Health Analytics of HIV Burden, Transmission, and Treatment in the Philippines and ASEAN, 1990–2024: Comparative Evidence from Official UNAIDS-Based Estimates

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Abstract

This study examined long-run HIV dynamics in the Philippines and ASEAN using official annual HIV indicator series from 1990 to 2024. Employing a quantitative longitudinal comparative design, the study drew on secondary data from World Bank HIV indicators sourced from UNAIDS estimates. The Philippines served as the anchor case, while ASEAN countries functioned as comparator units where sufficient annual observations were available. The analysis covered six core indicators: people living with HIV (PLHIV), new HIV infections, new HIV infection rate, HIV prevalence among adults aged 15–49 years, AIDS-related deaths, and antiretroviral therapy (ART) coverage. Because ART coverage had a shorter usable series, it was analyzed separately as a later-period treatment indicator. The official metadata identify the prevalence and incidence series as annual UNAIDS-based measures, with the prevalence series visibly spanning 1990–2024, while ART coverage is defined as the percentage of people living with HIV receiving antiretroviral therapy. Results showed a pronounced long-run escalation of the Philippine HIV profile. From 1990 to 2024, PLHIV increased from 200 to 220,000, new HIV infections from 100 to 30,000, new HIV infection rate from 0.01 to 0.48 per 1,000 uninfected population, HIV prevalence from 0.1% to 0.3%, and AIDS-related deaths from 100 to 2,300. ART coverage rose from 0% in 2000 to 40% in 2024. Phase-based analysis indicated that the strongest acceleration occurred during 2000–2010, when annualized growth reached 31.8% for PLHIV, 24.8% for new infections, 25.9% for incidence, and 17.5% for AIDS-related deaths. In the latest-year ASEAN comparison, the Philippines ranked first in both new HIV infections and new HIV infection rate, but only fifth in PLHIV, joint seventh in prevalence, and last in ART coverage among comparison countries. These findings indicate that the Philippine HIV situation is best interpreted not as the region's highest-prevalence case, but as a transmission-intensive and treatment-weak case within ASEAN. The study concludes that incidence-centered monitoring, treatment expansion, and longitudinal health analytics are essential for understanding and responding to the country's HIV trajectory.

Keywords: *HIV; health analytics; Philippines; ASEAN; HIV incidence; HIV prevalence; antiretroviral therapy coverage; UNAIDS estimates*

1. Introduction

World Health Organization (2025a) reported that HIV remains a major global public-health concern despite advances in prevention, testing, and treatment. At the end of 2024, approximately 40.8 million people were living with HIV worldwide, 1.3 million people newly acquired HIV, and about 630,000 died from HIV-related causes. Although treatment coverage has expanded, HIV transmission and mortality remain substantial global challenges.

In interpreting HIV epidemiology, it is important to distinguish between cumulative burden and current transmission dynamics. Measures such as the number of people living with HIV and adult prevalence reflect accumulated burden, whereas new infections and incidence capture ongoing epidemic momentum. World Health Organization (n.d.) defines HIV incidence as the estimated number of new HIV infections per 1,000 uninfected population and emphasizes its importance for monitoring the course of the epidemic and the impact of interventions. A country may not rank highest in prevalence yet may still be experiencing a comparatively intense transmission pattern.

The Philippines is a particularly important case. UNAIDS (2025) reported that, in 2024, an estimated three to four people were infected with HIV every hour in the Philippines, and that almost half of these new infections involved young people aged 15–24 years. The country has experienced a

six-fold increase in new infections since 2010, underscoring the continuing urgency of its HIV situation. These signals suggest that the Philippines warrants closer empirical attention not merely as a routine burden profile, but as a case in which transmission, treatment response, and long-run epidemic change demand structured examination.

ASEAN provides a relevant regional frame for comparative interpretation because member states differ substantially in HIV burden, epidemic maturity, mortality, and treatment coverage. For cross-country work of this kind, official annual HIV indicators are available through the World Bank and are explicitly identified as UNAIDS estimates. World Bank (2025a) identifies the adult HIV prevalence series as a UNAIDS-based indicator and shows annual availability from 1990 to 2024. In parallel, World Bank (2025b) describes the HIV incidence-rate series as an annual indicator for 1990–2024, produced within a common UNAIDS modelling framework that integrates HIV surveillance data, antiretroviral therapy coverage, demographic information, and assumptions regarding transmission, disease progression, and survival. These official series therefore provide a defensible basis for longitudinal and comparative health analytics.

