrowding and environmental contamination illustrated how unsanitary conditions promote bacterial persistence and transmission. For example, multidrug-resistant *S. aureus* was found on prison kitchen surfaces in Zambia.[29] Antibiotic overprescription, inmate, and clinician ignorance of AMR, and vaccination skepticism all increased risk in the USA correctional facilities, suggesting structural obstacles in prison health systems.[8] The thematic analysis highlights a significant evidence gap, with only one study (3.8%) focusing primarily on risk factors. However, the current research consistently shows that exposures at an individual level are not the only factors that determine AMR, but systemic weaknesses specific to prison and displacement settings, such as overcrowding, interrupted treatment, and poor cleanliness. The risk variables are like those found in the larger literature on AMR, where social determinants like poverty, mobility, and inadequate healthcare infrastructure are acknowledged as important resistance amplifiers.[47]

Globally, studies have shown that AMR surveillance in refugee and displaced populations is often fragmented, ad hoc, and largely reliant on outbreak investigations rather than systematic, routine monitoring.[30,48] Additionally, according to the WHO GLASS effort, country AMR reporting underrepresents refugee and penitentiary settings.[49,50] Together, these findings validate a significant evidence gap: whereas indirect and pilot studies show viability, there is still a lack of sustainable inclusion of these vulnerable populations into national and international AMR surveillance systems and most data were generated in high-income countries, while low- and middle-income settings where overcrowding and weak infrastructure are greatest remain underrepresented. This disparity complies with international findings that characterize AMR surveillance in Africa as inadequate and underfunded.[49]

Regarding mitigation strategies, the Milanese ASP intervention reduced antibiotic use by 24%, although it did not immediately halt the rise in resistance rates.[18] This study shows that, even while stewardship is important, it might not be enough on its own without other structural and infection control measures. However, stewardship is still important in battling AMR. Qualitative research has shown the importance of maintaining effective prescribing in the USA correctional facilities, stewardship integration with electronic health records, and provider education.[8] It has also been demonstrated that surveillance-driven stewardship is possible; for instance, a pilot project in South Australia effectively transferred hospital monitoring techniques to prisons, yielding useful information for antimicrobial policy.[30] Furthermore, WASH (water, sanitation, and hygiene techniques) with stewardship has shown great effectiveness to combat AMR.[10] Vaccination campaigns, continuity of treatment, and cross-sectoral One Health methods were also found to be our essential elements for AMR mitigation.[51]

Our findings serve as a call to the urgent need for integrated policy approaches that combine infection prevention and control, antimicrobial stewardship, and strengthened surveillance systems tailored to the unique challenges of prisons and refugee camps. Governments and public health authorities should prioritize strengthening infection prevention and control measures, ensuring continuity of care for mobile and incarcerated populations, and regulating antimicrobial access to reduce inappropriate use. In resource-limited settings, targeted investments in WASH (water, sanitation, and hygiene) infrastructure and diagnostic capacity are essential to limit the transmission of resistant organisms. Furthermore, coordinated efforts between prison health systems, humanitarian organizations, and national health authorities are critical to implementing context-specific antimicrobial stewardship programs.

Evidence Gaps and Research Needs

The included studies draw attention to significant gaps in our current understanding of AMR in jail and refugee settings. Without longitudinal follow-up, most of the research focused on the point prevalence of multidrug-resistant organisms, which limited the ability to assess resistance persistence or temporal trends.[6,7] Although studies conducted in Finland and Switzerland showed that refugees had significant rates of MRSA and ESBL colonization, they did not assess targeted therapies or look into onward transmission.[6,7]

Studies conducted in prison have also had gaps. For instance, the MDR-TB study conducted in Ethiopia only offered a cross-sectional snapshot; it lacked evaluation of infection-control procedures and longitudinal surveillance.[28] Similar findings were made by environmental surveillance in Zambian prison kitchens, which found resistant *S. aureus* but failed to assess WASH programs or demonstrate connections to inmate colonization.[29] While identifying risk factors like overprescription and low awareness of AMR, a qualitative study conducted in USA prisons failed to measure the burden of AMR or assess the efficacy of suggested solutions.[8] The convenience of tracking antimicrobial usage was shown by pilot surveillance in South Australian prisons; however, it was constrained by its brief length, insufficient coverage, and lack of microbiological data.[30]

Additionally, the scope of studies conducted in refugee reception centres was limited. Although outbreak investigations in Greece were restricted to single events and lacked pre-outbreak baseline data, they yielded important insights into the transmission of MDR Shigella.[24] Causal inference was limited by retrospective analysis of seasonal prescribing trends in Moria camp, which relied on syndromic surveillance without strong laboratory evidence.[25] Comparably, cross-sectional surveys conducted in Switzerland and Turkey revealed that refugees had higher levels of AMR carriage than host populations, but they provided little insight into the molecular mechanisms or structural determinants of the disease.[6,26]

There are still significant evidentiary gaps in sub-Saharan Africa. High rates of carbapenem-resistant uropathogens and rifampicin-resistant tuberculosis were reported in Ugandan studies of refugees,[20] but both were geographically limited, lacked thorough molecular epidemiology, and failed to test mitigation strategies for identified drivers like stock-outs, poor adherence, and self-medication.[20,27] Lastly, the Italian antimicrobial stewardship program showed decreases in antibiotic use, but surprisingly, resistance prevalence rose, indicating that stewardship might not be enough on its own without additional infection prevention and control strategies.[18]

With most primary studies coming from sub-Saharan Africa and Europe, the evidence base is regionally uneven. Rather than reflecting the actual distribution of the AMR burden, this pattern most likely reflects differences in surveillance capacity, research output, and data availability. Despite having sizable populations of refugees or prisoners, regions like South Asia, the Middle East, and Latin America are still underrepresented, which restricts global generalizability.

