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TMSS Medical College Journal (TMCJ)

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*Original Article***Laboratory-Based Surveillance of Dengue, Malaria, Syphilis, and Viral Hepatitis in Three Rohingya Refugee Camps in Cox's Bazar, Bangladesh**Murshid ME^{1*}, Islam S², Akhiruzzaman³, Asha DA⁴, Rahaman MM⁵

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Corresponding Author*Abstract**

Background: Refugee settlements can face increased risks of communicable diseases because of population density, environmental constraints, population mobility, and pressure on health services. Cox's Bazar hosts a large Rohingya refugee population and has experienced recurrent dengue transmission and substantial viral hepatitis concerns.

Objective: To describe laboratory test positivity patterns for dengue, malaria, syphilis, hepatitis B virus (HBV), and hepatitis C virus (HCV) among clients tested at three health posts in Camps 1E, 11, and 22 of Cox's Bazar, Bangladesh.

Materials and Methods: We conducted a retrospective cross-sectional analysis of cumulative laboratory register data from July 2024 through April 2026. The dataset comprised 5,053 test records for dengue NS1 antigen, dengue IgM and IgG, hepatitis B surface antigen (HBsAg), anti-HCV, venereal disease research laboratory (VDRL) testing, and malaria rapid diagnostic tests and/or microscopy. Positivity was summarized as percentages with 95% confidence intervals (CIs) using the Wilson method. Chi-square tests were used to assess differences in positivity across the three camps. Because the source data were aggregate and test-based, the analysis did not estimate population prevalence, incidence, or patient-level risk.

Results: HCV had the highest observed positivity, 23.3% (367/1,573; 95% CI 21.3–25.5), with the highest camp-specific positivity in Camp 11 (31.2%). Dengue NS1 positivity was 16.2% (76/468; 95% CI 13.1–19.9), ranging from 2.3% in Camp 1E to 28.7% in Camp 22 ($p < 0.001$). Dengue IgG positivity was 15.0% (44/293), while IgM positivity was 2.2% (7/318). HBsAg positivity was 3.3% (51/1,549), and VDRL positivity was 0.6% (5/823). No positive malaria tests were recorded among 29 tests. Anti-HCV results represent screening positivity and do not establish active HCV infection.

Conclusion: The findings demonstrate substantial HCV test positivity and marked between-camp variation in dengue NS1 positivity among clients who were tested. These findings support continued decentralized hepatitis diagnosis and linkage to treatment, camp-specific dengue surveillance and vector-control activities, and stronger routine laboratory surveillance. The results should not be interpreted as population prevalence or as evidence of temporal trends because the analysis was based on cumulative test records without monthly counts or individual-level denominators.

Keywords: laboratory surveillance, Dengue, Hepatitis C, Hepatitis B, Syphilis, Malaria, Rohingya refugees.

Introduction

Displaced populations may experience increased exposure to communicable diseases because of crowded living conditions, population mobility, environmental constraints, interrupted access to preventive services, and limited health-system capacity. In humanitarian settings, blood-borne infections and vector-borne diseases may coexist and place different demands on surveillance and clinical services. Global WHO reporting continues to identify

viral hepatitis B and C as major public health priorities, while dengue has expanded geographically and reached historically high levels of global reporting.^{1,2}

In Bangladesh, the Rohingya refugee response in Cox's Bazar comprises densely populated camps with substantial and continuing health-service needs. Dengue has been repeatedly reported in the camps and surrounding host communities, including a major upsurge during 2024. WHO described the 2024 dengue

outbreak in the Rohingya camps and host communities as the largest and most prolonged since 2018.^{3,4}

Viral hepatitis is also an important concern in the Rohingya refugee population. Previous studies and humanitarian health reports have documented substantial HCV seropositivity and active infection in this population. WHO reporting from Cox's Bazar has also highlighted the need to expand HCV diagnosis and access to treatment.^{5,6}

The epidemiological information available at district or response level may mask differences between individual camps. Camp-specific laboratory data can therefore provide operationally useful information for prioritizing surveillance, clinical services, referral, and prevention. However, positivity among people who are tested is not equivalent to population prevalence, and aggregate laboratory data do not permit patient-level risk-factor analysis.

