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Social determinants of health and antimicrobial resistance in the UK: a scoping review

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ABSTRACT

Objective Antimicrobial resistance (AMR) is a global public health threat, responsible for an estimated 35 200 bacterial resistance attributable deaths in the UK in 2019. Social determinants of health (SDoH) drive inequities that influence health outcomes. We aimed to conduct a scoping review of the evidence of the association between the SDoH and AMR in the UK.

Design A scoping review was conducted using search terms related to SDoH and AMR across multiple databases, supplemented by manual searches. This followed Arksey and O'Malley's framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guideline.

Data sources A systematic search was conducted across SCOPUS, PubMed, Academic Search Premier, AMED, APA PsycArticles, APA PsycInfo, CINAHL Plus with Full Text, Humanities International and Web of Science.

Eligibility criteria Primary UK-based literature exploring SDoH in relation to infectious disease syndromes requiring antimicrobial therapy and reporting AMR were included. Studies from January 2020 onwards, published in English, across all populations were considered. Non-UK studies, reviews, studies not addressing AMR, laboratory-based research and non-human health contexts were excluded.

Data extraction and synthesis Records were screened against eligibility criteria with reasons for exclusion documented. Data were charted against a customised form capturing study characteristics and key findings. Findings were thematically categorised to generate narrative synthesis.

Results 21 outputs met the inclusion criteria. Older females and those from lower socioeconomic groups showed higher antibiotic use and resistance. Migrant populations were vulnerable to AMR through poor living conditions and limited healthcare access. Misconceptions about AMR were common among younger and socioeconomically disadvantaged populations. Prescribing practices reflected patient expectations, systemic pressures and healthcare gaps, while fragmentation between primary and secondary care limited coordinated management and policy implementation.

Conclusion AMR in the UK is driven by social, economic and systemic factors, placing vulnerable groups at heightened risk. Sustainable and equitable control requires integrating SDoH through targeted interventions, public engagement and inclusive policymaking to meet national and global targets.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The use of the Arksey and O'Malley framework provides a structured but flexible approach to conducting this scoping review.
⇒ The inclusion of a diverse range of literature, due to the complexity of defining the Social Determinants of Health (SDoH) was preferred to address this topic.
⇒ Terminology used to describe the diverse concepts of the SDoH may have excluded relevant studies.

INTRODUCTION

Antimicrobial resistance (AMR) is a critical and escalating global health challenge. In 2019, bacterial AMR was implicated in nearly 5 million deaths worldwide, including an estimated 35 200 fatalities in the UK.[1,2] Antimicrobials are used to treat, prevent and control infections caused by bacteria, fungi, viruses and parasites in humans, animals and plants. AMR emerges when microorganisms evolve mechanisms to withstand drug therapy; this can be driven by the overuse or misuse of antimicrobials, poor infection control and the global spread of resistant strains through travel. The control and prevention of AMR is imperative to preserve the efficacy of existing antimicrobial therapies, reduce the burden of infectious diseases and alleviate the substantial economic costs associated with prolonged illness and subsequent demands on the healthcare system.[2]

Current strategies to combat AMR primarily focus on reducing inappropriate antimicrobial use, improving infection prevention and control, enhancing surveillance, limiting transmission, vaccinations and accelerating the development of therapeutic options. While these interventions are crucial, effectively addressing AMR necessitates a holistic approach that is attuned to the social, economic, cultural and environmental conditions. These underlying drivers are collectively known as the social determinants of health (SDoH)[3] which can include income, education, employment, housing and access to healthcare. Differences in these determinants can lead to significant gradients in health equity within populations, with estimates suggesting that SDoH can account for approximately 30–55% of differences in health outcomes.[4]

There is limited evidence about the impact of SDoH on AMR, due to complex upstream causal pathways and challenges in obtaining such data, making long-term outcomes uncertain. As a result, most previous research on AMR has focused on biomedical factors, antibiotic development and antimicrobial misuse as a contributor.[5] However, a few European studies have shown that socioeconomic deprivation is linked to higher antibiotic prescribing, driven by greater co-morbidity rates and lower health literacy, which can drive AMR.[6 7] Overcrowded and densely populated environments contribute to the spread of resistant microorganisms, while migrant populations face additional risks arising from the conditions experienced during migration, as well as poor living and working environments, further exacerbating health inequalities.[8] With a reported 4% rise in AMR-associated mortality rates and infections in the UK since 2021,[9] the need for broader investigation is increasingly evident.

The Marmot Review outlines the persistent and profound impact of health inequalities in the UK, demonstrating how differences in social determinants can result in unequal health outcomes.[10] These disparities were highlighted during the COVID-19 pandemic, where the risk of death among those diagnosed with the virus was higher in males than females, greater in individuals from more deprived areas compared with those in the least deprived, and disproportionately high among those from Black, Asian and Minority Ethnic (BAME) groups compared with those from White ethnic backgrounds.[11] For the first time, the UK government's National Action Plan (NAP) (2024–2029)[5] acknowledged the need to address health inequalities as part of its long-term vision to contain AMR by 2040. The NAP highlights significant gaps in understanding the determinants influencing variation in infection-related health outcomes and identifies addressing them as one of its top ten research priorities. Therefore, understanding the association between AMR and SDoH is essential for developing more inclusive, effective and sustainable AMR interventions for the most affected populations.