Despite this data availability, discussion of the Philippine epidemic often emphasizes burden snapshots, short surveillance windows, or programmatic concerns rather than a longer Philippines-centered time-series analysis situated explicitly within ASEAN comparison. A study based on consistent official annual estimates can clarify not only whether the Philippine HIV burden has increased over time, but also whether the country's regional significance lies more in cumulative prevalence, current transmission intensity, mortality burden, or treatment weakness.

Against this background, the present study examines long-run HIV trends in the Philippines from 1990 to 2024 using official annual estimates and situates those trends within the ASEAN regional context. Specifically, the study (a) analyzes the Philippine trajectory across key indicators of burden, transmission, and treatment; (b) compares the Philippine HIV profile with ASEAN counterparts where official annual observations are sufficiently available; and (c) identifies which indicators most clearly capture the Philippines' relative position in the region.

2. Review of Related Literature

2.1 Long-run HIV epidemiology in the Philippines

The trajectory of the HIV epidemic in the Philippines over the past two decades is characterized by a persistent upward trend, contrasting sharply with global patterns of declining incidence. Longitudinal analyses have documented a sustained increase in new HIV infections across all regions of the country from 2010 to 2022, with a notable concentration among males aged 25-34 years (Montegrico et al., 2024). The acceleration of the epidemic is underscored by a reported 411% surge in daily HIV incidence between 2012 and 2023, positioning the Philippines as the nation with the fastest-growing epidemic in the Western Pacific region (Gangcuangco & Eustaquio, 2023). Further quantitative assessments estimate a 676% growth rate in new infections from 2010 to 2021, with advanced time-series models projecting that this upward trajectory will persist through 2030 (Aribe et al., 2022). Recent data from early 2025 corroborate this trend, indicating a 57% increase in new diagnoses compared to the prior year, predominantly affecting young people aged 15 to 34 years (Shakeel & Shahid, 2025). Contributing to this long-run dynamic are persistent challenges, including high rates of late diagnosis, AIDS-related mortality, and sociocultural barriers such as stigma, which impede testing and treatment efforts (Gangcuangco & Eustaquio, 2023; Montegrico et al., 2025).

2.2 Comparative HIV patterns in ASEAN

ASEAN member states demonstrate marked heterogeneity in HIV epidemic trajectories, reflecting divergent public health capacities and intervention outcomes, a pattern consistent with findings that structural factors like financial depth and population density are more consequential for long-term developmental outcomes than short-run macroeconomic conditions (Atento, 2026). Projections indicate that while Singapore and Brunei are on track to achieve health-related Sustainable Development Goals by 2030, indicating effective HIV control, countries such as Malaysia and Thailand exhibit moderate progress, and several lower-income members continue to face substantial challenges in reducing infectious disease burdens (Si et al., 2025). Epidemiological disparities are further evident among key populations, with high HIV prevalence persisting among men who have sex with men (MSM) and transgender women across the region; however, urban centers display divergent

trends, with declines observed in Bangkok contrasting with increases or plateaus in Kuala Lumpur and Phnom Penh (Van Griensven et al., 2021). Socioeconomic determinants significantly shape these patterns, as lower socio-demographic index groups within the Asia-Pacific region, including parts of ASEAN, experience elevated age-standardized HIV incidence, mortality, and disability-adjusted life years (Li et al., 2024). This heterogeneity is further underscored by evidence showing that macroeconomic strength alone is insufficient for equitable health outcomes; for example, higher employment rates do not uniformly reduce child undernutrition without accompanying investments in care infrastructure and family-responsive policies (Quinto & Atento, 2025). To address this complexity, dynamic modeling tools such as the AIDS Epidemic Model have been employed to simulate transmission dynamics among key populations and inform targeted national responses (Brown et al., 2024). Within this regional mosaic, the Philippines has emerged as a distinctive outlier. Characterized as having the fastest-growing HIV epidemic in the Western Pacific, the country has experienced a 411% increase in daily new diagnoses between 2012 and 2023, contrasting sharply with global declines in incidence and AIDS-related mortality (Gangcuangco & Eustaquio, 2023). This surge, concentrated among MSM and compounded by a tuberculosis-HIV co-epidemic, underscores the profound disparities in health system capacity and prevention implementation across ASEAN (Torres et al., 2023; Van Griensven et al., 2021).