The present study therefore describes laboratory test positivity for dengue, malaria, syphilis, HBV, and HCV among clients tested at three Gonoshasthaya Kendra (GK)-operated health posts in Camps 1E, 11, and 22. The study specifically examines differences between camps and avoids interpreting cumulative test positivity as population prevalence or temporal incidence.

Materials and Methods

Study design and setting

This was a retrospective cross-sectional analysis of secondary, laboratory-based surveillance data. The study setting comprised three GK-operated primary health posts in Camp 1E, Camp 11, and Camp 22 in Ukhiya sub-district, Cox's Bazar, Bangladesh. The study was restricted to these three sites because the available laboratory register dataset covered the three GK health posts during the study period. Consequently, the sample represents clients tested at these service points and is not a population-representative sample of all residents of the three camps.

Study period

The study period was July 2024 to April 2026, corresponding to the period covered by the laboratory registers used for this analysis.

Data source and eligibility

Data were extracted from standardized laboratory registers covering the study period. Eligible records were laboratory test records for one of the predefined assays performed at the three study health posts during the study period. The included tests were: (1) dengue NS1 antigen, dengue IgM, and dengue IgG; (2) HBsAg and anti-HCV; (3) VDRL for syphilis; and (4) malaria rapid diagnostic testing and/or microscopy.

The analytical unit was the test record rather than a unique individual. Because the source dataset was aggregated and did not contain personal identifiers or a patient-level linkage key, it was not possible to determine whether the same client contributed more than one test record or to perform patient-level deduplication. Accordingly, denominators represent the number of tests recorded for each assay, not the number of unique persons.

No patient-level demographic or clinical exclusion criteria could be applied because age, sex, clinical history, and other individual-level variables were not available in the aggregated analytical dataset. Records outside the specified study period or unrelated to the predefined assays were outside the study dataset.

Laboratory measures

Dengue NS1 antigen was treated as evidence compatible with acute dengue infection at the time of testing; dengue IgM and IgG were interpreted as markers of recent and past exposure, respectively. HBsAg was used as the laboratory marker of current HBV infection, while anti-HCV was interpreted as evidence of previous or current HCV exposure and cannot by itself establish active HCV infection. VDRL was used for syphilis screening. Malaria testing was based on rapid diagnostic testing and/or microscopy. The study reports laboratory test positivity and does not establish clinical diagnoses beyond the test information available.

Statistical analysis

Analyses were performed using SPSS version 25. For each assay, positivity was calculated as the number of positive tests divided by the number of tests recorded for that assay. Exact denominators were retained for transparency. Aggregate 95% confidence intervals (CIs) were calculated using the Wilson score method. Pearson's chi-square test was used to assess heterogeneity in positivity across Camps 1E, 11, and 22 when expected cell counts were adequate; Fisher's exact test was used for sparse contingency tables. A two-sided $p < 0.05$ was considered statistically significant.

The analysis was intentionally descriptive because the available data were cumulative, aggregate, and test-based. No multivariable regression was undertaken because individual-level covariates and patient identifiers were unavailable. Likewise, no monthly or seasonal trend analysis was performed because monthly test counts and monthly positivity

data were not available in the analytical dataset. The absence of temporal analysis is therefore treated as a limitation rather than interpreted as evidence of stable or changing transmission over time.

Reporting framework

The manuscript was prepared with reference to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidance for cross-sectional studies, while recognizing that the underlying dataset was aggregate and laboratory-register based.

Results

Overall laboratory activity

A total of 5,053 infectious-disease test records were included. Camp 1E contributed 2,052 records (40.6%), Camp 11 contributed 1,727 (34.2%), and Camp 22 contributed 1,274 (25.2%). These figures describe laboratory testing activity and should not be interpreted as the number of unique clients.

