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Review Article

Health Equity in Dengue Prevention and Control: A Review of Social Vulnerability, Participation, and Climate-Related Risks

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ABSTRACT

Background: Dengue remains a major public health problem in tropical and subtropical regions, with transmission and disease outcomes strongly influenced by social, economic, and environmental conditions. Evidence indicates that inequities in socioeconomic status, community participation, healthcare access, and climate vulnerability contribute to unequal dengue burden, yet these aspects are rarely synthesized comprehensively.

Methods: This narrative review was conducted following the PRISMA guidelines. A literature search was performed using Google Scholar to identify original research articles published between 2020 and 2025 that explicitly addressed equity-related aspects of dengue prevention and control. Data were analyzed using narrative synthesis.

Results: Six studies from Asia, the Caribbean, and Latin America were included. The findings showed consistent inequities related to socioeconomic status, geographic access to healthcare, community participation, financial protection, and climate-related vulnerability. Low-income and marginalized populations experienced poorer preventive practices, higher out-of-pocket healthcare costs, and greater exposure to dengue risk, while unequal institutional capacity limited the implementation of climate-based early warning systems.

Conclusion: Dengue prevention and control are shaped by multidimensional inequities operating across social, community, and health system levels. An equity-oriented approach is needed to strengthen dengue control strategies, particularly through inclusive community engagement, improved healthcare access, and climate-informed public health interventions.

Keywords: Dengue; Equity; Community participation; Climate change; Disease control

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INTRODUCTION

Dengue is one of the most rapidly spreading vector-borne diseases globally and remains a major public health challenge, particularly in tropical and subtropical regions. Transmitted primarily by *Aedes aegypti* and *Aedes albopictus*, dengue virus infection comprises four antigenically distinct serotypes (DENV-1 to DENV-4) and can result in a wide spectrum of clinical manifestations, ranging from mild febrile illness to severe dengue and death.[1,2] The World Health Organization (WHO) estimates that dengue causes tens of millions of infections annually, with a substantial increase in incidence over the past two decades, driven in part by urbanisation, population mobility, and climate change.[3,4]

Low- and middle-income countries (LMICs) bear a disproportionate burden of dengue morbidity and mortality. Indonesia, for example, continues to report high dengue incidence, with more than 210,000 cases and over 1,200 deaths recorded across 259 districts in 2024 alone.[5,6] Despite longstanding vector control programmes and community-based prevention strategies, dengue transmission persists, indicating that biomedical and entomological interventions alone are insufficient to address the complex drivers of dengue risk.

A growing body of evidence highlights the critical role of social, economic, and environmental determinants in shaping dengue transmission and outcomes.[7–9] Socioeconomic disadvantage, limited access to health information, substandard housing conditions, and inadequate water and sanitation infrastructure increase exposure to mosquito breeding sites and constrain the adoption of effective preventive behaviours. Studies conducted in urban informal settlements consistently demonstrate gaps in knowledge, attitudes, and practices related to dengue prevention, reflecting underlying social inequities.[10,11]

Beyond prevention, dengue also imposes a substantial economic burden on households and health systems. Direct medical costs, non-medical expenditures, and productivity losses disproportionately affect low-income and informal workers, who often lack financial protection mechanisms.[12,13] Evidence from South and Southeast Asia shows that a large proportion of dengue-related healthcare costs is paid out of pocket, exacerbating financial hardship and reinforcing cycles of vulnerability.[14]

Climate change further amplifies these inequities. Rising temperatures, altered rainfall patterns, and the increased frequency of extreme weather events expand the geographic range and breeding potential of *Aedes* mosquitoes, intensifying the risk of dengue transmission.[15–17] Climate-sensitive early warning systems have demonstrated promise in improving outbreak preparedness; however, their implementation is often uneven, constrained by disparities in institutional capacity, technological infrastructure, and intersectoral coordination.[18] Importantly, dengue prevention and control are not only shaped by structural conditions but also by community participation and governance. Evidence suggests that engagement in dengue control activities varies across social groups, influenced by education, religious affiliation, and access to trusted information sources.[19,20] These disparities highlight that community participation is not uniformly distributed and may itself reflect broader inequities in power, resources, and social capital.