2.3 Incidence versus prevalence as measures of epidemic severity

In assessing the current momentum of an epidemic, particularly for HIV, incidence and prevalence provide distinct yet complementary information. Prevalence measures the total proportion of individuals living with the condition at a given time, reflecting cumulative burden and survival. Incidence, conversely, captures the rate of new infections, serving as a direct indicator of ongoing transmission dynamics (Govender et al., 2021; Carter et al., 2024). The distinction has become critical in the era of antiretroviral therapy (ART), as improved survival can cause prevalence to remain stable or even rise while incidence declines, thereby obscuring progress in curbing new infections (Tian et al., 2023; Govender et al., 2021).

Consequently, a growing body of evidence identifies incidence as the more informative metric for judging current epidemic intensity. Global analyses, such as those from the Global Burden of Disease, demonstrate that incidence peaked in the late 1990s in many regions and has since fallen, even as prevalence continued to increase due to ART-driven survival, highlighting that prevalence alone misrepresents transmission momentum (Tian et al., 2023; Carter et al., 2024). Studies focused on specific populations, including pregnant women in Mozambique and sexual minorities in South America, have similarly relied on recent infection and incidence estimates to monitor current dynamics, as prevalence changed slowly or declined while incidence remained high or volatile (Mendes-Muxlhanga et al., 2025; Torres et al., 2023). This has spurred the development of novel methodologies—such as recency assays, phylogenetic tools, and spatial viral load measures—to estimate incidence more accurately, precisely because it is the preferred measure of epidemic momentum (Golubchik et al., 2025; He et al., 2025; Negedu-Momoh et al., 2021).

To integrate both dimensions, recent research has advanced the incidence-to-prevalence ratio (IPR). A shrinking epidemic is often benchmarked by an IPR below 0.03, and its application in settings like Australia has confirmed that once this threshold is crossed, the epidemic is no longer self-sustaining, even with substantial residual prevalence (Tian et al., 2023; King et al., 2024). Thus, while prevalence remains essential for planning care and resource allocation, incidence and derived metrics like IPR are superior for detecting whether transmission is accelerating or coming under control.

2.4 ART coverage and epidemic control

Extensive evidence demonstrates that higher antiretroviral therapy (ART) coverage is consistently associated with reductions in HIV-related mortality and is fundamental to achieving epidemic control. Population-level analyses have documented significant mortality declines coinciding with ART scale-up; in Ghana, AIDS-related deaths shifted from a 14% annual increase to a 3.6% annual decline as coverage rose to 60% (Boah et al., 2023). A comprehensive strategy in Liangshan, China, produced an estimated 81% relative mortality reduction, with not receiving ART emerging as the strongest risk factor (Liang et al., 2025). Similarly, China's universal ART policy has been linked to substantial mortality reductions and a shifting profile toward non-AIDS causes of death (Zhao et al., 2023). Global programmatic data from PEPFAR show that scaling ART to approximately 20 million people corresponded with sharp declines in HIV morbidity and mortality alongside gains in viral suppression (Chun et al., 2023). Pediatric analyses confirm this pattern, with ART coverage tripling and AIDS deaths halving between 2010 and 2020 (Rosen et al., 2023). Individual-level cohort studies across diverse settings consistently identify being on ART, early initiation, viral suppression, and higher CD4 counts as protective factors against mortality (Bwogi et al., 2025; Mekonnen et al., 2025; Teeraananchai et al., 2025; Yadecha et al.,

2025). Conceptual models that integrate these dual objectives—such as frameworks aligning clinical excellence with financial sustainability—suggest that co-optimization is achievable when analytics, governance, and organizational alignment are treated as interconnected components (Atento, Quinto, Espelita, & Castaneda, 2025).

