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DENGUE IN 2025 EVOLVING EPIDEMIOLOGY, DIAGNOSTIC CHALLENGES, AND THE URGENT NEED FOR INTEGRATED VECTOR CONTROL

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As we enter 2025, dengue fever continues to pose one of the most formidable public health challenges across tropical and subtropical regions including Pakistan, South Asia, Southeast Asia, and parts of the Middle East [1]. The epidemiological landscape of dengue has changed considerably over the past decade, driven by climate variability, rapid urbanization, human mobility, and the expanding geographic distribution of Aedes mosquitoes. This year, global surveillance networks are already reporting earlier seasonal onset, higher viral circulation, and a worrisome rise in secondary infections that predispose patients to severe dengue [2].

The burden of dengue in 2025 is not merely a continuation of past trends but a reflection of deeply rooted systemic vulnerabilities. Increased rainfall variability, unplanned urban settlements, and inadequate waste management systems have created ideal breeding environments for Aedes aegypti and Aedes albopictus [3]. In high-density populations such as those in Lahore, Karachi, Rawalpindi, Dhaka, and Manila, mosquito indices have surpassed previous thresholds within the first quarter of the year. These patterns signal the potential for prolonged transmission, expanded outbreaks, and greater pressure on healthcare services [4].

Clinicians this year are also facing an evolving clinical picture. The emergence of overlapping viral infections including co-circulation of dengue and chikungunya, as well as seasonal influenza has complicated diagnostic pathways [6]. Misclassification remains a persistent problem, particularly in early febrile phases where dengue symptoms mimic common viral illnesses. Many low-resource clinical settings still lack rapid, reliable point-of-care diagnostics, leading to delays in case differentiation, unnecessary hospital admissions, or missed severe cases. Strengthening laboratory networks and expanding access to NS1 antigen assays, multiplex PCR, and complete blood count monitoring remains essential to improving case management [5].

Dengue's progression toward severe disease marked by plasma leakage, shock, hemorrhagic manifestations, and organ dysfunction continues to challenge clinicians in 2025, especially among children, pregnant women, and patients with comorbidities. The rise in secondary dengue infections due to sequential exposure to different serotypes (particularly DENV-2 and DENV-3 in South Asia) has amplified the risk of severe outcomes. This underscores the necessity of reinforcing clinical training on early recognition of warning signs, judicious fluid management, and standardized treatment protocols in emergency departments and primary-level facilities [7].

From a prevention standpoint, 2025 marks a critical juncture. Vector control remains the backbone of dengue prevention, yet traditional approaches fogging, larviciding, and community clean-up drives are failing to achieve sustainable impact when used in isolation. The integration of innovative strategies such as Wolbachia-infected mosquito release, environmental biological control, targeted breeding site mapping using GIS technologies, and climate-based early warning systems is urgently needed. Governments must adopt long-term, multisectoral dengue control policies involving municipal management, public health departments, environmental authorities, and communities [8].

Vaccination also re-enters the global conversation this year. While no universal dengue vaccine is yet accessible in South Asia, ongoing evaluations of newer-generation vaccines show promise. However, the deployment of any vaccine must be guided by robust seroprevalence surveillance, careful risk-benefit assessment, and transparent public communication to avoid the mistakes of previous dengue immunization rollouts [9].

As medical professionals, researchers, and public health leaders, 2025 obliges us to shift from reactive dengue control to proactive, evidence-based, and community-anchored strategies. Investment in vector ecology research, development of climate-adaptive control measures, and continuous clinician training must take center stage. Equally crucial is public health literacy—empowering communities to understand mosquito breeding behaviors, recognize early symptoms, and seek timely care [10].

The fight against dengue in 2025 is not merely a clinical challenge but a collective societal responsibility. With the convergence of climate change, urban expansion, and viral evolution, the coming years will likely determine whether dengue becomes a manageable seasonal infection or escalates into a year-round endemic crisis. A coordinated, science-driven, and forward-looking response today will shape the health outcomes of millions tomorrow.

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