Table 1. Camp-specific laboratory test positivity, July 2024–April 2026

Disease/test	Camp 1E	Camp 11	Camp 22	P-value
Dengue NS1 (acute)	4/174 (2.3%)	20/113 (17.7%)	52/181 (28.7%)	<0.001
Dengue IgG (past exposure)	31/158 (19.6%)	7/45 (15.6%)	6/90 (6.7%)	0.023
Dengue IgM (recent exposure)	1/159 (0.6%)	2/56 (3.6%)	4/103 (3.9%)	0.130
Hepatitis C (anti-HCV)	109/576 (18.9%)	202/648 (31.2%)	56/349 (16.0%)	<0.001
Hepatitis B (HBsAg)	20/577 (3.5%)	19/631 (3.0%)	12/341 (3.5%)	0.875
Syphilis (VDRL)	3/389 (0.8%)	0/233 (0.0%)	2/201 (1.0%)	0.574
Malaria	0/19 (0.0%)	0/1 (0.0%)	0/9 (0.0%)	—

(Values are positive tests/total tests (% positivity). P-values were calculated from the camp-specific 2×2 contingency tables using Pearson's chi-square test when expected cell counts were adequate and Fisher's exact test for sparse tables. Denominators represent test records, not unique individuals. A dash indicates that no formal comparison was performed for malaria because of the very small number of tests and zero positive results.)

Dengue NS1 antigen positivity differed significantly across the camps. Positivity was 2.3% (4/174) in Camp 1E, 17.7% (20/113) in Camp 11, and 28.7% (52/181) in Camp 22 ($p < 0.001$). Thus, Camp 22 had the highest proportion of positive NS1 test results and Camp 1E the lowest. These differences indicate marked variation in the distribution of positive NS1 results among clients tested at the three sites. However, the cross-sectional laboratory data cannot determine

whether these differences reflect an outbreak, seasonal effects, differences in clinical testing thresholds, or other factors.

Dengue IgG positivity also differed significantly among the camps ($p=0.023$). Positivity was highest in Camp 1E at 19.6% (31/158), followed by Camp 11 at 15.6% (7/45), and was lowest in Camp 22 at 6.7% (6/90).

Dengue IgM positivity was relatively low across all three camps and did not differ significantly ($p=0.130$). Positivity was 0.6% (1/159) in Camp 1E, 3.6% (2/56) in Camp 11, and 3.9% (4/103) in Camp 22.

Hepatitis C (anti-HCV) positivity varied substantially across the camps ($p<0.001$). Positivity was 18.9% (109/576) in Camp 1E, 31.2% (202/648) in Camp 11, and 16.0% (56/349) in Camp 22, with the highest positivity observed in Camp 11. The finding indicates a high burden of HCV-positive test results among

clients tested at these health posts, but it does not estimate community prevalence because testing was not population-based and the denominator comprised laboratory tests.

Hepatitis B (HBsAg) positivity was similar across the three camps ($p=0.875$), with positivity of 3.5% (20/577) in Camp 1E, 3.0% (19/631) in Camp 11, and 3.5% (12/341) in Camp 22.

Syphilis (VDRL) positivity was low and did not differ significantly between camps ($p=0.574$). Positivity was 0.8% (3/389) in Camp 1E, 0% (0/233) in Camp 11, and 1.0% (2/201) in Camp 22.

Malaria testing was very limited. No positive test was recorded in Camp 1E (0/19), Camp 11 (0/1), or Camp 22 (0/9). No formal statistical comparison was performed because of the very small number of tests and the absence of positive results.

Table II. Aggregate laboratory test positivity and 95% confidence intervals

Disease/test	Total tests	Positive	Positivity	95% CI
Hepatitis C (anti-HCV)	1,573	367	23.3%	21.3–25.5
Dengue NS1 antigen	468	76	16.2%	13.1–19.9
Dengue IgG	293	44	15.0%	11.2–19.6
Hepatitis B (HBsAg)	1,549	51	3.3%	2.5–4.3
Dengue IgM	318	7	2.2%	0.9–4.5
Syphilis (VDRL)	823	5	0.6%	0.2–1.4
Malaria	29	0	0.0%	0.0–11.9

(Aggregate positivity was calculated from the combined test records of Camps 1E, 11, and 22. Confidence intervals were estimated using the Wilson score method. The malaria interval is wide because only 29 malaria tests were recorded)

Dengue NS1 antigen positivity was 16.2% (76/468; 95% CI: 13.1–19.9). This aggregate estimate reflects the combined laboratory records from all three camps.