However, high coverage must be coupled with good adherence to fully realize mortality benefits (Abbasi et al., 2023; Lai et al., 2023). Furthermore, low or uneven ART coverage sustains HIV transmission by leaving a larger pool of virally unsuppressed individuals (Boah et al., 2023; Chun et al., 2023; Hamilton & Aliyu, 2025). Ecological and modeling studies confirm that higher coverage reduces new infections (Sun et al., 2025; Yaylali et al., 2024), while inadequate coverage permits continued transmission, including mother-to-child transmission (Astawesegn et al., 2022) and potential resurgence of drug-resistant strains (Ogunniran & Oshatuyi, 2025). Community-level data further indicate that residual transmission risk persists in populations with weaker coverage (Conan et al., 2022). Collectively, the literature affirms that expanding ART coverage, ensuring early initiation, and achieving high viral suppression across all groups are essential for reducing mortality and advancing toward epidemic control.

2.5 Health analytics and longitudinal analysis of HIV data

Longitudinal and time-series methodologies constitute a fundamental component of health analytics for HIV, enabling the detection of epidemic turning points, the evaluation of intervention effects, and the comparative assessment of disease burden across populations, a logic that extends to predictive modeling in other behavioral domains like enrollment intent (Espelita, Atento, & Atento, 2026). Interrupted time-series designs have quantified both immediate level changes and trend shifts in treatment cascade indicators following comprehensive strategy implementation, identifying transitions toward epidemic control (Liang et al., 2025). Complementing these primary analytic approaches, mixed-method and qualitative frameworks, such as thematic content analysis of institutional documents, offer a robust means of understanding the contextual factors that shape policy implementation and educational outcomes (Atento, 2025). Period-stratified analyses of the care continuum have revealed progressive shortening of times to antiretroviral therapy initiation and viral

suppression across calendar periods, though with notable subgroup disparities (Van Beckhoven et al., 2025). Phylogenetic approaches applied longitudinally have traced the emergence and acceleration of sub-epidemics through molecular cluster dynamics (Novitsky et al., 2021) and reconstructed sequential exponential growth phases associated with changing risk group composition (Ge et al., 2021). Broader time-series frameworks, including growth rate and reproduction number estimation (Harvey & Kattuman, 2021), volatility and change-point detection (Aber et al., 2025; Diop & Kengne, 2021), and spatio-temporal graph learning (Thanh et al., 2024), provide additional tools for identifying regime shifts in transmission patterns, with emerging technologies like AI serving as assistive tools for summarizing complex data streams rather than as replacements for professional judgment (Bendal, Sabasa, Espelita, & Atento, 2026). Joint models integrating longitudinal biomarkers with competing-risk outcomes have further elucidated spatio-temporal turning points in disease progression (Momenyan, 2021). Complementing these primary analytic approaches, modeled datasets from UNAIDS and the Global Burden of Disease are widely employed for comparative purposes, applying harmonized frameworks such as Spectrum and EPP to enable cross-national and temporal comparisons (Govender et al., 2021; Stover et al., 2021; Van Schalkwyk et al., 2024). However, the reliability of these estimates varies substantially by region and population, with data quality gradients and structural model uncertainty necessitating cautious interpretation, particularly for key populations and sub-national geographies (Moolla et al., 2023; Onovo et al., 2023; Stevens et al., 2024).

2.6 Synthesis of Literature, Research Gaps, and Contributions of the Study

Across the five preceding themes, several points of convergence emerge. First, the Philippine HIV epidemic has followed a markedly upward trajectory over the past two decades, in contrast to the broader global pattern of declining incidence (Aribe et al., 2022; Gangcuangco & Eustaquio, 2023; Montegrico et al., 2024; Shakeel & Shahid, 2025). Second, ASEAN is not epidemiologically uniform; member states vary widely in epidemic maturity, health-system response, and key-population vulnerability (Brown et al., 2024; Li et al., 2024; Si et al., 2025; Van Griensven et al., 2021). Third, prevalence is an important measure of cumulative burden but is not always the best

indicator of current momentum—particularly in the ART era, where improved survival can maintain or raise prevalence even as incidence falls (Carter et al., 2024; Govender et al., 2021; Tian et al., 2023). Incidence and derived metrics such as the IPR are more sensitive to ongoing transmission and better suited to detecting whether an epidemic is expanding or moving toward control (Golubchik et al., 2025; He et al., 2025; King et al., 2024). Fourth, ART coverage is central to epidemic control: wider access is associated with lower mortality and reduced transmission, while low coverage sustains both (Boah et al., 2023; Chun et al., 2023; Liang et al., 2025). Fifth, longitudinal and health-analytics approaches are methodologically well suited to HIV analysis, though modeled datasets require transparent handling and cautious interpretation (Moolla et al., 2023; Stevens et al., 2024).