Despite increasing recognition of the role of SDoH, there is currently no comprehensive synthesis mapping how these factors have been considered in relation to AMR in the UK. A scoping review is useful to map the breadth of literature on this emerging topic and explore this gap. Using a Population, Concept, Context framework, the objective of this scoping review aims to map the existing UK literature on AMR and SDoH, identify which determinants have been considered and highlight evidence gaps to inform future research, priorities and developments for tackling AMR.

METHODS

This scoping review follows the framework proposed by Arksey and O'Malley[12] following five stages: 1, identifying the research question, 2, identifying relevant studies, 3, study selection, 4, charting the data and 5, collating, summarising and reporting the results. This review was conducted between January and March 2025.

Eligibility criteria

This review included primary literature from the UK that focused on the SDoH as defined by Dahlgren and Whitehead's model.[3] All infectious disease syndromes requiring antimicrobial therapy and reporting on AMR across any healthcare setting were considered. English-language sources, encompassing all age groups and genders from January 1, 2020, were included to identify evidence shaped by COVID-19 and contemporary developments.

Systematic reviews, existing scoping reviews and meta-analyses, as well as studies conducted outside the UK, were excluded. Studies that addressed antimicrobial use without reference to AMR were not included. Laboratory-based studies focusing on in-vivo or in-vitro methods were excluded. Literature related to the agricultural sector or environmental factors related to AMR but outside the scope of human health was excluded.

Search strategy

The search strategy used databases including SCOPUS, PubMed, Academic Search Premier, AMED, APA PsycArticles, APA PsycInfo, CINAHL Plus with Full Text, Humanities International and Web of Science to ensure coverage of the current topic. Key search terms were identified and refined through a pilot search, focusing on commonly used terms related to SDoH as well as those outlined in Dahlgren and Whitehead's model (box 1). Filters were applied to limit results to articles published in the English language from 1 January 2020. The precise

Box 1 Key search terms and Boolean operators used to create search string

{Antimicrob* resistan*} **OR** {Antibiotic resistan*} **OR** {Drug resistan*} **OR** AMR

AND

{Social determinants of health} **OR** {Determinants of health} **OR** {Social determinants} **OR** {Structural determinants of health} **OR** {Health determinants} **OR** SDOH **OR** Socioeconomic **OR** Unemploy* **OR** Employ* **OR** Occupation **OR** Income **OR** Social **OR** Economic **OR** Financ* **OR** Poverty **OR** Depriv* **OR** Cultural **OR** Education **OR** {Health literacy} **OR** {Living conditions} **OR** {work* conditions} **OR** Housing OR Transport **OR** {Access to health care} **OR** {Access to social care} **OR** {Health care access} **OR** Rural **OR** Urban* **OR** Coast***OR** Immigrant* **OR** Migrant* **OR** {Asylum seeker} **OR** {Refugee} **OR** Residen* **OR** Citizen **OR** Race **OR** Racial **OR** Ethnic* **OR** Inequalit* **OR** Inequit* **OR** Vulnerab* **OR** {Health disparit*} **OR** Neighbourhood

AND

United Kingdom **OR** UK **OR** Britain **OR** England **OR** Wales **OR** Scotland **OR** Northern Ireland search strategy of key and alternative terms with filters is included in online supplementary 1. Duplicate records were removed using Rayyan's automated 'find duplicates' feature followed by manual verification to confirm accuracy. Titles and abstracts of retrieved articles were screened for relevance based on predefined inclusion and exclusion criteria.[13] Rayyan's blind screening mode and AI-assisted ranking system features were not used; all records were screened manually. Systematic reviews, scoping reviews and meta-analyses were excluded manually. Bibliographies of selected studies and reviews were examined for additional sources to ensure all relevant literature was captured. Key author tracking was used during manual searches. Grey literature was sourced through conference proceedings and from the UK Government Health and Social Care website, UK Health Security Agency, Public Health England, WHO and the National Health Service. Full text articles were requested, where applicable.

Data charting

Records were screened against the eligibility criteria. Title and abstract screening were undertaken by one reviewer, with shortlisted articles reviewed in consultation with co-authors. No measure of inter-rated agreement was used, as consensus was reached via discussion. Reasons for exclusion were documented using the Rayyan platform. Included literature was organised using a customised data charting form developed to capture key characteristics. The form captured the title, author(s), date of publication, clinical setting or type of paper, study aim, design, summary of the methodology, sample size, a summary of key findings and results, the strengths and limitations and future recommendations. Where applicable, information on the type of pathogen, infectious disease and antimicrobial investigated was recorded. Data charting was undertaken independently and verified in discussion with co-authors, where required. Quality assessment of the included literature was not conducted. Reporting adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guideline.[14] The included literature was thematically categorised through recurring topics to generate a narrative synthesis. This inductive approach was intended to identify patterns in the data set and propose how SDoH relate to AMR. Findings extracted from the included studies were read repeatedly to achieve immersion in the data. Initial codes were generated directly from the reported findings rather than aligned to a predetermined analytical framework. Codes representing similar concepts were subsequently grouped into broader categories through an iterative process of comparison and discussion between the authors and synthesised into higher-order themes. These themes were subject to ongoing review to ensure they accurately reflected the breadth and diversity of the included literature.

