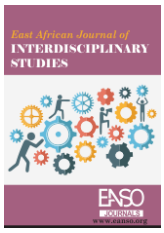
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Original Article

Beyond Borders: Migration Patterns and Surveillance Gaps at the West Nile Uganda-Democratic Republic of the Congo Border Entry Points

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ABSTRACT

Transboundary migration across the Uganda–Democratic Republic of the Congo (DRC) border remains a defining feature of population mobility and border governance in Uganda's West Nile region. Daily cross-border movements support trade and social ties, and are predominantly circular and repetitive rather than permanent. Such high-frequency mobility places sustained pressure on surveillance systems that are often designed for occasional travellers, creating gaps in routine monitoring at border entry points. This study examined transboundary migration patterns in terms of volume, direction, frequency, and demographic profiles, and assessed how existing migration surveillance controls at West Nile, Uganda–DRC points of entry aligned with and responded to these movements. A cross-sectional mixed-methods study was conducted across six West Nile border districts. Quantitative data were collected through structured interviews with 292 adult cross-border travellers at gazetted and porous entry points. Qualitative 03 FGDs, 02 community in-depth individual interviews, 05 policy level executive interviews, and 05 field observations at both gazetted and porous border points of entry. Quantitative data were analysed using descriptive and inferential statistics, while qualitative data were analysed thematically. Findings indicated that cross-border mobility was characterised by frequent and repetitive movement: 45.9% of respondents crossed the border 2–10 times in the previous three months, and 39.0% crossed more than 10 times. Although 75.7% used gazetted points of entry during their most recent crossing, 23.3% used ungazetted routes. Surveillance controls were inconsistently experienced, and only 40.4% reported observing migration-related checks. Perceived effectiveness of infectious disease monitoring was significantly associated with experiencing health checks and the presence of cross-border monitoring mechanisms, but not with general awareness of infectious diseases. In conclusion, frequent circular mobility and uneven enforcement of surveillance controls remain central challenges to effective border migration surveillance in the West Nile. Aligning migration surveillance systems with the realities of high-frequency movement is critical to strengthening routine infectious disease monitoring at both formal and informal border crossings.

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INTRODUCTION

Transboundary migration across the Uganda–Democratic Republic of the Congo border remained a major factor shaping population movement patterns, border governance, and interagency coordination in Uganda's West Nile region. The border corridor supported gazetted points of entry and porous crossing routes, which enabled daily movements linked to trade, livelihood activities, displacement, and social relations across border communities (Sami & Chun, 2024; Tagliacozzo et al., 2024). Mobility in this setting was largely circular and repetitive rather than permanent relocation, meaning the same individuals crossed frequently within short periods. This type of movement created sustained operational pressure on surveillance controls at border points that were largely structured for episodic travel rather than daily routine crossings (Munoriyarwa, 2020; Vearey et al., 2020).

Evidence from African borderlands showed that informal crossings accounted for a substantial share of daily movement, which weakened surveillance systems that relied mainly on formal border posts and structured clearance procedures (Sami & Chun, 2024). Kinyenje (2024) revealed that land border surveillance systems in Uganda and comparable East African settings, such as Kenya, Tanzania, Rwanda, and South Sudan, face persistent challenges related to congestion, porous routes, seasonal surges, staffing limitations, and weak continuity in routine checks, resulting in inconsistent application of surveillance controls. These challenges are more visible in high mobility border communities where travellers prioritise speed and convenience, and where informal movement routes remain socially accepted and economically necessary (Limenyande et al., 2024).

Uganda had introduced investments aimed at strengthening migration management, including technology-supported border governance and routine operational procedures at selected gazetted points of entry (Baker, 2022). However, available evidence showed that gaps had remained in staffing, equipment availability, and effective control coverage across gazetted and porous routes, limiting the ability of border surveillance systems to align with actual movement behaviour in border communities (Kinyenje, 2024). West Nile remained a critical transboundary region because it functioned as a trade corridor and a mobility zone shaped by recurrent displacement dynamics and sustained cross-border interaction (Lee et al., 2022). This study, therefore, generates empirical evidence by

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systematically measuring crossing volumes, directions of travel, frequency of movement, and demographic characteristics of travellers, and by assessing how existing surveillance controls operate at both gazetted and porous entry points to identify practical gaps in border governance and routine monitoring within this high mobility environment.