Despite this strong foundation, important gaps remain. Much of the Philippine literature emphasizes national growth in cases, recent surveillance patterns, or key-population vulnerability, but fewer studies integrate these into a long-run Philippines-centered analysis using a single official dataset across multiple decades and situated within a structured ASEAN comparative frame. Although regional heterogeneity is well documented, limited work directly asks where the Philippines stands when burden, transmission, and treatment are examined together using harmonized annual estimates. The literature supports the importance of incidence over prevalence for interpreting epidemic momentum, yet relatively few studies apply this distinction to determine whether the Philippines is a high-transmission but not highest-prevalence case within ASEAN—a framing that affects both research and policy. Similarly, while ART coverage is widely discussed as a determinant of control, its role in the Philippine comparative standing within a long-run official-data framework remains underexplored. Finally, simpler but policy-relevant comparative analytics—such as phase-based growth, rank comparison, and official-estimate benchmarking—remain underdeveloped for the Philippine case.

In response to these gaps, the present study contributes (a) a Philippines-centered long-run HIV analysis covering 1990 to 2024, extending beyond short-period accounts; (b) a comparative ASEAN perspective using harmonized official annual estimates; (c) an integrated framework examining burden, transmission, and treatment together; (d) an operationalization of the incidence-prevalence distinction to assess whether the Philippines' regional significance lies more in current transmission than in cumulative burden; and (e) a health-analytics perspective using longitudinal comparison, phase-based interpretation, and official

modeled estimates to identify escalation, comparative rank, and treatment disadvantage.

3. Methodology

3.1 Research Design

This study employed a quantitative longitudinal comparative design using secondary annual HIV data. The Philippines served as the anchor case, while ASEAN countries functioned as comparator units in a variable-specific panel framework. The analysis combined a national time-series perspective with a regional comparative perspective, allowing assessment of both long-run domestic change and relative position within ASEAN. The design was primarily descriptive and comparative rather than causal. Its core purpose was to identify patterns of change in HIV burden, transmission, mortality, and treatment response over time and to assess whether the Philippine HIV profile differed meaningfully from those of ASEAN counterparts.

Because the official annual HIV indicators are modeled estimates generated within a common UNAIDS framework rather than simple administrative counts, the design is especially appropriate for examining trajectories, relative rankings, and phase-based change. World Bank (2025b) states that the incidence-rate series is produced within a common modeling framework integrating surveillance data, ART coverage, demographic information, and assumptions on transmission and survival.

A dual temporal structure was adopted. The core epidemic analysis used the period 1990–2024, the strongest common official annual range for the principal HIV indicators. A separate later-period analysis covered ART coverage because its usable series begins later. This preserved comparability across burden and transmission indicators while still incorporating treatment response.

3.2 Data Sources and Data Collection

The study relied exclusively on official public secondary data. The principal source was the World Bank Data platform and DataBank metadata system, which disseminate annual HIV series attributed to UNAIDS estimates. World Bank (2025a) identifies the prevalence indicator as a UNAIDS-based series, while World Bank (2025b) and World Bank (2025c) identify the incidence-rate and ART-coverage indicators within the same framework.

Six indicators were collected: people living with HIV, new HIV infections, new HIV infection

rate, HIV prevalence among adults aged 15–49 years, AIDS-related deaths, and ART coverage. These represent the main dimensions of burden, transmission, mortality, and treatment response. World Bank (2025b) defines the incidence-rate indicator as the number of new HIV infections among uninfected persons aged 15–49, expressed per 1,000 uninfected population, while World Bank (2025c) defines ART coverage as the percentage of all people living with HIV receiving antiretroviral therapy.

The geographic scope centered on the Philippines as the primary unit of analysis. Comparator countries included ASEAN member states with available official annual observations: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. The temporal extraction followed the longest available span, 1990–2024, while ART coverage was retained as a later-period series. Brunei and Singapore were retained in the assembled file but showed limited usable continuity across the principal indicators and thus appear only where their data were sufficiently complete.

