

Introduction to Independent Research Skills (BMHP5019_BIRM)



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Research Report (Component 2):

***The Evolving Role of Nursing and Midwifery Interventions in
Managing Zika Virus: A Scoping Review of Clinical, Social, and
Digital Health Perspectives within the UK Context***

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Table of Contents

Introduction	3
Background	5
Methods	7
Scoping Review Framework	7
Data Collection and Search Strategy	7
Selection and Eligibility Criteria	8
Data Analysis Approach	8
Ethical Considerations	8
Results	9
Overview of Selected Studies	9
Table 1: Summary of Selected Articles	10
Summary of Findings	11
Discussion	12
Part 1: Analysis of Themes and Clinical Patterns	12
<i>Critical Appraisal of the Evidence</i>	13
Part 2: Digital Implications and Critical Evaluation	13
<i>Critical Synthesis of the Evidence Base</i>	14
Part 3: Clinical Innovations and Public Health Accountability	15
<i>Midwives as Environmental Sentinels</i>	15
<i>Critical Appraisal and Policy Lag</i>	16
<i>Strategic Implications for Midwifery</i>	16
Conclusion and Recommendations	17
Summary of Key Insights	17
Recommendations for Future Research	17
Recommendations for Policy and Practice	18
Reference List	19

Introduction

The Zika virus (ZIKV) represents a multifaceted global health challenge, functioning as both a significant teratogenic threat and a potential catalyst for oncological innovation. Originally identified in 1947 within the Zika Forest of Uganda, ZIKV is a mosquito-borne arbovirus of the Flaviviridae family (Gubler, Vasilakis and Musso, 2017). Although geographically confined for decades, its recent global emergence has transformed it from a neglected tropical disease into a paramount public health priority for international health organisations.

While historically associated with mild symptomatology, the 2015–2016 outbreaks established a definitive causal link between maternal infection and severe neurodevelopmental abnormalities, most notably Congenital Zika Syndrome (CZS) (Rasmussen *et al.*, 2016). Beyond these critical clinical risks, emerging research identifies ZIKV as a potential therapeutic tool, demonstrating selective oncolytic activity against glioblastoma stem cells (Zhu *et al.*, 2017). This complex dual nature necessitates a robust, multidisciplinary approach to clinical management and professional nursing surveillance.

The rationale for this research resides in the escalating necessity for clinical preparedness within non-endemic regions such as the United Kingdom (UK). For the National Health Service (NHS), the asymptomatic nature of ZIKV poses a substantial risk to maternal safety due to international travel and migration (UKHSA, 2025). Critically, environmental shifts have necessitated the monitoring of invasive vectors such as *Aedes albopictus* in the UK, suggesting a potential transition from imported to localised risk (Medlock *et al.*, 2022). Midwives and nurses occupy the frontline of this response, requiring robust, evidence-informed protocols to navigate diagnostic complexities and ethical dilemmas (Tambo *et al.*, 2017). Furthermore, digital health tools are increasingly recognised as pivotal components for real-time monitoring and global health security (Melo *et al.*, 2024).

This scoping review synthesises peer-reviewed literature to elucidate the evolving role of nursing and midwifery interventions. The central research question is: “What are the key midwifery and nursing interventions for supporting pregnant women affected by ZIKV, as identified by existing peer-reviewed literature?”

The objectives are:

- To identify and categorise primary themes regarding the clinical, diagnostic, and emotional care of pregnant women.
- To highlight evidence gaps in social and digital health frameworks to inform future nursing education.
- To provide insights into policy adaptations within the UK maternity context to enhance clinical preparedness for imported cases.

Background

The clinical landscape of maternal health underwent a fundamental paradigm shift following the recognition of the Zika virus (ZIKV) as a potent neurotropic pathogen. While the virus remained relatively obscure for decades following its 1947 discovery in the Zika Forest of Uganda, and subsequent documentation in Nigeria (MacNamara, 1954), the 2015–2016 epidemic illuminated the catastrophic systemic consequences of vertical transmission. From a midwifery perspective, the primary clinical concern resides in the virus's capacity to breach the placental barrier, subsequently disrupting fetal neurogenesis through complex teratogenic and neuropathogenic mechanisms (Hcini *et al.*, 2024). This disruption manifests as Congenital Zika Syndrome (CZS), a deleterious cluster of anomalies encompassing severe microcephaly, intracranial calcifications, and ocular impairment (Petersen *et al.*, 2016). Consequently, the World Health Organization (2016) strategically designated these complications as a Public Health Emergency of International Concern (PHEIC), necessitating a global re-evaluation of antenatal surveillance protocols.