BACKGROUND AND SIGNIFICANCE

Transboundary migration across the Uganda–Democratic Republic of the Congo border remained a major factor shaping population movement patterns, border governance, and interagency coordination in Uganda's West Nile region (Shen et al., 2025). The border corridor supported gazetted points of entry and porous crossing routes, which enabled daily movements linked to trade, livelihood activities, displacement, and social relations across border communities (Sami & Chun, 2024). Mobility in this setting was largely circular and repetitive rather than permanent relocation, meaning the same individuals crossed frequently within short periods. This type of movement created sustained operational pressure on surveillance controls at border points that were largely structured for episodic travel rather than daily routine crossings (Munoriyarwa, 2020; Vearey et al., 2020).

Acikalin (2020) examined migration volume and surveillance operations at land border points in East Africa and showed that officially recorded movements often underestimate actual crossings because many travellers move repeatedly within short periods and also use informal routes. Kinyenje (2024) reported that border movements in Uganda increase sharply during market days and agricultural seasons, which overwhelms routine surveillance controls and causes officers to prioritise clearing congestion over consistent checks.

Munoriyarwa (2020) found that much of this high-volume mobility is driven by livelihood needs rather than permanent relocation, making cross-border movement routine, frequent, and predictable. Vearey et al. (2020) similarly emphasised that circular and repetitive crossings are normal in border communities, yet surveillance systems still operate with procedures designed for occasional travel. The evidence therefore shows that high mobility pressures surveillance systems, but the studies mainly explain movement volume without clearly showing how volume pressures translate into practical gaps in routine infectious disease monitoring at points of entry.

Tagliacozzo et al. (2024) showed that borderland mobility in Africa is largely bidirectional and circular, where travellers move back and forth daily for trade, family ties, and access to services. Sami & Chun (2024) explained that surveillance systems often struggle to adapt to shifting flows and reversals in mobility patterns, especially under high movement settings. Vearey et al. (2020) reported that return movements and repeated crossings often receive less attention from border controls compared to inward movements, creating monitoring blind spots.

Further, Munoriyarwa (2020) also noted that frequent crossers become familiar with border routines and may not comply consistently with repeated screening procedures, particularly where speed and livelihood needs take priority. Although this literature explains the direction and frequency of movement and how it disrupts routine controls, it does not provide sufficient empirical clarity on how circular mobility directly reshapes the reliability of screening and reporting for infectious diseases at specific high mobility entry points, such as West Nile, Uganda–DRC.

Babalanda (2022) found that border surveillance controls in Uganda are commonly structured around security priorities such as documentation, enforcement, and identity checks, while public health monitoring functions remain limited and inconsistently applied. Jung (2023) reported that digital and biometric systems can improve identification and movement tracking, but the health surveillance value remains low where these technologies are not integrated with health

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monitoring systems. Limenyande et al. (2024) showed that operational capacity gaps, such as staffing shortages, limited equipment, and weak reporting tools, reduce the consistency of surveillance checks at points of entry.

Buback et al. (2025) also demonstrated that under-resourced border posts experience delays and surveillance breakdowns, especially when porous routes enable undocumented movement. The research gap is that existing studies largely treat migration patterns and surveillance capacity as separate discussions, leaving limited direct evidence on how frequent circular movement interacts with uneven surveillance controls to produce routine health monitoring gaps at both gazetted and ungazetted entry points.