RESULTS

The initial database search generated 3975 papers and identification from other methods generated 4. After filtering and removing duplicates, 1366 papers were screened from databases against the eligibility criteria. 21 papers were included in the final review (figure 1). The characteristics of the included studies are summarised in online supplementary 2.

Characteristics of included literature

Of the 21 final papers, nine were quantitative studies, six were qualitative, four were opinion pieces and two letters to the editor. A total of nine papers drew from a clinical setting of which three papers were set within primary care (eg, General Practice), three in secondary care (eg, hospital) and three across both care settings. A total of six papers were from a non-clinical setting where three involved the public, two were conducted within an academic environment and one involved policy makers. The remainder were four opinion-based papers and two letters to the editor.

The chronological distribution of literature indicates a concentration in 2020 with seven papers,[15–21] four in 2021,[22–25] three in 2022,[26–28] four in 2023[29–32] and three in 2024.[33–35] Geographically, most studies had UK wide coverage (n=14) while five were conducted in England,[15 16 20 24 29] one in Scotland[26] and one in Northern Ireland.[23]

Methodologically, the literature employed a range of quantitative and qualitative approaches. Quantitative analyses included patient data studies in primary care[16 26] and secondary care,[33] as well as prescribing[34] and surveillance[19] data across primary and secondary care settings. Qualitative methods included semi-structured interviews with patients in primary care,[15] clinicians in secondary care[22] and both clinicians and policy makers across care settings.[18 27] Additional methods included patient surveys,[17] public interviews[23 30] and data collection within schools through interviews and questionnaires.[20 24] The remaining papers consisted of opinion articles[21 25 28 35] and letters to the editor.[31 32]

When grouped by study population and setting, three involved patient data or samples in primary care,[15 16 26] one study examined patient data in secondary care[33] and two studies drew on datasets across both care settings.[19 34] Healthcare professionals (HCPs) in secondary care were the focus of one paper,[22] while two studies included both clinicians and policymakers across care settings.[18 27] Public perspectives were captured in three studies[23 29 30] and educational settings (schools) were presented in two studies.[20 24]

Socioeconomic inequalities in antibiotic use and AMR awareness

Research exploring the relationship between socioeconomic status (SES) and antibiotic use or AMR awareness reveals notable disparities, with four papers examining this association.[15 16 26 34] Gilham *et al* found resistance rates of bloodstream infections (BSIs) were 41% higher in the most deprived Indices of Multiple Deprivation quintile compared with the least deprived.[34] In addition, BSI resistance was highest in Asian and British Asian groups (34.6%).[34] Individuals