Elucidating the pathophysiology is essential for nursing professionals, as the "invisible" nature of the infection - where approximately 80% of cases remain asymptomatic - complicates early detection within routine antenatal care. Peer-reviewed literature underscores that midwives frequently serve as the primary point of contact for expectant mothers, rendering their role in identifying subtle symptomatology and travel-related risks paramount. In high-burden regions such as Uganda and Nigeria, the African lineage of ZIKV historically circulated with limited or unnoticed human incidence, requiring nursing staff to maintain high clinical resilience despite constrained diagnostic infrastructure (Bribes and Nisole, 2025). These frontline experiences highlight a significant disparity in global health: while African nursing models are often defined by managing sporadic, localised cases, European frameworks, including the NHS, are increasingly reliant on integrated digital health surveillance and laboratory-based confirmation to monitor emerging infectious threats (WHO, 2025; Melo *et al.*, 2024).

The evolution of ZIKV research has further identified sexual transmission as a secondary yet critical vector, which necessitates a broader scope of health education provided by community nurses (Brooks *et al.*, 2016). Unlike many other flaviviruses, the persistence of ZIKV in reproductive fluids introduces unique ethical and socio-political challenges in family planning and preconception counselling (Musso and Gubler, 2016, p. 490). Furthermore, contemporary research into rapid antigen testing highlights the diagnostic ambiguity in regions where ZIKV is co-endemic with Dengue, further complicating the nursing triage process (Bosch *et al.*, 2020). Consequently, the background of ZIKV is not merely a history of a tropical disease, but

an ongoing narrative of global epidemiological surveillance where midwifery interventions must adapt to both viral mutations and shifting migratory patterns.

In the United Kingdom, the management of imported arboviral threats is governed by stringent clinical frameworks designed to safeguard maternal health. The UK Health Security Agency (UKHSA, 2026) provides updated laboratory and clinical guidelines that dictate screening protocols for symptomatic and asymptomatic pregnant travellers returning from endemic zones. These guidelines are integrated into broader NHS infectious disease strategies and the "Global Health Framework" (Department of Health and Social Care, 2023), which emphasises a multidisciplinary approach involving midwives, obstetricians, and infectious disease specialists (NHS England, 2024). This structured preparedness is a strategic necessity in a post-2016 landscape where global mobility has rendered geographic boundaries increasingly irrelevant to viral transmission (Coyle, 2016).

The strategic role of the midwife within the United Kingdom's antenatal care model is heavily influenced by RCOG (2019) and NICE (2022) guidelines, which mandate proactive travel history assessments during initial appointments. Unlike localised, community-led models in high-burden regions, the UK framework is predicated on centralised digital health surveillance. Contemporary evidence suggests these systems function as a critical early-warning mechanism, enabling the NHS to systematically track potential ZIKV clusters and coordinate resource allocation with heightened efficiency (Melo *et al.*, 2024; WHO, 2025). This digital integration aligns with the broader NHS Digital Strategy, prioritising real-time data synthesis to mitigate the impact of "invisible" pathogens before they escalate into community threats (NHS England, 2024).

Furthermore, the legal and ethical framework governing midwifery is underpinned by the dual requirements of informed consent and specialised psychological intervention. Midwifery professionals must navigate the tension between the technical exigencies of viral screening and the compassionate care necessitated by maternal anxiety and the psychological burden associated with potential fetal anomalies (Tambo *et al.*, 2017). However, significant challenges persist regarding digital health literacy among frontline staff and inherent diagnostic delays. As rising global temperatures expand *Aedes vector* habitats towards Northern Europe, encompassing urban centres like London, the UK's reliance on robust policy and digital innovation becomes increasingly critical for national health security (Rezza, 2024).

Methods

Scoping Review Framework

To ensure a rigorous, transparent, and reproducible synthesis, this study adopts the seminal framework established by Arksey and O'Malley (2005), further refined by Levac *et al.* (2010). This methodology is uniquely suited to mapping the breadth of evidence within arboviral maternal care, enabling the identification of key concepts and critical knowledge gaps. The process followed five iterative stages:

1. Identifying the research question;
2. Searching for relevant studies;
3. Study selection;
4. Charting the data;
5. Collating and reporting results (Arksey and O'Malley, 2005, p. 22).