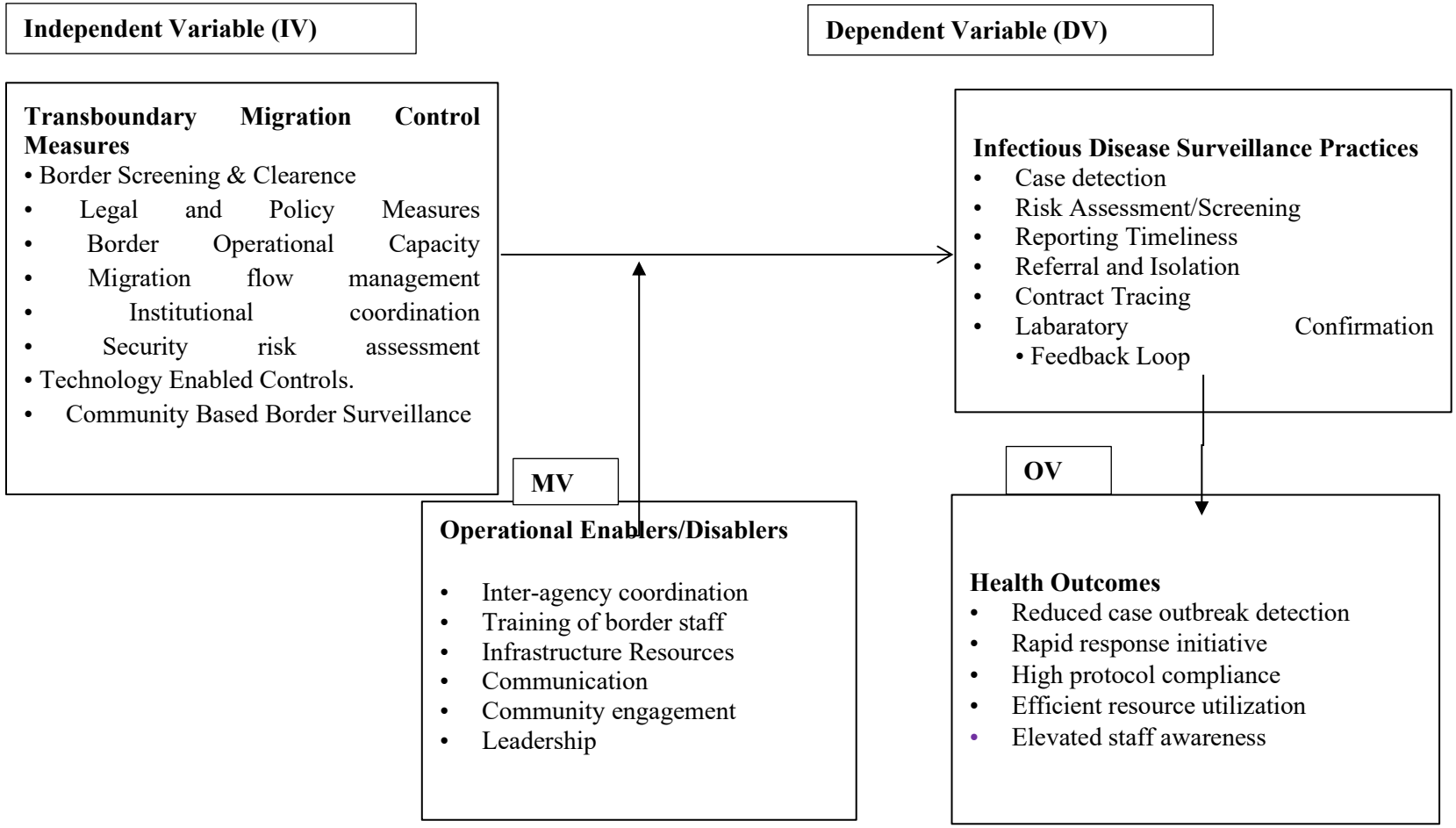
Study Conceptual Framework

This study framework was informed by empirical literature on transboundary migration control and public health surveillance, which demonstrated that border governance structures influenced the organisation and implementation of infectious disease surveillance practices at points of entry.

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Figure 1: Conceptual Framework: Transboundary Migration Control Measures and Infectious Disease Surveillance Practices



Source: *Adopted from literature review (Ario et al., 2023; Buback et al., 2025; Kinyenje, 2024; Limenyande et al., 2024; Mugasha et al., 2025; Nsawotebba et al., 2021; Nsimire et al., 2022; Sami & Chun, 2024a) and modified by the researcher for the study.*

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Further, the study was guided by the general systems theory and border theory to explain mobility patterns and institutional surveillance controls operating within the Uganda–DRC transboundary environment. General systems theory, developed by von Bertalanffy (1968), viewed institutional processes as connected components functioning through inputs, processes, outputs, and feedback loops. In the context of migration surveillance, general systems theory supported the view that border surveillance controls did not operate as isolated actions, but as linked processes involving immigration screening, documentation, security checks, data management, communication channels, and coordination among agencies. Border theory, introduced by Anzaldúa (1987), views borders as dynamic interaction spaces rather than fixed territorial lines. Border theory supported analysis of why surveillance controls performed differently across gazetted and porous sites, since compliance and route selection were shaped by social networks, informal economies, trust relationships, and practical convenience (Sami & Chun, 2024; Tagliacozzo et al., 2024).

Border Theory by Paasi (1996) affirms the proposition that borders are not fixed territorial lines but socially constructed, dynamic, and continually negotiated spaces. Also, the findings of routine, circular, and livelihood-driven mobility patterns have normalised border crossing among local communities, shaping how migration controls are interpreted, negotiated, and selectively applied in practice. Frequent crossers progressively become familiar to border officials, and over time, they traverse both formal and informal crossings with diminished scrutiny, thereby weakening the effectiveness of one-time, event-based health screening approaches.