Dengue IgG positivity was 15.0% (44/293; 95% CI: 11.2–19.6), while **Dengue IgM positivity** was 2.2%

(7/318; 95% CI: 0.9–4.5).

Hepatitis B (HBsAg) positivity was 3.3% (51/1,549; 95% CI: 2.5–4.3).

Syphilis (VDRL) positivity was 0.6% (5/823; 95% CI: 0.2–1.4).

No malaria-positive test was recorded among the 29 malaria tests performed. The observed positivity was therefore 0.0%, with a wide 95% CI of 0.0–11.9%, demonstrating substantial statistical uncertainty associated with the very small denominator.

Discussion

Principal findings

This laboratory-register analysis identified two operationally important patterns: high anti-HCV positivity among tested clients, particularly in Camp 11, and marked between-camp variation in dengue NS1 positivity. These findings are consistent with the coexistence of blood-borne and vector-borne disease priorities described in humanitarian and Bangladesh-specific health reports.^{1,3,5} In contrast, HBsAg and VDRL positivity were lower and relatively consistent across camps, while malaria testing was too limited to support a meaningful conclusion about malaria transmission.

HCV positivity in the humanitarian context

The overall anti-HCV positivity of 23.3% indicates a substantial burden of HCV-positive test results among clients tested at these health posts. Previous work in Rohingya refugee settings has also documented substantial HCV seropositivity and active infection, supporting the interpretation that hepatitis C warrants sustained attention in humanitarian health services.^{1,5,6} This interpretation also aligns with broader evidence on viral-hepatitis epidemiology and prevention in low- and middle-income settings.^{7,8}

The 31.2% anti-HCV positivity observed in Camp 11 is particularly important for service planning. However, the study cannot determine why positivity was higher in Camp 11. Explanations such as previous exposure to unsafe medical procedures, differences in referral patterns, screening practices, or other risk factors are plausible but were not measured in this dataset. Such explanations should therefore be treated as hypotheses for further investigation rather than as established causes.

From a programmatic perspective, the findings support strengthening decentralized pathways for confirmatory testing, linkage to care, and access to direct-acting antiviral treatment. WHO has emphasized the effectiveness of direct-acting antivirals and the need to expand access to diagnosis and treatment¹, and experience from Rohingya refugee services illustrates

the operational relevance of linking diagnosis with treatment pathways.⁶ The feasibility and design of decentralized treatment should, however, be guided by national policy, confirmatory diagnostic capacity, and humanitarian health-sector coordination.

Dengue and camp-level heterogeneity

The overall NS1 positivity of 16.2% and the range from 2.3% in Camp 1E to 28.7% in Camp 22 indicate substantial heterogeneity in positive dengue tests among clients who were tested. This pattern is consistent with the importance of camp-level dengue surveillance in Cox's Bazar, where dengue has been a recurrent humanitarian health concern. WHO reporting and recent epidemiological work have described substantial dengue activity in the camps and host communities and have emphasized preparedness, surveillance, and vector-control measures.^{2,3,4}

Several environmental and operational factors could contribute to between-camp differences, including water and waste management, vector breeding conditions, population density, timing of testing, healthcare-seeking patterns, and variation in vector-control activities. These are plausible considerations in densely populated humanitarian settings and are relevant to the surveillance and preparedness priorities described for Cox's Bazar.^{3,4,9} However, these variables were not available in the present dataset. The observed differences should therefore be interpreted as descriptive camp-level heterogeneity rather than proof of a specific environmental mechanism or a confirmed localized outbreak.