Although prior studies have examined individual determinants of dengue risk—such as climate, socioeconomic status, and healthcare access—there remains a lack of an integrated synthesis that explicitly frames dengue prevention and control through a health equity lens. In particular, how inequities operate simultaneously across structural, community, health system, and individual levels remains insufficiently articulated in the dengue literature. Therefore, this review aims to synthesise current evidence on health equity in dengue prevention and control, with a specific focus on social vulnerability, community participation, economic burden, healthcare access, and climate-related risks. By integrating findings across diverse contexts, this study seeks to advance an equity-informed understanding of dengue and to inform more inclusive and effective public health strategies.

METHOD

This narrative review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A structured literature search was conducted in Google Scholar to identify relevant studies. The search strategy employed combinations of the following keywords: *"dengue," "participation," "equity," and "control*." Following the initial search, all retrieved records were screened and subsequently analyzed through data extraction and narrative synthesis. Study selection was guided by predefined inclusion and exclusion criteria.

Studies were included if they: (1) were published between 2020 and 2025; (2) were available as full-text articles with open access; (3) reported original research findings; and (4) explicitly addressed issues of equity in dengue prevention or control. Studies were excluded if they: (1) did not provide accessible or complete full texts; (2) had titles or content not sufficiently relevant to the review objectives; or (3) focused on health equity in general without specific reference to dengue prevention or control.

RESULTS

The study selection process is presented in Figure 1. The initial search identified 988 records from Google Scholar. After title and abstract screening and application of inclusion and exclusion criteria, six studies published between 2021 and 2024 were included in the final synthesis.

Characteristics of included studies

The six included studies were conducted across diverse geographic and socioeconomic contexts, including Southeast Asia (Malaysia, Thailand, Bangladesh), South Asia (India), the Caribbean (Barbados), and Latin America (Brazil). Study designs varied and included cross-sectional surveys, retrospective cohort studies, participatory implementation research, macroeconomic case studies, and cost-of-illness analyses (Table 1). Across all studies, dengue-related outcomes were examined through multiple equity-relevant dimensions, including socioeconomic status, gender, geographic access to healthcare, community participation, climate-related vulnerability, and financial protection.