This study addressed that gap by linking the dominant migration patterns in West Nile, Uganda–DRC, to the practical surveillance weaknesses observed at points of entry and showing how these conditions shape the consistency of monitoring practices. The insight gained from this study may alert the government to the potential health consequences resulting from unmonitored transboundary movements and associated infectious disease threats at the border points of entry. The border managers may benefit from the findings of this study, with the knowledge that addresses border governance issues, especially on migration surveillance and disease monitoring.

MATERIALS AND METHODS

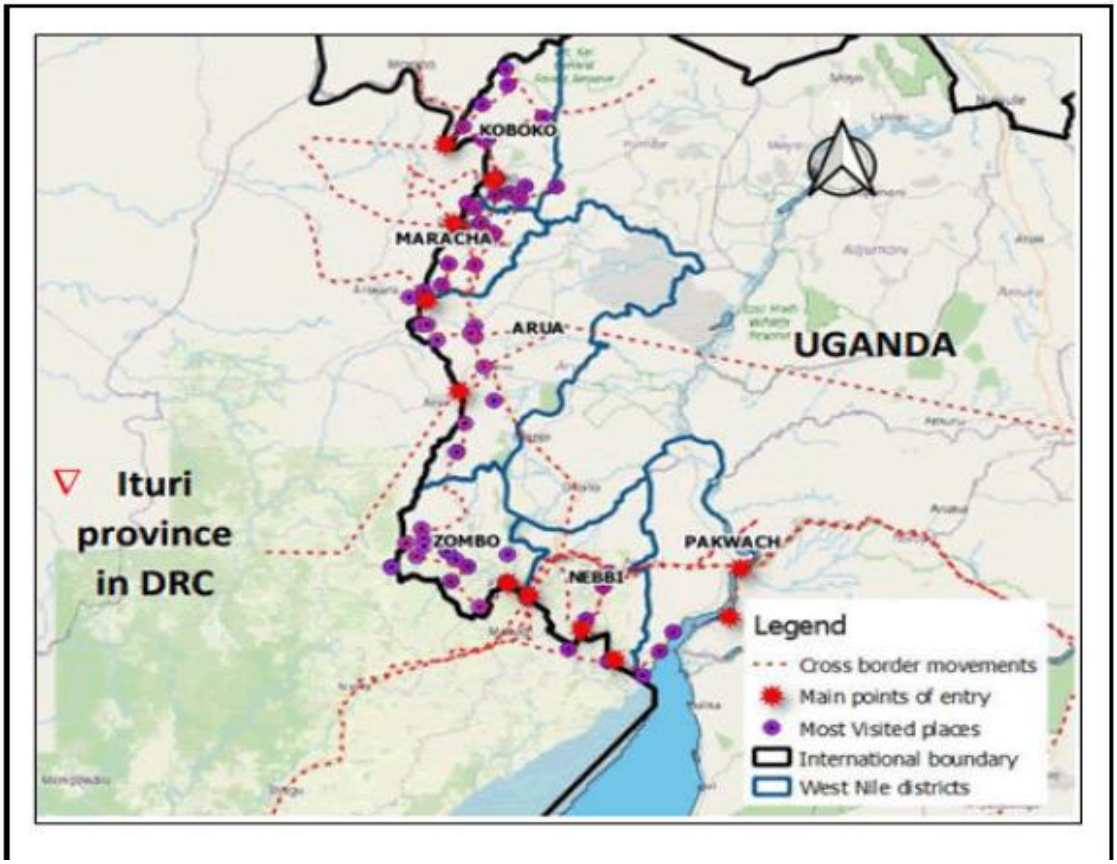
Study Area

The West Nile region was selected because of its sustained exposure to cross-border population movements linked to documented episodes of insecurity and armed conflict in the Ituri region of the eastern Democratic Republic of the Congo between 2017 and 2024. Displacement tracking reports by the International Organization for Migration and refugee movement records by UNHCR show repeated population inflows into West Nile during this period, placing pressure on border management systems and public health surveillance structures (IOM, 2023; UNHCR, 2024).