3.3 Variables and Measurement

The study treated the HIV indicators as analytic outcome variables rather than organizing them into a conventional dependent-independent variable structure. People living with HIV served as the principal indicator of cumulative burden. New HIV infections represented the annual flow of newly infected cases. New HIV infection rate served as the central transmission-intensity measure because it adjusts new infections relative to the uninfected population at risk. HIV prevalence among adults aged 15–49 years captured relative burden within the adult population. AIDS-related deaths represented the mortality dimension. ART coverage served as the principal treatment-response indicator.

The study used official annual values in two ways. First, original level values were retained and used for descriptive and comparative interpretation. Second, selected variables were transformed into derived measures—year-over-year growth rates, three-year moving averages, and indexed series— for supplementary interpretation. These derived measures were stored separately from official values to preserve source integrity.

3.4 Data Processing and Analytical Procedures

After extraction, the annual series were consolidated into a single master dataset organized by country, year, and indicator value. Country names and codes were standardized, year fields were harmonized, variable names were cleaned, and numeric fields were checked for comparability. The dataset was screened for duplicate records, structurally empty rows, and variable-specific discontinuities. A terminal placeholder year that did not contain usable values was excluded from the final interpretation.

A strict non-imputation rule was applied: missing values were retained as missing unless already provided as official modeled estimates in the source data. A country-by-year completeness matrix was created for each indicator, allowing the study to determine which variables were sufficiently complete for Philippines-only analysis, which were usable for ASEAN comparison, and which required later-period or reduced-sample treatment.

The principal analysis was descriptive and comparative. For the Philippines-only component, the study summarized long-run movement using starting values, ending values, absolute changes, relative magnitudes of increase, and phase-based growth patterns. For the ASEAN component, the study used latest-year comparison, rank comparison, and trend-oriented comparison, placing greater emphasis on rate variables and indexed trajectories where raw cross-country count comparisons could be distorted by country size.

3.5 Ethical Considerations

This study used only publicly accessible secondary data from official country-level HIV indicator series. It did not involve direct contact with participants, fieldwork, interviews, surveys, experimental intervention, or access to individual-level clinical records. The dataset consisted entirely of aggregated annual national estimates containing no personally identifiable information. Raw downloads were preserved, missing values were not artificially filled, and derived metrics were stored separately from official values. The analysis was framed at the national and regional level without stigmatizing language or attribution of blame to particular groups.

3.6 Limitations of the Data and Design

Several limitations should be recognized. First, the analysis is based on official modeled estimates, not identical administrative case counts from a

single uniform surveillance system; the data should be interpreted as official comparative estimates rather than exact enumerations. Second, the completeness of annual series varies across countries and indicators. The Philippines has strong long-run continuity, but some comparators show gaps; the study therefore uses variable-specific analytic samples rather than imposing a single balanced panel. Third, ART coverage becomes analytically meaningful only in the later period. Fourth, the design is descriptive and comparative rather than causal. Fifth, national-level aggregated data impose an ecological limit: the study describes country-level patterns but cannot disaggregate them by region, sex, or specific key population.

3.7 Statistical Treatment of Data

The statistical treatment was primarily descriptive, longitudinal, and comparative. For the Philippines-only component, the official annual series were summarized using start values, end values, absolute changes, relative magnitudes, and phase-based growth. For the ASEAN component, the study used latest-year comparison, rank comparison, and trend-based comparison. Three derived measures supported interpretation: year-over-year growth rates, three-year moving averages, and indexed series using a common base year. These were stored separately so that original source values remained intact and auditable.

4. Results and Discussion of Findings

4.1 Long-Run HIV Trends in the Philippines

The official HIV series reveal a pronounced long-run upward trajectory in the Philippine epidemic from 1990 to 2024. Across the principal indicators, the pattern is one of sustained expansion rather than temporary fluctuation.

The strongest increase appears in people living with HIV, which rose from a very low baseline to a substantially larger burden by the end of the period. A similar upward movement is evident in annual new infections, indicating that the expansion reflects not merely improved survival but persistent growth in ongoing transmission.

The new HIV infection rate reinforces this reading. Because this indicator adjusts for the size of the uninfected population at risk, it provides a stronger basis for assessing transmission intensity than raw counts alone; its marked rise over time points to a genuine strengthening of transmission pressure. The adult prevalence rate also increased, confirming that the burden expanded in proportional as well as absolute terms.