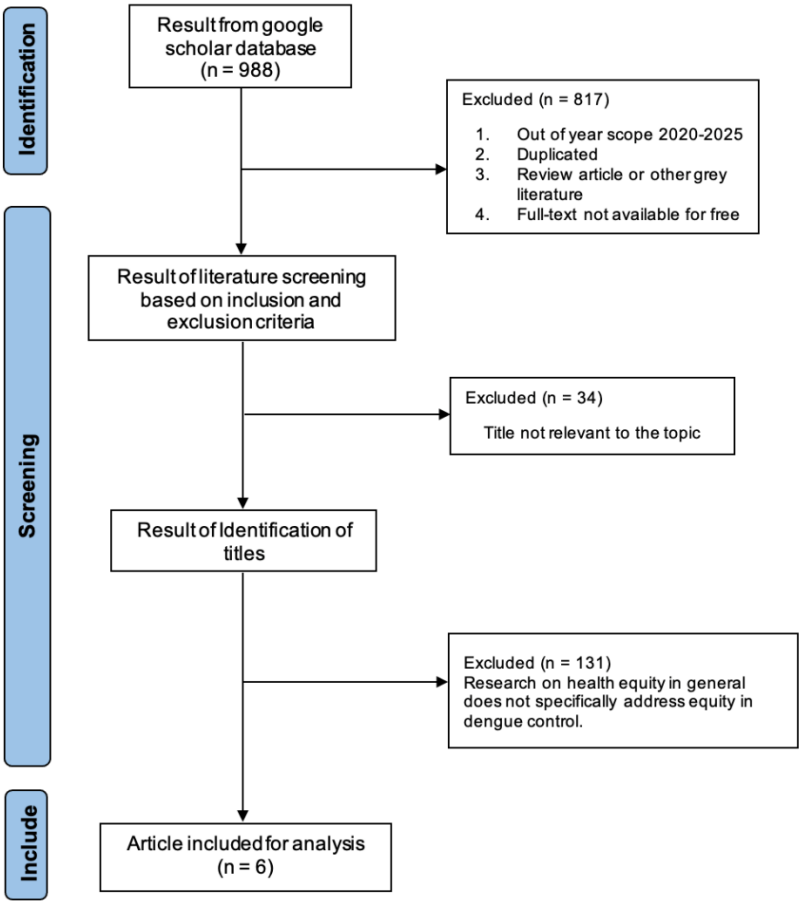

Figure 1. Diagram of Preferred Reporting Items

Equity dimensions identified in dengue prevention and control

Socioeconomic and financial inequities

Two studies conducted in Bangladesh highlighted pronounced socioeconomic inequities in dengue prevention and care. Low educational attainment and limited access to reliable health information were associated with inadequate preventive practices among urban slum dwellers. In addition, the economic burden of dengue was disproportionately borne by low-income households, with the majority of treatment costs paid out-of-pocket, indicating limited financial protection against dengue-related illness.

Table 1. Summary findings from articles analyzed

No	Author (Year)	Country/setting	Study design	Equity dimension examined	Key findings related to equity
1	Arham et al. (2021)[20]	Malaysia (urban, Klang Valley)	Cross-sectional survey	Social participation; religious and educational differences	Scientists demonstrated higher knowledge and awareness of dengue control compared to the general community. Religious affiliation was associated with differing levels of engagement, indicating inequities in community participation.

No	Author (Year)	Country/setting	Study design	Equity dimension examined	Key findings related to equity
2	Marczell et al. (2024)[21]	Thailand & Brazil	Macroeconomic case studies	Economic vulnerability; labour sector inequity	Dengue outbreaks caused substantial GDP losses due to reduced tourism and labour productivity, disproportionately affecting informal workers and economically vulnerable populations.
3	Kumar et al. (2024)[22]	India	Retrospective cohort	Gender; geographic access	No significant gender differences in clinical outcomes; however, rural residence—more common among male patients—was associated with reduced access to healthcare services, reflecting geographic inequity.
4	Stewart-Ibarra et al. (2022)[17]	Barbados	Participatory implementation study	Climate vulnerability; institutional capacity	Climate-based early warning systems improved preparedness, but inequities in technological capacity, intersectoral coordination, and funding limited equitable implementation across health systems.
5	Rahman et al. (2023)[23]	Bangladesh (urban slums)	Cross-sectional KAP survey	Socioeconomic status; information access	Low educational attainment and limited access to reliable information were associated with poor preventive practices, highlighting socioeconomic inequities in dengue prevention.
6	Sarker et al. (2023)[2]	Bangladesh (urban hospitals)	Cost-of-illness study	Financial protection; healthcare access	Most dengue treatment costs were paid out-of-pocket, disproportionately burdening low-income households and indicating inequitable access to affordable care.

Geographic and gender-related inequities

One retrospective cohort study examining gender disparities found no significant differences in clinical outcomes between male and female patients. However, geographic inequity emerged as a key factor, as rural residence—more common among male patients—was associated with reduced access to healthcare services, suggesting that place of residence played a more substantial role than gender alone in shaping dengue-related health outcomes.

Inequities in community participation and governance

A cross-sectional study from Malaysia demonstrated disparities in community participation in dengue control efforts. Scientists exhibited higher levels of knowledge and awareness than the general community, while religious affiliation was associated with varying levels of engagement in dengue prevention activities. These findings suggest inequities in social participation and access to dengue-related knowledge.

Climate-related and institutional inequities

A participatory implementation study from Barbados identified climate variability as a critical driver of dengue risk. Although climate-based early warning systems improved outbreak

preparedness, inequities in technological capacity, intersectoral coordination, and financial resources limited their equitable implementation across institutions.