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Figure 2: Most Visited Places, Points of Entry and Cross-border Movements, West Nile Region, Uganda, August, 2021



Study Design and Setting

The study adopted a cross-sectional research design combined with mixed methods involving both quantitative and qualitative approaches; this design was considered appropriate for collecting comprehensive and relevant data needed to address the study variables as recommended by Kumar (2018). The study was conducted in West Nile districts bordering the DRC, including Koboko, Maracha, Arua, Zombo, Nebbi, and Pakwach. These districts host gazetted points of entry—such as Dei, Goli, Paidha, Padea, Vurra, Odramachaku, and Burijjako—as well as porous routes commonly used for informal crossings (Uganda Bureau of Statistics- Informal Cross Border Survey Report, 2023). The region is multi-ethnic with cultural groups such as Alur, Lugbara, Kakwa, and Madi engaging in subsistence agriculture as a primary livelihood source.

Data Collection Procedures

Quantitative data were collected through structured questionnaire interviews administered to cross-border travellers aged 18 years and above at selected gazetted and porous entry points. Convenience sampling was applied because cross-border travellers were highly mobile and could best be accessed at the point of movement (Fricker & Schonlau, 2002). The qualitative data were collected through key informant interviews(KIIs) with border management stakeholders, including immigration, port health, customs, police, and other security actors, as well as focus group discussions(FGDs) with selected Indepth community leaders. The sample of respondents was purposively selected. Field observations were conducted at selected porous crossing sites and nearby health facilities to document movement

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patterns and surveillance controls as practised in daily operations.

Data Analysis

Quantitative data were entered into EpiData and analysed using STATA to generate descriptive statistics and test associations between surveillance controls and perceived effectiveness of infectious disease monitoring. Qualitative data were transcribed verbatim and analysed thematically following Braun & Clarke's (2006) approach, with themes aligned to migration patterns and surveillance practices. The Fisher's exact test was used for associations between health checks, cross-border monitoring mechanisms, and perceived effectiveness, including the important null finding for disease awareness.

Informed Consent Statement

Consent forms were distributed to cross-border immigrant respondents above the age of 18. They were given detailed information on the study and the minimal risks it could bring up, such as the research questions sparking off memories of their vulnerabilities as they travelled/travel. The researcher described the research in detail, explaining the purpose and importance of the study. Participants were reminded that participation was voluntary and that all data were confidential and protected by assigning a unique identification number to the interview schedule instead of their names. Consent forms were signed by all respondents.

RESULTS

Table 1 below presents the social and demographic characteristics of respondents who participated in the quantitative survey conducted at selected gazetted and ungazetted border points along the West Nile, Uganda–DRC border between December 2024 and February 2025.

Table 1: Social and Demographic Characteristics of Quantitative Survey Respondents

Variable	Category	Asina	Birijako	Busia	Dei	Goli	Kasato	Nyibola	Padea	Vurra	Total
Average Age	Mean (years)	36.4	36.6	42.8	37.1	38.6	37.8	38.0	36.4	36.8	37.5
Age Group	18–24	20.0% (3)	21.6% (8)	18.8% (3)	14.9% (7)	6.4% (3)	15.4% (2)	16.7% (2)	8.5% (4)	14.0% (8)	13.8% (40)
	25–29	6.7% (1)	24.3% (9)	6.3% (1)	12.8% (6)	17.0% (8)	30.8% (4)	0.0% (0)	23.4% (11)	10.5% (6)	15.8% (46)
	30–39	33.3% (5)	16.2% (6)	6.3% (1)	34.0% (16)	34.0% (16)	15.4% (2)	41.7% (5)	29.8% (14)	43.9% (25)	30.9% (90)
	40–49	26.7% (4)	21.6% (8)	37.5% (6)	17.0% (8)	25.6% (12)	23.1% (3)	25.0% (3)	19.2% (9)	14.0% (8)	21.0% (61)
	50+	13.3% (2)	16.2% (6)	31.3% (5)	21.3% (10)	17.0% (8)	15.4% (2)	16.7% (2)	17.0% (8)	17.5% (10)	18.2% (53)
Gender	Male	80.0% (12)	60.5% (23)	75.0% (12)	59.6% (28)	74.5% (35)	61.5% (8)	58.3% (7)	93.6% (44)	71.9% (41)	71.9% (210)
	Female	20.0% (3)	39.5% (15)	25.0% (4)	40.4% (19)	25.5% (12)	38.5% (5)	41.7% (5)	6.4% (3)	28.1% (16)	28.1% (82)
Nationality	Ugandan	13.3% (2)	57.9% (22)	75.0% (12)	59.6% (28)	19.2% (9)	23.1% (3)	58.3% (7)	19.2% (9)	15.8% (9)	34.6% (101)
	Congolese	86.7% (13)	42.1% (16)	25.0% (4)	40.4% (19)	51.1% (24)	76.9% (10)	41.7% (5)	72.3% (34)	59.7% (34)	54.4% (159)
	Other	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	29.8% (14)	0.0% (0)	0.0% (0)	8.5% (4)	24.5% (14)	11.0% (32)