Data Collection and Search Strategy

A systematic search was conducted across three electronic databases: PubMed, CINAHL, and the UWTSD Library portal. These platforms were strategically selected for their comprehensive indexing of peer-reviewed literature within midwifery, nursing, and global health security. The search architecture adheres strictly to PRISMA-ScR guidelines (Tricco *et al.*, 2018), utilising complex Boolean operators:

- ("Zika virus" OR "ZIKV") AND ("midwifery care" OR "nursing interventions")
- ("Zika" AND "pregnancy") AND ("UK maternity" OR "clinical guidelines")
- ("Zika virus" AND "digital health") AND "surveillance"

Selection and Eligibility Criteria

The selection process was governed by stringent criteria to maintain thematic integrity:

- Inclusion:

Peer-reviewed primary research and systematic reviews; English language (2016–2026); focusing on clinical management, nursing roles, and maternal/fetal outcomes.

- Exclusion:

Grey literature (editorials, blogs); publications predating the 2016 PHEIC declaration; and studies focused exclusively on entomological data without clinical nursing application.

Data Analysis Approach

Following selection, data were synthesised using thematic analysis, as advocated by Aveyard (2023). This approach facilitates the identification of patterns across diverse study designs through a three-step process: (1) data familiarisation; (2) generation of initial codes based on midwifery interventions; and (3) development of overarching themes to address the research question (Aveyard, 2023, p. 130).

Ethical Considerations

As a scoping review of secondary data, formal institutional ethical approval was not required (Saunders *et al.*, 2023, p. 194). However, ethical integrity was maintained through "intellectual honesty" and strict adherence to inclusion criteria. All sources were scrutinised for academic validity to ensure recommendations are predicated on reliable, high-quality research (Holloway and Galvin, 2024, p. 56).

Results

Overview of Selected Studies

The systematic search across PubMed, CINAHL, and the UWTSD Library yielded a final selection of six high-impact, peer-reviewed articles for detailed thematic analysis. These studies were strategically curated based on their direct relevance to midwifery interventions, the clinical management of ZIKV, and the specificities of the UK's health and social care context. The selection emphasises a synergistic blend of clinical evidence, nursing resilience, and digital health innovation, ensuring a comprehensive response to the primary research question. The evidentiary base, summarised in Table 1, reflects a global perspective adapted for local clinical application.

Table 1: Summary of Selected Articles for Thematic Analysis:

Author(s), Year	Research Objectives	Methods	Key Findings	Relevance to Review Question
Hcini et al. (2024)	To assess vertical transmission and placental changes.	Systematic Review	ZIKV bypasses the placental barrier; vertical transmission remains a persistent maternal threat.	Justifies the need for specialized midwifery monitoring.
Petersen et al. (2016)	To define the clinical spectrum of ZIKV and CZS.	Clinical Review	Established a causal link between ZIKV and microcephaly; defined screening parameters.	Provides the clinical baseline for midwifery screening.
Bribes & Nisole (2025)	To evaluate the risk profiles of ZIKV lineages.	Literature Review	African and Asian lineages require distinct surveillance; diagnostic resilience is vital.	Addresses the "global health" and triage element of the report.
Bosch et al. (2020)	To evaluate diagnostic precision in co-endemic zones.	Experimental Study	Rapid antigen tests are critical to distinguish ZIKV from Dengue in triage settings.	Direct application for nursing triage and diagnostic accuracy.
Melo et al. (2024)	To explore the role of digital health in arboviral surveillance.	Scoping Review	Digital tools and real-time data integration enhance the tracking of clusters.	Addresses the "Digital Health" requirement of the report.
Tambo et al. (2017)	To examine psychological support and ethical challenges.	Peer-reviewed Review	Anxiety levels are high; midwives must provide specialized emotional and ethical counselling.	Focuses on the holistic and social care aspect of midwifery.

Following the analytical framework established by Aveyard (2023), data extraction involved identifying recurring patterns across the six selected studies. Initial coding focused on critical nursing actions, including "rigorous travel history screening," "advanced fetal ultrasound monitoring," and "structured psychological reassurance." Through iterative comparison and constant refinement, these codes were synthesised into three overarching thematic categories:

- **Theme 1:**

Clinical Triage and Diagnostic Precision: This theme focuses on the midwife's pivotal role in early detection and the necessity of distinguishing ZIKV from co-endemic pathogens to ensure maternal safety (Petersen *et al.*, 2016; Bosch *et al.*, 2020).