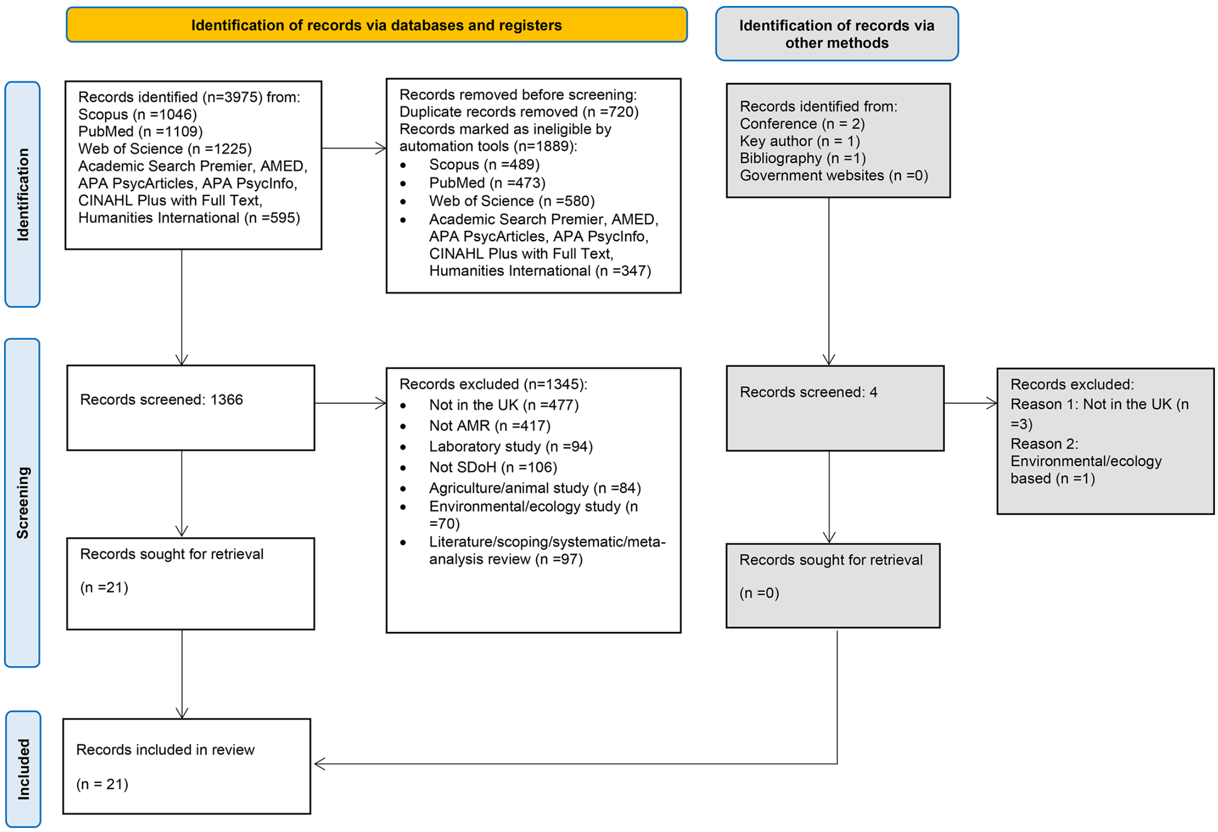

Figure 1 PRISMA-ScR flow diagram representing final literature included for review. (Adapted from PRISMA-ScR for Scoping Reviews, 2018).[14] This figure is original and was created by the authors for this study and has not been published elsewhere. AMR, antimicrobial resistance; SDoH, social determinants of health.

from higher socioeconomic backgrounds reported greater perceived knowledge and awareness of AMR.[15 26] McCowan *et al* found that older females in Scotland requiring treatment for urinary tract infections (UTIs) were more likely to come from lower SES, with patients in the most deprived quintile showing higher resistance rates to *Escherichia coli* infections.[26] Additionally, older males from the most deprived areas with previous antibiotic exposure experienced greater mortality and emergency hospital admission rates.[26] In Northern Ireland, men from the least deprived backgrounds were less likely to report using antibiotics in the previous 12 months, a trend that Shebehe *et al*[23] found difficult to interpret. However, this may be partly explained by findings from Hammond *et al*, who reported that 59% of individuals living in deprivation have difficulties accessing GP appointments.[16] Overall, these findings indicate the impact of socioeconomic factors on both AMR awareness and health outcomes related to antibiotic use (figure 2).

Public knowledge, perceptions and behaviours around antibiotic use and AMR

Public understanding and perceptions of antibiotics and AMR are complex, influencing both antibiotic use and expectations around prescribing, with eight papers exploring these issues.[15 20 22–24 27 29 35] UK policymakers have reported that patient compliance and attitudes significantly influence antibiotic use.[27] One study found individuals with greater knowledge of antibiotics were more likely to use them, suggesting that awareness alone may not reduce consumption.[20] Many patients, particularly females with recurrent UTIs, believed antibiotics could cure all infection symptoms and those with recurrent UTIs had good knowledge of AMR through experience of use[15]

Younger and more informed patients generally accept restricted antibiotic use. However, many still perceived that general practitioners (GPs) often issued prescriptions when antibiotics were expected, acknowledging the pressure placed on GPs to meet this expectation.[15] Broom *et al* support this and report that UK doctors prescribe antibiotics to patients when encouraged out of fear of complaints and maintaining their reputation.[22] In contrast, Gilham *et al* found that some individuals did not anticipate receiving antibiotics from their GP when ill and instead reported using out-of-hours services to obtain them.[29] Hayes *et al* reported that individuals perceived that HCPs had more responsibility than themselves in preventing AMR.[24]

Studies found that most adolescents have low AMR knowledge unless studying biology, with persistent misconceptions about how resistance spreads, including the common belief that antibiotics can be used to treat viral infections.[20 24] Adolescents believe older people underestimate the threat of AMR and advocate for awareness to be promoted through social media, in a similar manner to climate change messaging.[24] Sirota *et al* support this by reporting that AMR has received less attention from social media than COVID-19 and should also be seen as a pandemic.[35] However, Gilham *et al* found media campaigns temporarily improved AMR knowledge, particularly among younger people, and had limited impact on those aged over 50 years due to reduced media engagement. GPs also observed this knowledge diminished post campaigns.[29] There is a lack of recognition of AMR severity and the role of behavioural science in addressing this. There is a need for educational resources and awareness campaigns to target this gap[35] (figure 2).