Source: *Field Data, 2025*

Transboundary Migration Patterns

Cross-border migration along the West Nile Uganda–DRC entry points was largely routine and repetitive, with most respondents reporting multiple crossings within a short period. Out of 292 respondents, 45.9% reported crossing the border 2–

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10 times in the last three months, while 39.0% crossed more than 10 times. Only 13.7% crossed once, and 1.4% did not cross within the same period. This pattern demonstrates that border mobility is dominated by frequent travellers rather than occasional entrants, meaning that the same individuals are repeatedly exposed to border procedures and any surveillance gaps over time.

> *"In this area, crossing the border is part of people's daily livelihood activities… Some individuals cross several times within a single day. Because this movement is so frequent and routine, both the migrants and the officers tend to treat it as normal movement rather than formal international travel"* (KII Respondent, Vurra Border PoE, February 2025)

Most respondents (75.7%) used gazetted points of entry during their last crossing, while 23.3% used ungazetted routes, confirming that informal movement remains substantial even when formal entry points exist.

"…. In many cases, what we record at the official points does not reflect the real situation on the ground because a large number of people are using ungazetted routes on a daily basis. These are not just a few individuals, but continuous streams of movement involving traders, farmers, and even families who cross regularly without passing through formal checkpoints" (KII participant, Dei border PoE, Pakwach district, 2025)

The above mixture implies that surveillance coverage is not uniform across the border landscape because nearly one quarter of travellers can enter and exit through routes where standard control procedures are limited or absent. The preferred modes of transport further reflected flexible movement systems, with motorcycles (44.2%) and walking (20.2%) dominating cross-border travel. These transport modes are linked to quick crossings and easier shifting between official and unofficial routes, which reduces the ability of border systems to consistently enforce checks.

> *"….motorcycles are the most commonly used because they are fast, affordable, and can move through almost any route, including small paths where vehicles cannot pass. Riders know both the official and unofficial routes … Even those who walk use similar paths because they understand the terrain. Because of this, a large part of the movement does not pass through the official points, hence difficult to monitor or control consistently."* (KII Respondent at Goli border PoE, May 2025)

Livelihood activities were the leading driver of movement. Respondents crossing mainly for business and trade accounted for 55.1%, while 15.4% crossed for visiting relatives and other social reasons. This shows that the border functions as an economic and social corridor where mobility is normalised and driven by daily survival needs. Since trade activity depends on speed and routine movement, travellers are more likely to prioritise fast crossing over compliance with time-consuming procedures.

> *"….for most people here, crossing the border is not about migration in the formal sense, it is about survival and daily life"* (Community Indepth Interview at Goli Border Community, 2025)

Transboundary Migration Border Controls

Border surveillance controls were inconsistently experienced by travellers. Only 40.4% of respondents reported observing some form of movement checks at the crossing point, while 59.6% reported that no checks were observed. This shows that border controls were either absent, weak, or inconsistently applied in day-to-day operations. Even when checks were present, health-related surveillance remained limited. Only 16.8% of respondents reported observing health screening, showing that migration controls were not consistently structured around public health monitoring.

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In contrast, security-oriented procedures were more commonly observed, reflecting a surveillance orientation that may prioritise enforcement and control of goods and identity over disease prevention. Additionally, 40.6% of respondents reported crossing the border without clearance in the last three months. This indicates that undocumented movement is not rare, and that the border operates with significant routine bypassing of formal control procedures.

> *"....when many people are crossing, especially on market days or during peak hours, it is not possible to stop everyone for full checks. Officers are forced to focus on managing the flow so that movement continues smoothly. In such situations, things like health screening are not given priority because they take time. So, the system ends up allowing people to pass without being checked fully...."* (KII participant at Vurra Border PoE Arua district, April 2025).

Relationship Influence

The inferential findings showed that perceived effectiveness of infectious disease monitoring was shaped more by what travellers experienced at the border than by what they knew about diseases.