The 15.0% dengue IgG positivity suggests previous exposure among the tested population, consistent with the role of serological surveillance in describing prior dengue circulation.^{2,9} Because the data do not include serotype information, clinical severity, or longitudinal follow-up, the study cannot estimate the risk of secondary infection or severe dengue in this population. The finding nevertheless supports continued clinical vigilance and laboratory surveillance during periods of increased dengue activity.

Syphilis, HBV, and malaria surveillance

VDRL positivity was low (0.6%), but continued screening remains relevant to sexual and reproductive health and prevention of mother-to-child transmission, particularly because sexually transmitted infections have been documented among Rohingya refugees 9. The relatively consistent HBsAg positivity across camps suggests a need for continued hepatitis B prevention, diagnosis, and linkage to care, consistent with the broader public-health importance of hepatitis B prevention and treatment.^{1,7,8,10}

No positive malaria test was identified, but this finding should not be interpreted as evidence that malaria is absent from the camps. Only 29 malaria tests were recorded, producing a very wide confidence interval. The low number of tests may reflect the clinical testing context, service priorities or other surveillance factors that cannot be evaluated from the aggregated dataset. Maintaining appropriate malaria surveillance remains important in Cox's Bazar because humanitarian populations are mobile and service needs can change across time and location.^{3,11}

Implications for humanitarian surveillance

The findings illustrate the value of linking routine laboratory surveillance with service-level planning. A more informative surveillance system would retain monthly counts, test type, camp, age group, sex, and where ethically and operationally appropriate-unique patient identifiers or a secure linkage mechanism. Such data would permit analysis of temporal patterns, demographic inequalities, repeat testing, and service utilization without exposing personal identifiers. WHO's Cox's Bazar reporting and recent dengue analyses demonstrate the importance of integrated, camp-sensitive disease surveillance within the humanitarian health-sector coordination system.^{3,4,9}

Strengths

The study has several strengths. First, it uses laboratory-record data from more than 5,000 test records rather than relying solely on syndromic reporting. Second, it provides camp-specific estimates that can reveal heterogeneity hidden by district-level aggregation. Third, it examines multiple pathogens

relevant to humanitarian health planning. Fourth, the use of exact test denominators and Wilson confidence intervals improves transparency around the uncertainty of the observed positivity estimates.

Limitations

Several limitations are important. First, the data are derived from clients who were tested at three health posts and are therefore subject to selection and testing-practice biases; the results cannot be interpreted as population prevalence. Second, the analytical unit is a test record rather than a unique individual, and repeat testing could not be identified. Third, individual-level variables such as age, sex, symptoms, pregnancy status, clinical indication, treatment history, and risk factors were unavailable, preventing adjusted analyses. Fourth, the study used cumulative data rather than monthly observations, so temporal and seasonal trends could not be assessed. Fifth, the malaria denominator was very small, limiting inference. Sixth, the study covers three health posts and cannot automatically be generalized to all 33 refugee camps or to the host population. Finally, the available data do not permit causal explanations for the differences between camps.

Conclusion

Among clients tested at three GK-operated health posts in Camps 1E, 11, and 22, anti-HCV positivity was substantial and dengue NS1 positivity varied markedly between camps. HBsAg and VDRL positivity were lower, while the very small number of malaria tests prevented meaningful conclusions about malaria absence. The findings support strengthening decentralized hepatitis diagnosis and linkage to treatment, maintaining camp-specific dengue surveillance and vector-control activities, and improving routine laboratory data systems so that monthly, demographic, and patient-level patterns can be evaluated in future analyses. Importantly, the reported percentages represent laboratory test positivity among tested clients, not population prevalence or incidence.