AMR risks among migrant populations

Across three studies,[30–32] migrants are identified as particularly vulnerable to AMR due to the challenging conditions they face during displacement and resettlement. Factors such as inadequate hygiene and sanitation, with limited access to diagnostic services, can lead to the misuse or overuse of antibiotics, often pre-purchased in their home countries in anticipation of difficult circumstances during their journey.[30 31] On resettlement, these challenges are often compounded by poor living conditions specific to migrant populations, including overcrowded housing, which can facilitate the spread of resistant pathogens.[32] Unsanitary environments such as detention centres, hotels with poor hygiene or council housing with mould can contribute to developing respiratory infections, UTIs and skin infections.[30] Limited access to healthcare services due to long processing times often push migrants to seek support from refugee organisations, hospitals or out-of-hours services and these encounters may be hindered by language barriers and mistrust in interpreters, which can discourage engagement.[30 31] As a result, some individuals may resort to self-medicating or obtaining antibiotics outside the healthcare system; practices that may be culturally accepted but contribute to inappropriate antibiotic use and increased AMR risk.[30–32] Additionally, there is a concern of introducing multidrug-resistant pathogens from countries of origin into host populations.[31] Hernando *et al* found that gonococcal isolates from foreign-born individuals showed higher resistance to ceftriaxone and a greater prevalence of *Neisseria gonorrhoeae* infections compared with those from native-born individuals.[19] Authors suggest improving housing conditions, access to antibiotics through mobile facilities, and ensuring information is available in multiple languages to help overcome some of the highlighted issues.[30–32]

Antibiotic use and AMR trends in specific diseases

Eight studies explored antibiotic use and AMR trends in relation to specific diseases. The most investigated disease was UTIs, appearing in five papers.[15 16 26 30 33] Other diseases that were mentioned, each in a single paper, included respiratory tract infections,[15] sexually transmitted diseases (STI)[19] and BSIs.[34] Females were higher users of antibiotics compared with males.[17 23] Older females were higher users compared with those younger,[16 23 26] and demonstrated higher resistance rates.[26] These patterns were influenced by social determinants including healthcare access and utilisation over time with females consulting for medical advice more than males,[16 23] having frequent contact with healthcare services through gynaecological and maternal services,[23] and cumulative antibiotic exposure across the life course.

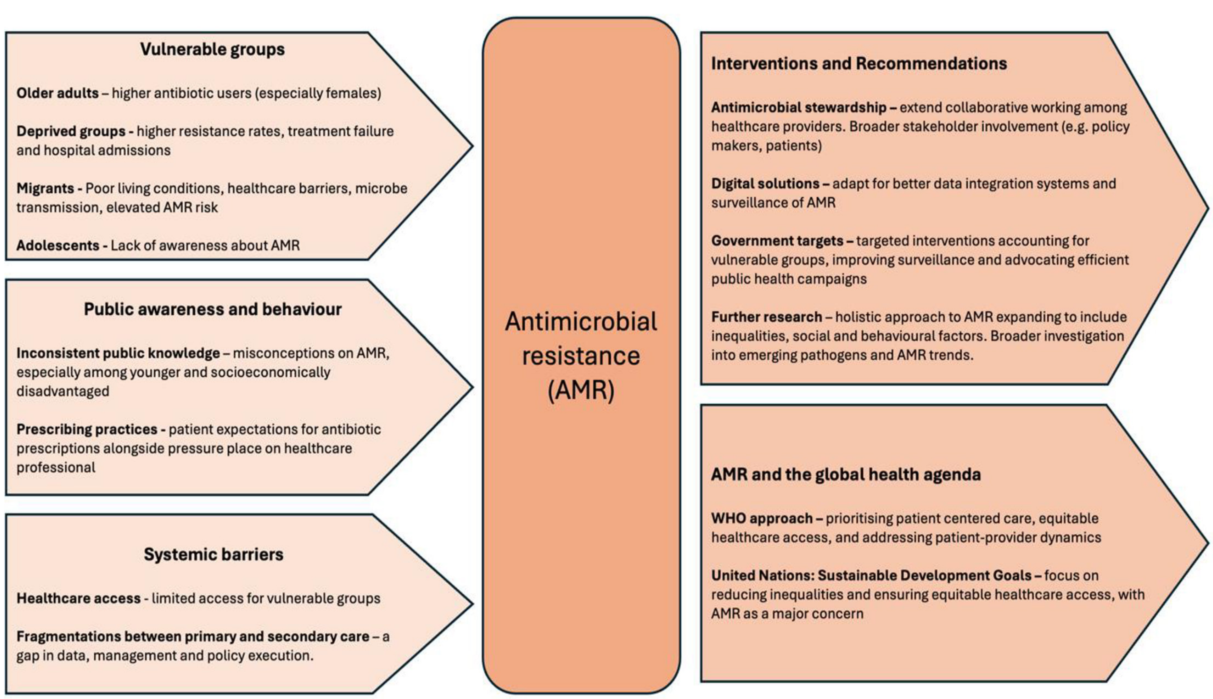

Figure 2 Overview of key factors associated with SDoH and AMR and recommendations. AMR, antimicrobial resistance; SDoH, social determinants of health.

Three papers investigated UTIs, predominantly caused by *E. coli*.[15 16 26] McCowan found 77.58% of positive cultures were positive to *E. coli*.[26] Resistance to commonly used antibiotics such as amoxicillin was high (up to 56.8% in 2019[26]) and associated with reinfection rates of 29.2% within 1–2 weeks.[26] Recurrent UTIs further reinforce antibiotic use, with patients often relying on previous treatment success and expecting repeat prescriptions, in contrast to conditions such as respiratory infections where decision making was preferred to be GP led.[15] The expectation for antibiotics shaped by previous treatment experience may contribute to repeat antibiotic prescribing reflecting behavioural and healthcare usage relating to SDoH.