Table 2: Relationship between Migration Surveillance Controls and Perceived Effectiveness of Infectious Disease Monitoring Practices

Variable	Response category	No effectiveness n (%)	Effectiveness n (%)	Total n (%)	Fisher's exact (p-value)
Awareness of common infectious diseases along the border	Yes	173 (75.2%)	57 (24.8%)	230 (100.0%)	p=0.415
	No	43 (69.4%)	19 (30.6%)	62 (100.0%)	
Household experienced symptoms of infectious diseases (past 3 months)	Yes	17 (85.0%)	3 (15.0%)	20 (100.0%)	p=0.418
	No	156 (74.3%)	54 (25.7%)	210 (100.0%)	
Subjected to health checks when crossing the border	Yes	7 (8.5%)	75 (91.5%)	82 (100.0%)	p=0.000*
	No	209 (99.5%)	1 (0.5%)	210 (100.0%)	
Cross-border monitoring for infectious diseases	Yes	67 (56.8%)	51 (43.2%)	118 (100.0%)	p=0.000*
	No	149 (85.6%)	25 (14.4%)	174 (100.0%)	

*Statistically significant at $\alpha = 0.05$

Source: *Field data, 2025*

Awareness of infectious diseases along the border was not significantly associated with perceived effectiveness of monitoring (p=0.415). This indicates that although many respondents knew about common infectious diseases, that knowledge alone did not translate into confidence that monitoring systems were functioning well at points of entry. Similarly, households reporting recent symptoms did not show a statistically significant difference in perceived effectiveness (p=0.418), suggesting that illness exposure in itself did not change how the monitoring system was judged.

A strong pattern emerged where monitoring was visible in practice. Respondents who were subjected to health checks reported very high perceived effectiveness (91.5%), compared to near complete dissatisfaction among those not checked. This association was statistically significant (p=0.000),

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meaning that experiencing screening at the point of crossing was closely linked to perceiving the monitoring system as functional. A similar association was found for cross-border monitoring mechanisms, where reported presence of monitoring structures was significantly linked to better perceptions of effectiveness (p=0.000). Together, these findings show that functionality is strongly influenced by operational consistency and enforcement of health surveillance actions at points of entry rather than general awareness alone.

DISCUSSION OF STUDY FINDINGS

These study findings confirm that mobility along the West Nile Uganda–DRC border is dominated by frequent, livelihood-driven, and circular movement. These findings align with evidence that borderland mobility in African settings is defined by circular and livelihood-driven movement rather than permanent migration (Munoriyarwa, 2020; Vearey et al., 2020). The dominance of frequent crossings shows that the West Nile Uganda–DRC border operates as a routine economic corridor where mobility is embedded within daily survival systems (Acikalin, 2020; Kinyenje, 2024).

The continued reliance on ungazetted routes reflects border dynamics described in border theory, where borders function as lived spaces shaped by community practices, social networks, and informal norms rather than fixed administrative boundaries (Khosravi, 2021; Kolosov, 2023). In such contexts, formal border points exist alongside long-established informal crossing routes that remain socially legitimate to local communities. The use of motorcycles and foot travel strengthens this borderland reality because these modes support flexible crossing and reduce dependence on controlled entry infrastructure.

The findings also match General Systems Theory (GST) by showing that infectious disease monitoring cannot perform effectively when the border surveillance system operates with weak inputs, fragmented processes, and inconsistent feedback loops (Rusoja et al., 2021). Border surveillance is shaped by multiple interacting parts, such as staff presence, infrastructure, coordination, reporting systems, and traveller compliance. Weakness in any part reduces overall performance, which is consistent with systems thinking applied to public health surveillance environments (Leischow et al., 2023). The limited observation of health screening reflects a structural imbalance within the system where security tasks appear more institutionalised than public health surveillance activities.

Existing scholarship on migration governance supports the observation that border control procedures in low-income contexts often prioritise enforcement functions such as identity verification and goods inspection, while public health monitoring receives secondary attention (Babalanda, 2022; Sami & Chun, 2024). This pattern is further reinforced by evidence that even when digital surveillance infrastructure is introduced, it frequently operates in isolation from health databases, limiting its public health value (Jung, 2023). The practical implication is that surveillance gaps persist not because borders lack systems, but because the systems in place are not effectively aligned to capture health risks in real time.