Public Health Recommendations

- Strengthen decentralized HCV confirmatory testing, linkage to care, and access to direct-acting antiviral treatment in coordination with national and humanitarian health-sector guidance.
- Maintain camp-specific dengue surveillance and strengthen targeted vector-control and environmental management where surveillance identifies increased activity.
- Continue routine HBV and syphilis screening, particularly through antenatal and other relevant clinical services.
- Maintain appropriate malaria surveillance despite the absence of positive tests in this small dataset.
- Standardize routine laboratory reporting to retain monthly test and positivity counts and relevant non-identifying demographic variables, enabling future temporal and equity analyses.
- Develop secure approaches for distinguishing unique clients from repeat test records where operationally and ethically feasible.

Ethical Considerations

This study used retrospective, aggregated, category-wise cumulative laboratory information without personal identifiers. During routine service delivery at the health posts, client information was recorded in the electronic medical record system after informed consent for healthcare delivery and service improvement. Permission to access and use the retrospective data for this analysis was obtained from Gonoshasthaya Kendra and Malteser International. No additional identifiable participant data were accessed for this study.

Data Availability

The underlying laboratory registers are institutional service records and are not publicly deposited because they are subject to organizational data-governance requirements. The aggregate data used for the analyses are presented in Tables 1 and 2. Any additional data sharing should follow the policies of Gonoshasthaya Kendra, Malteser International, and the relevant humanitarian health-sector authorities.

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Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this paper.

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Generative AI Statement

During the preparation and restructuring of this manuscript, generative artificial intelligence (GPT-5.6) was used solely to assist with grammatical refinement, technical editing, and standardization of academic language and citation style. The study design, data aggregation, statistical analysis, interpretation of findings, and policy recommendations were developed by the authors. The authors reviewed and verified the AI-assisted text and take full responsibility for the accuracy, integrity, and originality of the manuscript.

References

1. World Health Organization. Global hepatitis report 2024: action for access in low- and middle-income countries. Geneva: World Health Organization; 2024.
2. World Health Organization. Dengue: global situation, surveillance and progress-2024 update. *Weekly Epidemiological Record*. 2025;100: 665-678.
3. World Health Organization Bangladesh. WHO Cox's Bazar: Rohingya emergency crisis – Situation Report: June 2024. Dhaka: WHO Bangladesh; 2024.
4. World Health Organization Bangladesh. WHO leads after action review to boost dengue preparedness in Cox's Bazar. 29 May 2025.

5. Schramm B, Khondaker A, Ashakin, Firuz W, Hadiuzzaman M, Farhat JB, et al. Prevalence of hepatitis C virus seropositivity and active infection in Rohingya refugee camps. *Lancet Gastroenterol Hepatol*. 2025;10(7):648–657.
6. Ceccarelli G, Branda F, Fairouz F, Albanese M, Scarpa F, d’Ettorre G, et al. Management of hepatitis C infections among Rohingya refugees, Bangladesh. *Bull World Health Organ*. 2026;104(4):282-284. doi:10.2471/BLT.24.292920.
7. Jefferies M, Rauff B, Rashid H, Lam T, Rafiq S. Update on global epidemiology of viral hepatitis and preventive strategies. *World J Clin Cases*. 2018;6(13):589–599. doi:10.12998/wjcc.v6.i13.589.
8. Mamun-Al-Mahtab. Past, present, and future of viral hepatitis in Bangladesh. *Euroasian J Hepatogastroenterol*. 2016;6(1):43-44. doi:10.5005/jp-journals-10018-1164.
9. Halder CE, Hasan MA, Soma ER, Okello JC, Rahman MM, Das PP, et al. Epidemiological, clinical, and diagnostic characteristics of a large-scale upsurge of dengue in the Rohingya refugee camps and host communities in Cox’s Bazar, Bangladesh, 2021 to 2024: a retrospective study. *medRxiv*. 2026;2026.03.27. 26349486. doi:10.64898/2026.03.27.26349486.
10. Hossain MM, Sultana A, Mazumder H, Munzur-E-Murshid. Sexually transmitted infections among Rohingya refugees in Bangladesh. *Lancet HIV*. 2018;5 (7):e342. doi:10.1016/S2352-3018(18)30140-1.
11. UNHCR. Bangladesh: Operational Data Portal. United Nations High Commissioner for Refugees; 2026.