Impact of COVID-19 on AMR

The COVID-19 pandemic highlighted several factors that influenced AMR, as demonstrated in two papers.[21 25] These trends reflect underlying SDoH, particularly disruptions to healthcare access, system capacity and service delivery during the pandemic. An estimated 62% of hospitalised COVID-19 patients received an antibiotic, despite only 8% having a confirmed bacterial infection,[21] highlighting lapses in antimicrobial stewardship, driven in part by constrained healthcare resources, potentially driving AMR. The surge in antibiotic use was further driven by complications such as ventilator-associated pneumonia in intensive care patients as well as the expanded application of prophylactic antibiotics in contexts where it had previously not been routine, such as certain dental procedures.[25] One paper reported a trend towards 'relaxed' antibiotic prescribing practices due to disruption of routine health services and redeployment of staff, which resulted in an unintended consequence of the pandemic.[21] In contrast, lockdown measures led to a decrease in the transmission of resistant infections[25] demonstrating how wider social and environmental conditions can influence infection dynamics. Healthcare adapted importance towards infection control practices such as hand hygiene, isolation rooms, and the use of Personal Protective Equipment.[21] The emergence of telemedicine during the pandemic and shift in outpatient parenteral antibiotic therapy and its impact on AMR has yet to be investigated.[21 25] Rawson *et al* suggest an increase in societal sensitivity towards infectious diseases could drive engagement with AMR[21] directing public awareness as key. This demonstrates both the risks and potential opportunities the pandemic posed for AMR, shaped by interconnected social, systemic and behavioural determinants of health.

Health system challenges, surveillance and policy

Effective monitoring of AMR and antibiotic prescribing practices rely on availability, quality and usability of data across both primary and secondary care settings. However, challenges with data integration between these settings represent a broader systemic issue in healthcare data infrastructure, not limited to SDoH but affecting AMR surveillance more widely, as highlighted across three papers.[18 27 28]

GPs reported that national and local prescribing datasets are useful tools for monitoring AMR trends; however, they note that these datasets would be more valuable if they included detailed indicators, such as patient characteristics and diagnoses. Additionally, the current format is often inaccessible, and national datasets fail to reflect local patterns or emerging trends.[18]

In secondary care, hospital doctors report that on-site data is incomplete, lacks patient-level detail, and is only published annually due to insufficient infrastructure. The absence of electronic prescribing systems in almost 40% of hospitals in the UK further limits responsiveness to emerging AMR trends locally.[18] While existing data can support infection prevention and control practices such as monitoring methicillin-resistant *Staphylococcus aureus* rates, its complex presentation makes it difficult and time-consuming to interpret. Furthermore, the lack of integration between primary and secondary care data may affect prescribing and treatment decisions; however, hospital doctors voiced they did not want prescribing data from GPs believing it may be used in performance management and could cause friction among peers.[18] GPs expressed similar concerns stating data may be used to create prescribing targets.[18]

Overall, these challenges highlight systemic barriers to integrated data use across healthcare settings, extending beyond AMR and reflecting wider limitations in data sharing, infrastructure and governance. Recommendations were made to improve data format, including increasing the frequency of availability by incorporating seasonal prescribing trends. It was also recommended to include data from other prescribing HCPs, such as pharmacists and nurse prescribers, to ensure a more comprehensive dataset as well as keeping guidelines and policies up to date.[18]

An identified challenge for policymakers is the gap between national policy and local level implementation.[27] The success of AMR policy often depends on individual efforts rather than institutional processes, risking continuity when those individuals withdraw, as policymakers have reported limited institutional capacity and poor coordination in policy implementation.[27] Thornber and Kirchhelle reinforce this perspective, arguing that national AMR strategies are underfunded and reactive, advocating for a shift toward long-term, preventive approaches to AMR with upstream interventions rather than targeting individual pathogens or healthcare settings,[28] incorporating a multidisciplinary approach.[27]

DISCUSSION

This review explored the association between the SDoH and AMR in the UK. Antibiotic use and AMR are influenced by a range of complex, interrelated factors. Older females tend to use antibiotics more frequently due to increased healthcare engagement, and *E. coli* in

UTIs among this group has shown high levels of resistance.[17 23 26] Public knowledge of AMR is inconsistent; while some groups (eg, those with recurrent UTIs) are well-informed, patient expectations and widespread misconceptions persist, especially among adolescents and those from deprived socioeconomic backgrounds.[15 23 26] Socioeconomic inequalities influence antibiotic use, with deprived populations experiencing higher resistance rates, treatment failure resulting in higher hospital admission rates and reduced access to healthcare,[15 23 29] similar to migrant groups that also face elevated AMR risks due to poor living conditions and barriers within healthcare systems.[30–32] Additionally, the spread of resistant microbes through travel exacerbates the complexity of tackling AMR,[19] a factor temporarily mitigated by COVID-19 lockdowns.[25] The COVID-19 pandemic increased antibiotic use despite low bacterial co-infection rates; yet it improved infection control practices and gave public awareness to infectious diseases,[21 25] something which previous AMR campaigns have struggled to achieve.[29] Systemic gaps in surveillance, data quality, fragmentation between primary and secondary care and policy implementation hinder effective AMR management, underscoring the need for integrated, equitable, and behaviourally informed strategies.[18 28] These findings reveal that understanding AMR requires a multidimensional approach, integrating behaviours, demographic influences, structural inequalities and systemic limitations.