The significant relationships between health checks, cross-border monitoring mechanisms, and perceived effectiveness support a practice-based argument for surveillance performance. This aligns with broader public health evidence showing that monitoring credibility depends on consistent and visible implementation rather than awareness campaigns alone (Andersson, 2022; Peters, 2022). It also aligns with syndemic theory, which highlights that mobile populations may face overlapping disease risks, requiring integrated monitoring that can detect threats early across frequent and repeated exposures (Mendenhall, 2022; Tsai, 2021). If screening is irregular or absent,

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detection systems are weakened in settings where multiple epidemic-prone diseases coexist.

Remote control theory also provides a useful interpretation because border governance increasingly relies on indirect surveillance tools and technology, but these mechanisms may shift attention toward migration control outcomes rather than health outcomes unless integration is deliberate (Andersson, 2022; FitzGerald, 2020). In this case, visible security-oriented checks do not necessarily translate into functional infectious disease monitoring, especially where health screening remains inconsistent or reactive.

The findings reinforce that border health surveillance in West Nile is shaped by a mismatch between the realities of frequent mobility and the limited routine integration of health monitoring within migration controls. Strengthening monitoring effectiveness, therefore, requires institutionalising health screening as a routine function of border management, extending surveillance coverage beyond gazetted entry points, and improving coordination mechanisms that track health risks alongside population movement.

STUDY LIMITATIONS

The study employed a cross-sectional design that captured migration patterns and surveillance control practices at a single point in time. This means that only the occurrences at that time were captured and observed. The use of convenience sampling among cross-border travellers may introduce selection bias in the use of self-reporting of several variables on frequency of crossings, experiences of surveillance checks, and perceived effectiveness of infectious disease monitoring.

Secondly, some findings relied on self-reported experiences and perceptions from immigrants and border staff, which may be affected by recall bias or social desirability. This was addressed through field observations and cross-checking responses across different respondent categories to reduce over-reliance on single data streams.

Regarding the operational coverage, the data collection, particularly observations conducted at porous border points of entry, was undertaken mainly during daytime hours. This created the possibility that important patterns of night-time cross-border movement, which may involve different categories of travellers, routes, and surveillance practices, were not fully captured. Observing border activities during both day and night could have provided deeper insights into hidden mobility dynamics and surveillance gaps that are often underreported in border health research. However, this limitation was minimised by collecting data across multiple districts and border settings, which helped ensure that recurrent findings reflected broader system-wide patterns rather than isolated site-specific experiences.

CONCLUSIONS

The findings show that cross-border mobility along the West Nile Uganda–DRC corridor is mainly routine, circular, and livelihood-driven, dominated by economically active adults who cross frequently for trade, transport, farming, and family obligations, often within the same day or after short stays. This mobility pattern places constant pressure on border systems and exposes gaps in how migration surveillance controls operate in practice, especially because movement is normalised and repeated by familiar travellers. Surveillance systems remain misaligned with the high-frequency nature of movement, limiting their effectiveness in routine infectious disease monitoring. The results also indicate that migration controls remain more security-focused and irregular rather than fully aligned to the high-frequency nature of movement. The study provides new empirical insight into how surveillance effectiveness is constrained when control mechanisms are configured for irregular or one-off movements rather than for sustained, repetitive circulation.

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Recommendations

Border surveillance systems should be adapted to the realities of frequent and circular movement by institutionalising routine, repeat-friendly procedures that minimise delays while ensuring consistent monitoring. Strengthening staffing during peak periods, improving screening infrastructure at gazetted points of entry, extending surveillance to porous routes through community-linked approaches, and enhancing interagency coordination between Immigration, Port Health, Police, Customs, and district leadership are essential to closing existing migration control gaps. There is also a need for strengthening exit screening and the use of local trusted community health workers, especially at informal crossing points for syndromic surveillance.

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Conflict of Interest: All authors state that they have no conflicts of interest to declare.

Disclaimer: The findings and conclusions in this paper are those of the authors based on the study findings and literature and do not necessarily represent the official position of the Ministry of Internal Affairs and or Ministry of Health in Uganda.

Ref List of Abbreviations

DRC	Democratic Republic of the Congo
SB	Spencer Birungi
CM	Charles Muchunguzi
EM	Edgar Mulogo
MPox	Monkeypox
PoE	Point of Entry//Exit
REC	Research Ethics Committee
WHO	World Health Organization
GST	General Systems Theory
DV	Dependent variable
IV	Independent Variable
OV	Outcome variable
MV	Mediating Variable
IDSR and Reporting	Integrated Disease Surveillance
FGD	Focus Group Discussion
KIIs	Key Informant Interviews
MUST	Mbarara University of Science and Technology

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