Macroeconomic inequities

Macroeconomic analyses from Thailand and Brazil showed that dengue outbreaks led to substantial economic losses due to reduced tourism and labour productivity. These impacts disproportionately affected informal workers and economically vulnerable sectors, highlighting broader structural inequities beyond the health system.

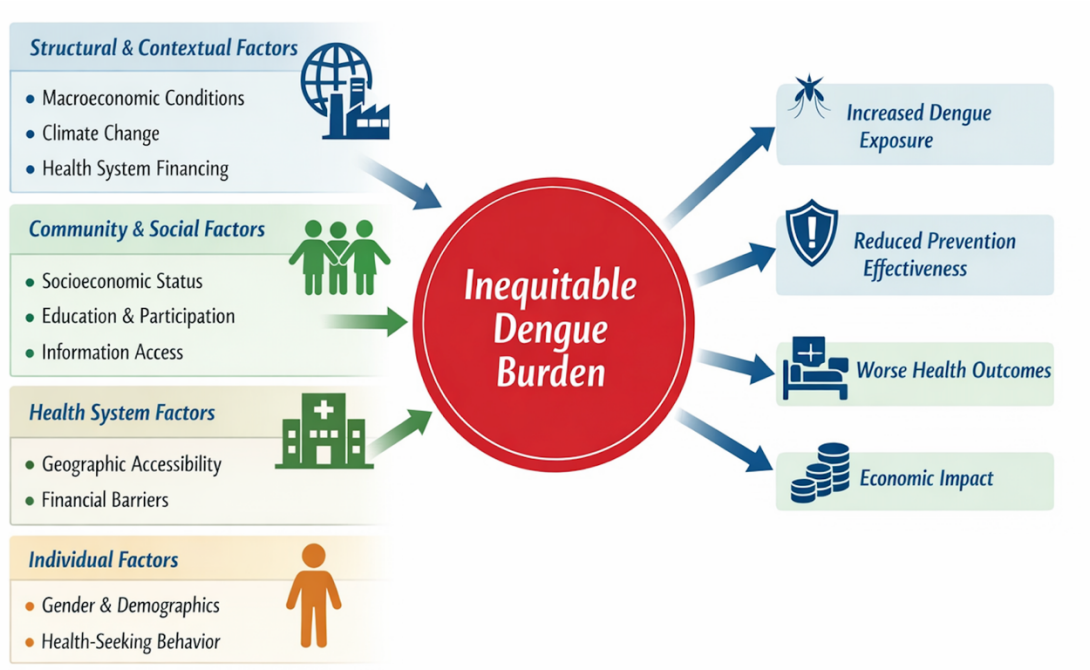

Figure 1. Health Equity in Dengue Prevention and Control

DISCUSSION

This review highlights that dengue prevention and control are deeply shaped by social, economic, environmental, and institutional inequities rather than by biomedical factors alone. Across diverse settings, dengue risk and outcomes were consistently higher among populations experiencing socioeconomic disadvantage, limited access to health services, and greater exposure to climate-related hazards. These findings reinforce the need to conceptualise dengue as a disease embedded within broader social and structural contexts, rather than as an isolated vector-borne infection.[1,2,9] An equity-oriented perspective is therefore essential to understanding why dengue persists despite long-standing control efforts in many endemic countries.

At the structural level, macroeconomic conditions, climate change, and health system financing emerged as upstream determinants influencing dengue vulnerability. Evidence from Thailand and Brazil demonstrates that dengue outbreaks generate substantial macroeconomic losses, disproportionately affecting informal labour sectors and economically marginalised populations.[21] Climate change further intensifies these structural inequities by expanding vector habitats and increasing outbreak unpredictability, particularly in regions with

limited adaptive capacity.[17,18] These findings are consistent with global evidence showing that climate-sensitive diseases such as dengue amplify existing social and economic inequalities.[24]

At the community level, disparities in socioeconomic status, education, and access to information significantly influenced participation in dengue prevention activities. Studies conducted in urban slums and low-resource communities revealed persistent gaps in knowledge and preventive practices, despite widespread awareness campaigns.[10,23] Community participation was also unevenly distributed, shaped by social capital, religious affiliation, and trust in institutions.[20] These findings suggest that community-based dengue interventions must move beyond uniform messaging and address the social conditions that enable or constrain collective action.