Certain groups have been highlighted as disproportionately affected by AMR including socioeconomically disadvantaged populations, migrants and older people. The Marmot review reports that individuals from lower socioeconomic backgrounds experience shorter life expectancy, due to differences in social determinants such as income and housing.[10] This review found that these groups are faced with similar inequalities, showing higher rates of resistance and frequent treatment failures leading to increased hospital admissions.[26] Tackling these inequalities is vital to enable a fair distribution of health and well-being.[10] The NAP prioritises understanding and funding targeted interventions for vulnerable groups and regions with the highest AMR burden. By obtaining this information, it seeks to identify strategies to address these disparities and strengthen efforts to control AMR.[5] The United Nations Sustainable Development Goals also call for reducing inequality and deprivation, adopting a holistic approach. AMR impacts several of the Goals with a core principle in Goal 3 of attaining 'good health and well-being' with target 3.d.2 addressing the AMR crisis by monitoring microbes that increase resistance to BSIs globally.[36] Findings of this review demonstrate that those from lower SES and those from Asian and British Asian groups are vulnerable to such BSIs.[26] The UK Health Security Agency (UKHSA) reports that 30-day mortality from critical care unit associated BSIs was 25.6% in 2016–17 and remains above pre-pandemic levels at 27.1% in 2023–2024. With an estimated 100 000 BSI episodes annually in the UK, these figures underline the urgent need for targeted action to ease healthcare pressures and reduce the associated financial burden.[37]

The WHO[38] report 'People-centered approach to tackling AMR in human health' emphasises prioritising individuals' needs and values while ensuring equitable access to healthcare services. This aligns with a key finding, which highlights the importance of a patient-focused narrative in addressing AMR. The WHO's recognition of barriers patients face in accessing healthcare is reflected in several studies included here, which not only identified challenges among vulnerable groups but also pointed to wider systemic issues. Patient expectations for antibiotics and pressure placed on GPs to meet these demands[29] have contributed to increased reliance on out-of-hours services, ultimately adding further strain to the healthcare system. The WHO report therefore both reinforces and extends this review findings, highlighting the need for strategies that address not only access but also patient-provider dynamics and broader awareness of AMR.

This review found that public understanding of AMR can vary. One way of raising this awareness is effective public communication. While some groups, such as individuals with recurrent UTIs, are well-informed,[15] knowledge gaps remain, particularly among adolescents.[20 24] These variations may indicate how determinants including age, access to health information and education shape an individual's understanding and engagement with AMR. The findings suggest that media campaigns can play a role in addressing AMR,[24] but these initiatives must be carefully targeted to avoid message fatigue.[29] Focusing on vulnerable groups and implementing sustainable strategies to address misconceptions, inform behaviour and promote shared responsibility between healthcare providers and the public can support a collaborative approach to preventing antibiotic misuse. The NAP on AMR prioritises public engagement and education with an aim to raise awareness among young people, identified in this review as often unaware of AMR but who are key to safeguarding antibiotic effectiveness for future generations.[5] The NAP suggests drawing on lessons from COVID-19 media campaigns; a strategy supported by findings in this review.[35] It gives importance to clear communication, meaningful healthcare providers and patient dialogue, while addressing misinformation. Ensuring these strategies are tailored to account for these disparities is essential in ensuring AMR knowledge and engagement.

The National Institute for Health and Care Excellence (NICE) guideline 'Antimicrobial stewardship: changing risk-related behaviours in the general population'[39] outlines strategies to reduce AMR by changing risk-related behaviours in the general population. It emphasises public education on appropriate antimicrobial use, infection prevention and self-care for self-limiting infections. The guideline advocates for consistent messaging across healthcare providers, schools and community settings, promoting hygiene practices and safe food handling, settings which were presented in papers of this review. While comprehensive, the guideline lacks targeted interventions for vulnerable groups such as migrants and individuals from deprived communities, who may face barriers like language difficulties and limited healthcare access. To enhance effectiveness, future strategies should incorporate such determinants, ensuring inclusivity and equitable access to AMR prevention efforts.