- **Theme 2:**

Holistic Care and Psychological Support: This underscores the imperative for compassionate, person-centred care to mitigate the profound maternal anxiety associated with potential congenital anomalies (Tambo *et al.*, 2017; Hcini *et al.*, 2024).

- **Theme 3:**

Digital Integration and Global Surveillance: This explores how real-time data sharing and digital health frameworks enhance public health responses and clinical preparedness within the NHS (Melo *et al.*, 2024; Rezza, 2024).

Summary of Findings

The systematic synthesis of the evidence base demonstrates that contemporary midwifery interventions have evolved beyond traditional bedside care. They are now intrinsically integrated into a globalised network of digital surveillance, specialised ethical counselling, and multidisciplinary clinical protocols, ensuring a robust response to emerging arboviral threats.

Discussion

Part 1: Analysis of Themes and Clinical Patterns

The synthesis of the selected literature reveals a sophisticated interplay between clinical necessity and the multidimensional socio-emotional responsibilities of modern midwifery. Regarding Clinical Triage and Differential Diagnosis, a definitive pattern emerges across the evidence base, emphasising that ZIKV's "asymptomatic invisibility" constitutes its most significant clinical threat. Petersen *et al.* (2016) and Bosch *et al.* (2020) strategically align in their assertion that clinical suspicion must remain heightened, even in the absence of overt symptomatology. Bosch *et al.* (2020) specifically demonstrate that because ZIKV symptoms frequently mimic other endemic arboviruses such as Dengue, midwives must advocate for the utilisation of specific NS1 protein markers to ensure diagnostic precision. Within the UK context, this is paramount; while UKHSA (2026) provides robust laboratory pathways, the practical implementation by frontline midwives often encounters logistical bottlenecks. These delays do not merely represent administrative hurdles but directly exacerbate maternal anxiety, potentially leading to profound psychological distress.

This disconnect identifies a critical tension between high-level policy and frontline clinical reality, necessitating what Nickitas, Middaugh, and Feeg (2023, p. 84) describe as "political advocacy." They argue that the efficacy of clinical protocols is fundamentally dependent on integrating nursing expertise into national health policy to ensure that resource allocation matches the stringency of clinical guidelines. A contemporary meta-analysis by Ba *et al.* (2025) - utilising the Newcastle-Ottawa Scale for rigorous critical appraisal - further reinforces this risk. Their findings identify maternal age (≥ 30 years) and late-gestational diagnosis (≥ 25 weeks) as critical modifiers, correlating with a significant incidence of microcephaly and corpus callosal anomalies. For UK midwifery practice, this necessitates a shift in perspective: diagnostic vigilance must be sustained throughout all trimesters, moving beyond the traditional focus on the first trimester.

Regarding Holistic Care, Tambo *et al.* (2017) suggest that the psychological burden of ZIKV is frequently subordinated to clinical outcomes in contemporary research. While European models prioritise laboratory confirmation, this review contends that UK midwifery would significantly benefit from integrating the community-centered frameworks observed in high-burden regions to better support diverse, often marginalised, migrant populations within the NHS. Tambo *et al.* (2017) identify a "syndrome of anxiety" rooted in epidemiological uncertainty, reinforcing the concept that patient safety is inextricably linked to professional autonomy and robust educational support (Holloway and Galvin, 2024). Furthermore, clinical research, such as the placental studies by Hcini *et al.* (2024), tends to focus on the acute

phase of infection. This leaves a palpable knowledge gap regarding the long-term, longitudinal follow-up care required for families navigating the UK's social care system post-diagnosis.

Critical Appraisal of the Evidence

A primary strength of the reviewed studies - notably Ba *et al.* (2025) and Bosch *et al.* (2020)—resides in their rigorous methodological validation, which provides a resilient foundation for evidence-based practice. Conversely, the qualitative insights offered by Tambo *et al.* (2017) are limited by localised sampling, which may constrain their generalizability to the broader UK demographic. Drawing on the foundational nursing research of Holloway and Galvin (2024), it is evident that such small-scale qualitative insights must be synthesised with larger workforce data to develop sustainable health protection policies. Furthermore, a persistent geographic bias toward South American datasets remains; there is a notable paucity of studies addressing the specific cultural nuances and linguistic needs of ZIKV-affected communities within the British maternity system.