At the health system level, inequities in geographic accessibility and financial protection were prominent drivers of unequal dengue outcomes. Rural residence and limited healthcare infrastructure were associated with delayed diagnosis and treatment, increasing the risk of severe disease.[22] In addition, high out-of-pocket expenditures for dengue care disproportionately burdened low-income households, reinforcing cycles of financial vulnerability.[13] These patterns align with broader evidence from LMICs showing that weak primary healthcare systems and inadequate financial protection undermine equitable access to care for infectious diseases.[14]

At the individual level, gender alone did not consistently predict differences in clinical outcomes; however, gender intersected with place of residence, occupation, and socioeconomic position to shape exposure risk and health-seeking behaviour. For example, men residing in rural areas experienced reduced access to healthcare services, reflecting geographic rather than biological inequities.[22] This intersectional pattern underscores the importance of analysing individual characteristics within their broader social and structural contexts, rather than in isolation.[25]

Climate-related inequities represent a critical cross-cutting theme linking structural, community, and health system dimensions. Climate-based early warning systems have demonstrated potential to improve outbreak preparedness and response; however, their implementation remains uneven due to disparities in technological capacity, institutional coordination, and funding.[15,18] Without explicit attention to equity, climate-informed dengue interventions risk benefiting already-resourced settings while leaving vulnerable populations further behind.

Taken together, the findings of this review support the proposed conceptual framework of equity in dengue prevention and control, which illustrates how inequities operating across multiple levels interact to produce unequal dengue burdens. Addressing dengue effectively, therefore, requires integrated, equity-oriented strategies that combine climate-informed surveillance, strengthened primary healthcare, inclusive community participation, and policies to reduce socioeconomic and geographic barriers. Such approaches are essential to ensure that dengue control efforts are not only effective, but also socially just and sustainable.

This review has several limitations that should be considered when interpreting the findings. First, the literature search was conducted in a single database (Google Scholar), which may have limited the comprehensiveness of the identified evidence. Although Google Scholar

provides broad coverage, relevant studies indexed exclusively in databases such as PubMed, Scopus, or Web of Science may not have been captured.

Second, the inclusion criteria were restricted to articles published between 2020 and 2025 and available in full-text open access. While this approach ensured accessibility and relevance to recent evidence, it may have excluded earlier foundational studies or subscription-based publications that provide important insights into equity and dengue control.

Third, the final synthesis included a relatively small number of studies (n = 6), reflecting the limited availability of research explicitly addressing equity dimensions in dengue prevention and control. The heterogeneity of study designs and contexts also precluded quantitative synthesis and limited the ability to draw generalisable conclusions. Nevertheless, the included studies provided valuable cross-contextual evidence that informed the proposed conceptual framework of equity in dengue prevention and control.

CONCLUSION

This review demonstrates that dengue prevention and control are shaped by intersecting inequities operating across structural, community, health system, and individual levels, as conceptualized in the proposed equity–dengue framework (Figure 2). Social and economic disadvantage, limited community participation, geographic barriers to healthcare, inadequate financial protection, and climate-related vulnerability consistently contribute to unequal dengue exposure, reduced prevention effectiveness, poorer health outcomes, and a greater economic burden.

At the structural level, macroeconomic conditions, climate change, and health system financing influence the distribution of dengue risk and institutional capacity to respond to outbreaks. At the community level, disparities in socioeconomic status, education, and access to information affect engagement in preventive behaviors. Health system inequities, particularly related to geographic accessibility and out-of-pocket expenditures, further exacerbate unequal access to timely diagnosis and treatment. At the individual level, demographic characteristics intersect with social and geographic contexts to shape health-seeking behavior and vulnerability.