The COVID-19 pandemic not only increased public awareness of how infectious diseases spread but also had a wider impact on AMR. This review highlighted how the healthcare system was affected by the pandemic and subsequently on AMR. While the pandemic led to increased antibiotic use despite low bacterial co-infection rates, a risk associated with increasing AMR rates, it strengthened infection control practices.[21] These changes were shaped by underlying SDoH, such as healthcare access and workforce capacity which influenced prescribing practices and antimicrobial stewardship. This review demonstrated that travel contributes to the spread of resistant microbes, complicating efforts to tackle AMR.[31] This highlights the role of global mobility as a key social determinant in the spread of AMR. Although COVID-19 lockdowns temporarily reduced microbial transmission,[25] this approach is unsustainable when addressing AMR. COVID-19 models were suggested for application towards addressing AMR, such as investment in drug development, surveillance systems and diagnostics, for example, when treating gonococcal STIs[5] or recording data from underrepresented groups. There is widely accepted evidence that highlights the impacts of SDoH on health outcomes in vulnerable groups (eg, certain ethnic groups, migrants and deprivation) during the COVID-19 pandemic[40]; however, the interplay with AMR seems to remain underexplored.

Surveillance of AMR in primary and secondary care was time-consuming, incomplete and lacked the infrastructure to support development of policies and its implementation.[27] While these challenges reflect broader systemic issues in data integration and healthcare infrastructure, they can have important implications in health equity. Effective surveillance is essential for enabling patient-centred care in the context of AMR, as it informs evidence-based policymaking and targeted interventions.[38] Incomplete surveillance may disproportionately affect socially disadvantaged populations who are less likely to have consistent healthcare contact and as a result gaps in data can further obscure AMR burden within these groups.[41] The NAP recommends exploring the use of Artificial Intelligence by leveraging NHS data on AMR, emphasising the importance of clinician support in this effort.[5] To enable this, investment in digital infrastructure and stronger data integration will be required, an area identified by NHS England as a priority in its 'Digital Vision for Antimicrobial Stewardship in England'[42] report. Here, they acknowledged that digital solutions would require continued engagement with HCPs. However, this review found differing opinions among clinicians on system integration[18] highlighting the need for further interprofessional collaboration when addressing this.

A model approach to this integration is through Antimicrobial Stewardship (AMS) teams. Established within NHS organisations, they oversee the implementation, monitoring and optimisation of antimicrobial use to preserve their effectiveness. The NICE guidance on AMS[43] highlights the importance of collaborative working to enable shared learning, effective feedback, alignment of guidelines and formularies, and optimal use of data. NICE states collaborative working can be supported through governance, shared tools, cross-setting education and clear communication pathways, which help standardise practice, minimise duplication and facilitate system-wide monitoring of prescribing and resistance.[43] This can be strengthened through effective leadership, integrated data tools, targeted training, constructive feedback, relationship-building and effective patient engagement.[42 43] These strategies break down professional barriers and promote a shared stewardship culture among HCPs, advancing efforts to tackle AMR.

Strengths and weaknesses of the study

This scoping review employed a rigorous and transparent method, enabling the inclusion of a broad range of literature, which is a necessary approach given the complexity of defining SDoH. Despite this comprehensive strategy, some relevant studies may have been missed due to the diverse terminology used to describe concepts related to SDoH.[44] This review prioritised mapping current research activity over critical appraisal, allowing for the most recent evidence to be captured. Most included studies focused specifically on *E. coli* and UTIs, and further research is needed on other emerging pathogens or resistance patterns. This review was primarily conducted by a single researcher, with study inclusion decisions discussed and resolved in consultation with co-authors.

Recommendations and future work

Most studies focused on specific pathogens and infections such as *E. coli* and UTIs, indicating a need for broader investigation into emerging pathogens and resistance trends.[18] Enhancing infrastructure to integrate primary and secondary care data systems would improve the ability to monitor local resistance patterns more efficiently, reducing the need for manual data input through the implementation of electronic prescribing across all NHS sites, including information on patient characteristics and diagnoses.[18] Such integration would enable more accurate national AMR surveillance and facilitate a coordinated and collaborative response, including targeted public health campaigns, educational initiatives for both the public (particularly in schools) and HCPs and more informed policymaking at a system-wide level (figure 2).

Establishing multidisciplinary working groups that include patients, HCPs and policymakers, with particular attention to pharmacist and nurse prescribers, and wider representation from vulnerable groups would support more inclusive and equitable decision making. Increased research investment in telemedicine and its impact,[21 25] especially for improving healthcare access among marginalised groups, such as migrants and those from socioeconomically deprived backgrounds should be assessed, especially to reduce the reliance on out of hours services.

None of the included studies specifically examined the impact of rural compared with urban living, and few focused on BAME populations, with limited data available. This highlights a gap in literature that needs further investigation. While government initiatives consider clinical and some behavioural factors, they often overlook SDoH and the needs of vulnerable groups. Future research should explore how these factors can inform and strengthen these initiatives and future interventions.

CONCLUSION

In conclusion, this review highlights that AMR in the UK is shaped by a complex combination of social, economic and systemic factors. Vulnerable groups, including socioeconomically disadvantaged populations, migrants and older adults, face heightened risks due to structural inequalities, limited access to healthcare and low health literacy. While existing strategies focus on antimicrobial stewardship and drug innovation, integrating the SDoH is essential for sustainable and equitable solutions. Addressing these determinants through targeted interventions, improved public engagement, digital innovation and inclusive policymaking is vital to reduce health disparities and effectively contain AMR in the future.

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