Part 2: Digital Implications and Critical Evaluation

Building upon the clinical patterns identified previously, the subsequent critical theme focuses on digital integration, revealing a transformative shift in how the National Health Service (NHS) manages emerging epidemiological threats. While high-level surveillance architectures are undeniably robust, a critical appraisal suggests a persistent "digital divide" within clinical practice. Melo *et al.* (2024), in a comprehensive scoping review of digital health infrastructure, highlight that sophisticated surveillance now constitutes the backbone of UK preparedness. However, a salient pattern identified across the literature is that the frontline integration of these tools for community midwives remains fragmented. This systemic disparity is further underscored by Farooq *et al.* (2025) in *The Lancet Planetary Health*; using advanced time-to-event analysis, they demonstrate that increasingly favourable climatic conditions in Europe have compressed the interval from vector establishment to disease outbreak from twenty-five years to less than twelve months.

Farooq *et al.* (2025) argue that digital health and early warning systems (EWS) must evolve beyond passive data repositories to become proactive instruments for real-time clinical decision-making. As Nickitas, *et al.* (2023, p. 348) emphasise in their influential work on nursing technology, the strategic utilisation of health information technology is no longer optional but essential for midwives to monitor fluctuating population health trends. Nevertheless, a significant knowledge gap persists: the majority of peer-reviewed research prioritises the technological capabilities of systems over the digital health literacy of the

workforce required to operate them. This "pedagogical gap" suggests that without targeted training, even the most advanced surveillance systems may fail to translate into improved maternal outcomes at the point of care.

Critical Synthesis of the Evidence Base

Critically evaluating the broader evidence base reveals a juxtaposition of methodological strengths and inherent weaknesses. A primary merit of the reviewed literature - specifically the foundational work of Petersen *et al.* (2016) and Bosch *et al.* (2020) is the rigorous clinical validation of ZIKV as a potent teratogen, providing a definitive evidentiary foundation for practice. Conversely, the qualitative insights offered by Tambo *et al.* (2017) provide profound, empathetic perspectives on maternal anxiety but are frequently constrained by localised, non-generalisable sample sizes.

While these qualitative nuances are vital for "person-centred care," a contradiction arises when attempting to extrapolate these findings across the vast, diverse NHS landscape. Drawing on the broader nursing research of Holloway and Galvin (2024), it is evident that such micro-level insights must be balanced with macro-level workforce data to formulate sustainable health protection policies. Furthermore, a discernible geographic bias remains prevalent; the literature lacks sufficient studies addressing the specific cultural, linguistic, and socio-economic needs of ZIKV-affected migrant communities navigating the UK social care system.

Practical Implications and Strategic Readiness The practical implications for contemporary midwifery are profound. The findings suggest that ZIKV preparedness must be treated not as a static, top-down protocol, but as a dynamic, evolving clinical competency. Midwives must be equipped not only with diagnostic expertise but also with the agility to navigate the complex digital and ethical landscapes of modern infectious disease management. As Nickitas, *et al.* (2023, p. 84) highlight through their "advocacy and action" framework, midwives must be empowered to lead these technological transitions and influence health policy, rather than merely adhering to reactionary directives.

Linking back to the primary research objectives, this review has elucidated that while clinical themes are well-documented, the integration of social and digital dimensions remains an evolving frontier. To enhance future readiness, the disconnect between high-level policy (UKHSA, 2026) and frontline midwifery experience must be bridged through targeted professional development, enhanced digital literacy, and more comprehensive UK-centric clinical trials that encompass the holistic social reality of the disease.

Part 3: Clinical Innovations and Public Health Accountability

Expanding the discourse beyond digital surveillance, the final theme explores the critical intersection of clinical innovation and professional accountability. The dual nature of ZIKV functioning as both a devastating teratogen and a potential tool in neuro-oncology introduces a unique paradigm for contemporary midwifery education. While the clinical priority remains fetal protection, the emerging research by Zhu *et al.* (2017) and the comprehensive review by Francipane *et al.* (2021) underscore a biological complexity that midwives must effectively communicate to patients. This review contends that a high-level understanding of viral neurotropism is not merely an academic exercise; it is essential for articulating how ZIKV's affinity for neural stem cells, which precipitates neurodevelopmental harm in utero, can be strategically exploited to target glioblastoma stem cells.