Together, these interconnected layers of inequity reinforce a cycle in which socially and economically disadvantaged populations bear a disproportionate burden of dengue. Addressing dengue effectively, therefore, requires equity-oriented strategies that extend beyond vector control alone, integrating climate-informed surveillance, inclusive community participation, strengthened primary healthcare systems, and policies that reduce financial and geographic barriers to care. An explicit equity lens, as articulated in the proposed framework, is essential to ensure that dengue prevention and control efforts are both effective and socially just.

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Declarations

Authors' contribution

FRA and SS contributed equally to the study design. FRA completed the data collection and analysis and wrote the first draft. SS reviewed and expanded the draft. SH contributed on to the ide generated and reviewed the draft.

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Conflict of interest

There is no conflict of interest in this research.

REFERENCES

1. Guzman MG, Harris E. Dengue. The Lancet. 2015 Jan;385(9966):453–65.
2. WHO. Dengue [Internet]. Web. 2025 [cited 2026 Feb 9]. p. 1–1. Available from: https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue
3. Gubler DJ. Dengue, Urbanization and Globalization: The Unholy Trinity of the 21st Century. Trop Med Health [Internet]. 2011 [cited 2026 Feb 9];39(4 Suppl):3. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3317603/
4. WHO. Dengue- Global situation [Internet]. Web. 2023 [cited 2026 Feb 9]. p. 1–1. Available from: https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON498
5. Septiani NH, Sitorus JRH. Penyusunan Indeks Kerawanan Sosial Demam Berdarah Dengue Provinsi-Provinsi di Indonesia Tahun 2019. In: Seminar Nasional Official Statistics [Internet]. Politeknik Statistika STIS; 2021 [cited 2026 Feb 9]. p. 373–82. Available from: https://prosiding.stis.ac.id/index.php/semnasoffstat/article/view/874
6. Indonesia Ministry of Health. Waspada Penyakit di Musim Hujan [Internet]. Web Kemenkes. 2024 [cited 2026 Feb 9]. p. 1–1. Available from: https://kemkes.go.id/id/waspada-penyakit-di-musim-hujan
7. Laserna A, Barahona-Correa J, Baquero L, Castañeda-Cardona C, Rosselli D. Economic impact of dengue fever in Latin America and the Caribbean: a systematic review. Revista Panamericana de Salud Pública. 2018 [cited 2026 Feb 9];42:e111. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC6386068/
8. Akbar F, Putra BH, Masyarakat K, Fort U, Kock D, Soekarno Hatta J, et al. Pengaruh Pengetahuan, Ekonomi Dan Iklim Terhadap Kejadian Demam Berdarah Dengue (DBD) Di Asia Tenggara Tahun 2022 (Studi Meta Analisis). Human Care Journal [Internet]. 2022 Jan 14 [cited 2026 Feb 9];7(3):715–23. Available from: https://ojs.ufdk.ac.id/index.php/humancare/article/view/2315
9. Zellweger RM, Cano J, Mangeas M, Taglioni F, Mercier A, Despinoy M, et al. Socioeconomic and environmental determinants of dengue transmission in an urban setting: An ecological study in Nouméa, New Caledonia. PLoS Negl Trop Dis. 2017 Apr 3;11(4):e0005471.
10. Hossain MJ, Das M, Islam MW, Shahjahan M, Ferdous J. Community engagement and social participation in dengue prevention: A cross-sectional study in Dhaka City. Health Sci Rep [Internet]. 2024 Apr 1 [cited 2026 Feb 9];7(4). Available from: https://pubmed.ncbi.nlm.nih.gov/38572117/