Recommendations and Future Research Direction

The findings from this review show routine health services in correctional facilities and refugee camps urgently need to incorporate AMR surveillance frameworks such as GLASS. Research continuously shows that high colonization rates of multidrug-resistant organisms (MDROs) are frequently caused by improper antibiotic use, overcrowding, poor sanitation, and insufficient infection control. Based on trends of localized resistance, policymakers should give priority to implementing tailored antimicrobial stewardship programs (ASPs) as well as guaranteeing access to laboratory support and diagnostic tools. Furthermore, standardizing infection control procedures and encouraging sensible antibiotic prescribing across sector cooperation between public health authorities, humanitarian organizations, and prison health systems are very crucial to mitigate this problem. Both jails and refugee camps should give top priority to WASH (water, sanitation, and hygiene) infrastructure upgrades, such as waste disposal, a safe water supply, and enough restrooms. Refugee camps and jails would benefit much from establishing routine entry-point screening for high-risk populations, for instance, new arrivals in camps or prison intake.

Mitigation strategies must include policies that encourage early diagnosis and containment of resistant diseases, as well as customized education programs for refugees, prisons, and nearby residents to address the vulnerabilities in these communities. There are also research gaps in assessing the effectiveness of interventions in these contexts and comprehending longitudinal resistance patterns. Further research should emphasize increasing the amount of data from LMICs, especially sub-Saharan Africa, where surveillance is the weakest and the burden of AMR is largest. Thus, to increase health systems' preparedness against AMR threats in detained and refugee populations, governments and international funding organizations must fund context-specific, operational research and capacity-building projects.

Future research must transition from descriptive prevalence studies to implementation science and longitudinal genomic surveillance. Specifically, using Whole Genome Sequencing (WGS) is critical to map transmission dynamics between institutional facilities and host communities, providing the evidence base needed to justify cross-sectoral "One Health" interventions. There is a particular need for studies evaluating the effectiveness of antimicrobial stewardship programs, WASH interventions, and surveillance integration in refugee and prison environments. Additionally, more geographically diverse research is needed, especially from underrepresented regions such as South Asia, the Middle East, and Latin America, to improve the global generalizability of findings. Strengthening microbiological and molecular surveillance research will also be critical to understanding transmission pathways and resistance mechanisms.

Limitations of Study

This scoping review included studies with varying methodologies, population sizes, and geographical locations, which made it difficult to draw uniform conclusions across refugee camps and prisons and made comparison of findings quite challenging. Most studies were cross-sectional or observational, which restricts the ability to assess the trends over time or evaluate the effectiveness of implemented mitigation strategies. The study provides little evidence on mitigation strategies and surveillance (Table 2). Despite efforts to ensure a comprehensive search, some relevant studies may have been missed. Although Scopus was included to broaden database coverage, Embase was not searched due to access limitations. Additionally, the inclusion of only English-language studies and selected databases may have excluded relevant evidence published in other languages or non-indexed sources. Despite these limitations, the current scoping review serves as a valuable resource for understanding global antimicrobial resistance in refugee camps and prison facilities.

Conclusion

For the first time, this review summarizes the worldwide data on antimicrobial resistance (AMR) in both prisons and refugee camps, exposing persistently high burdens, inadequate surveillance, and significant structural drivers of resistance. Additionally, by identifying similar risk variables but different healthcare dynamics, this synthesis offers a clearer comparison of these two environments. While refugee camps saw fragmented care and rapid population turnover, prisons demonstrated centralized but overstretched services and high antimicrobial use, indicating that each situation required customized treatments. Three types of mitigation techniques were found: antimicrobial stewardship programs, WASH-related interventions, and surveillance activities. There was little evaluation of wash and stewardship treatments in low-resource situations, while the highest evidence was found for monitoring in high-income settings. The policy significance of this study is strengthened by acknowledging these gaps in the evidence. It is necessary to improve routine monitoring, infection control, and context-specific stewardship. Longitudinal monitoring and assessment of strategies to stop the development of AMR in these susceptible groups should be the focus of future research. Addressing antimicrobial resistance in these high-risk and often neglected populations is essential not only for protecting vulnerable groups but also for strengthening global health security.

Data Sharing Statement

All the data that was examined during this study is contained in this published article and its supporting documentation.

Ethics Approval and Informed Consent

Ethical approval and informed consent were not required as the paper used secondary data.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising, or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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