Midwives as Environmental Sentinels

The integration of longitudinal surveillance data from Johnston *et al.* (2025) reveals that the United Kingdom is no longer a passive observer of ZIKV trends. The detection of *Aedes aegypti* and *Aedes albopictus* markers near major transport hubs like Heathrow Airport highlights a critical necessity for midwives to function as "environmental sentinels." As Aiken (2025, p. 3) emphasises in her seminal policy analysis, midwives serve as the healthcare system's primary "safety net," where each additional patient per practitioner is statistically associated with a 7% increase in mortality. This evidence-based finding reinforces the "Nursing Intellectual Capital" framework explored by Ridge *et al.* (2022), who argue that professional resources, facility-based protocols, and clinical mentorship are the cornerstones of institutional resilience. A discernible pattern identified here is that without safe staffing levels and robust intellectual resources, the lag between recognizing emerging environmental risks and executing a clinical response could be catastrophic for maternal safety.

Critical Appraisal and Policy Lag

A significant strength of current UK health policy, supported by UKHSA (2025) and the foundational guidelines of Khalil *et al.* (2020), is the rapid adaptation of screening protocols. However, a major contradiction identified in this scoping review is the over-reliance on travel-based triage. The recent entomological data from Johnston *et al.* (2025) suggests that "travel history" may soon become an insufficient diagnostic filter, revealing a "policy lag" where clinical guidelines have not yet synchronised with the ecological reality of vector presence in Southeast England. To mitigate this systemic risk, the professional autonomy advocated by Nickitas *et al.* (2023) must be utilised to advocate for broader, more inclusive screening criteria that transcend geographic boundaries.

Strategic Implications for Midwifery

Midwives must now bridge the gap between high-tech genomic surveillance and community-based care. This involves not only clinical screening but also the sophisticated management of the "syndrome of anxiety" identified by Tambo *et al.* (2017) through evidence-based reassurance and ethical transparency. The role of the midwife must evolve into that of a "specialist practitioner" capable of navigating the complexities of sexual transmission risks (Brooks *et al.*, 2016), digital health literacy, and the long-term neurodevelopmental monitoring of infants, as necessitated by the placental pathologies outlined by Hcini *et al.* (2024).

Conclusion and Recommendations

Summary of Key Insights

This scoping review has systematically mapped the evolving landscape of midwifery and nursing interventions related to the Zika virus (ZIKV). The findings underscore that while ZIKV remains a profound teratogenic threat (Rasmussen *et al.*, 2016), the midwife's role has transitioned into a complex, multidisciplinary intervention required to manage both acute clinical risks and long-term socio-emotional outcomes (Tambo *et al.*, 2017). Key insights reveal that effective management is predicated on a "triad of care": precise clinical triage (Petersen *et al.*, 2016), robust psychological support, and integrated digital surveillance (Melo *et al.*, 2024). This review identified a critical disparity between high-level policy (UKHSA, 2026) and frontline reality, particularly regarding NHS diagnostic delays. Furthermore, the detection of invasive vectors near Heathrow signals a paradigm shift (Johnston *et al.*, 2025); midwives must now evolve from passive observers into active "environmental sentinels" to mitigate emerging localised risks within the UK (Rezza, 2024).

Recommendations for Future Research

- Longitudinal Impact:

Further research is required to evaluate the long-term social and developmental support systems for UK families affected by CZS beyond the initial diagnostic phase (Hcini *et al.*, 2024).

- Workforce Resilience:

Future studies should investigate the correlation between midwife staffing levels and surveillance effectiveness, as inadequate staffing directly compromises patient safety (Aiken, 2025).

- Migrant Health:

Dedicated research is needed to explore the specific cultural and linguistic barriers faced by migrant women from endemic zones when accessing NHS maternity services (Tambo *et al.*, 2017).

Recommendations for Policy and Practice

- Standardised Training:

The NHS should implement mandatory training focusing on differential diagnosis and evolving vector habitats. Guidelines must reflect that maternal age (≥ 30) and late-gestational exposure are critical risk modifiers (Ba *et al.*, 2025).

- Staffing Advocacy:

Policymakers must prioritise safe patient-to-midwife ratios; professional autonomy and adequate staffing (Ridge *et al.*, 2022) are foundational to maintaining robust surveillance systems (Aiken, 2025).

- Digital Integration:

To reduce maternal anxiety, health policies should prioritise integrated platforms facilitating instantaneous communication between laboratories and community teams, bridging the current "digital divide" (Farooq *et al.*, 2025).

- The "Sentinel Midwife" Framework:

This review proposes a specialised "Infectious Disease Liaison Midwife" role within each NHS Trust to link genomic surveillance data (UKHSA) with frontline practice, ensuring real-time updates to travel-based triage (Johnston *et al.*, 2025).

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