11. Liu J, Han Z, Liu Y, William S. Trust in Government, Perceived Integrity and Food Safety Protective Behavior: The Mediating Role of Risk Perception. Int J Public Health. 2023 Mar 8;68.
12. Thisyakorn U, Saokaew S, Gallagher E, Kastner R, Sruamsiri R, Oliver L, et al. Epidemiology and costs of dengue in Thailand: A systematic literature review. PLoS Negl Trop Dis. 2022 Dec 1 [cited 2026 Feb 9];16(12):e0010966. Available from: https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0010966
13. Sarker AR, Paul S, Zohara F, Hossain Z, Zabeen I, Zahedul Islam Chowdhury SM, et al. Economic burden of dengue in urban Bangladesh: A societal perspective. PLoS Negl Trop Dis. 2023 Dec 1 [cited 2026 Feb 9];17(12):e0011820. Available from: https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0011820
14. OECD. Primary Health Care in Brazil. Paris: OECD Publishing; 2021.
15. Nguyen VH, Tuyet-Hanh TT, Mulhall J, Van Minh H, Duong TQ, Van Chien N, et al. Deep learning models for forecasting dengue fever based on climate data in Vietnam. PLoS Negl Trop Dis. 2022 Jun 1 [cited 2026 Feb 9];16(6):e0010509. Available from: https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0010509
16. Arivadany AMR. Dampak Perubahan Iklim Terhadap Penyebaran Demam Berdarah : Tinjauan Literatur. Jurnal Kesehatan Tambusai. 2024 Sep;5(3):7107–19.
17. Stewart-Ibarra AM, Rollock L, Best S, Brown T, Diaz AR, Dunbar W, et al. Co-learning during the co-creation of a dengue early warning system for the health sector in Barbados. BMJ Glob Health. 2022 Jan 6 [cited 2026 Feb 9];7(1). Available from: https://pubmed.ncbi.nlm.nih.gov/34992079/
18. Kesehatan J, Indonesia L, Rahayuningtyas D, Pascawati A, Alfanan A, Dharmawan R. Model Prediksi Kasus DBD Berdasarkan Perubahan Iklim: Cohort Study dengan Data NASA di Kabupaten Bantul. Jurnal Kesehatan Lingkungan Indonesia. 2025 Feb 28 [cited 2026 Feb 9];24(1):83–93. Available from: https://ejournal.undip.ac.id/index.php/jkli/article/view/66917
19. Samsudin NA, Karim N, Othman H, Naserrudin NA, Sahani M, Hod R, et al. Exploring community behaviours and stakeholder challenges in engaging communities with dengue prevention behaviour in Malaysia: implementation research for a qualitative study with a community-based participatory research design. BMJ Open. 2024 Mar 1 [cited 2026 Feb 9];14(3):e074222. Available from: https://bmjopen.bmj.com/content/14/3/e074222
20. Arham AF, Amin L, Razman MR, Mahadi Z, Rusly NS, Mazlan NF, et al. Participatory: Stakeholder's Engagement Toward Dengue Control Techniques in Klang Valley, Malaysia. Sage Open. 2021 [cited 2026 Feb 9];11(1). Available from: https://journals.sagepub.com/doi/pdf/10.1177/2158244020982605
21. Marczell K, García E, Roiz J, Sachdev R, Towle P, Shen J, et al. The macroeconomic impact of a dengue outbreak: Case studies from Thailand and Brazil. PLoS Negl Trop Dis. 2024 Jun 1 [cited 2026 Feb 9];18(6):e0012201. Available from: https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0012201
22. Kumar D, Quadir S, Saad MZ, Radha O, Ashraf A, Karim A, et al. Sociodemographic Determinants of Gender Disparity in Dengue Fever Diagnosis and Treatment. 2024 Jul 23 [cited 2026 Feb 9]; Available from: https://www.qeios.com/read/OY4QQJ
23. Rahman MM, Tanni KN, Roy T, Islam MR, Al Raji Rumi MA, Sadman Sakib M, et al. Knowledge, Attitude and Practices Towards Dengue Fever Among Slum Dwellers: A Case Study in Dhaka City, Bangladesh. Int J Public Health. 2023 [cited 2026 Feb 9];68:1605364. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC10239854/
24. WHO. Climate change [Internet]. Web. 2023 [cited 2026 Feb 9]. Available from: https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health
25. Mungall-Baldwin C. Women's participation in the prevention and control of dengue using environmental methods in the global south: a qualitative meta-synthesis. Int J Equity Health. 2022 Dec 1 [cited 2026 Feb 9];21(1). Available from: https://pubmed.ncbi.nlm.nih.gov/36151547/