AIDS-related deaths moved upward as well, indicating that the epidemic's growth was

accompanied by a rise in fatal outcomes. Although treatment access improved in the later period, the increase in ART coverage was not sufficient to offset the broader upward movement in transmission-related indicators. (See Table 2)

4.2 Philippines and ASEAN Comparative Position

The 2024 cross-sectional comparison places the Philippines in a distinctive position within the ASEAN sample. Its profile is defined not by the highest adult prevalence or the largest stock of people living with HIV, but by the strongest current transmission signal and the weakest treatment coverage among comparison countries.

In total PLHIV, Indonesia and Thailand record the largest estimated totals, followed by Myanmar and Viet Nam; the Philippines is substantial but positioned below these higher-burden countries. A similar pattern holds for adult prevalence, which in the Philippines remains lower than in Thailand, Myanmar, and Cambodia.

The most significant result emerges from the transmission indicators. In 2024, the Philippines records the highest number of new HIV infections and the highest new HIV infection rate among comparison countries. Its position is therefore most alarming not because it has reached the highest prevalence level, but because it appears to be the most intense current transmission case in the ASEAN sample—a country with an expanding epidemic rather than one that has plateaued at a high level.

The treatment series strengthens this reading. The Philippines records the lowest ART coverage among comparison countries, while others range from moderate to very high coverage. Weak treatment coverage reduces the system's capacity to suppress transmission, improve survival, and slow epidemic expansion.

The mortality pattern is more mixed. The Philippines does not record the highest AIDS-related deaths in 2024, but it occupies the middle-to-upper part of the distribution, indicating that transmission growth has translated into a meaningful fatal burden. (See Table 3)

4.3 Relative Position of the Philippines Across Core HIV Indicators

Expressing the Philippine position in ranked terms sharpens the interpretation. In 2024, the Philippines ranks first in both new infections and new infection rate, but only fifth in PLHIV, tied in the lower middle of the distribution for prevalence, and last in ART coverage among countries with available treatment data (Table 4). This uneven ranking pattern is central to the paper's contribution: the Philippine HIV problem is not simply a matter

of cumulative burden, but of currently active epidemic acceleration.

A country may have high prevalence because of a historically large epidemic, yet still be moving toward control if current transmission is declining. The Philippine case points in the opposite direction. Cambodia and Thailand, for example, combine stronger ART coverage with lower incidence rates. Indonesia, despite having a much larger stock burden and the highest death count, still records slightly higher ART coverage. The Philippine response thus appears weaker at the treatment-coverage margin, which may be one factor associated with its strong transmission profile.

Because the Philippines is not the highest-prevalence country, its current HIV situation cannot be reduced to the claim that it has the region's largest epidemic. The data instead indicate a country where the epidemic is still actively intensifying—concerning precisely because its position lies at the intersection of high current transmission and weak treatment, rather than at the endpoint of cumulative prevalence. (See Table 4)

4.4 Phase-Based Growth Analysis of HIV Trends in the Philippines

A longer time horizon shows that the epidemic increased, but not when it intensified most. The Philippine series was divided into three phases: 1990–2000, 2000–2010, and 2010–2024. Using compound annual growth rates (CAGRs), the results show that the most intense expansion occurred during 2000–2010.

PLHIV grew at an annualized rate of 31.8% from 2000 to 2010, well above the 19.6% from 1990 to 2000 and the still-high 19.1% from 2010 to 2024. New infections followed the same pattern: a CAGR of 24.8% in 2000–2010, compared with 17.5% and 14.3% in the flanking periods.

The new HIV infection rate, which remained flat in the earliest phase, increased sharply at 25.9% annually during 2000–2010 before slowing to 11.9% from 2010 to 2024. Because this is a rate-based measure, the acceleration in the 2000s cannot be explained by population growth alone; it reflects a genuine strengthening of transmission intensity.

HIV prevalence remained flat in the first two subperiods and then grew at 8.2% annually from 2010 to 2024, indicating that visible accumulation in the adult population became most pronounced in the

later phase. AIDS-related deaths showed no growth in the earliest subperiod, rose most rapidly at 17.5% annually in 2000–2010, and continued upward at 11.5% from 2010 to 2024.

ART coverage follows a different temporal pattern because its meaningful series begins later. The 2000 baseline of zero makes a standard CAGR for the earlier subperiod uninterpretable. The available series shows coverage rising from 5% in 2010 to 40% in 2024 (annualized growth of 16.0%), confirming that treatment access improved substantially after 2010—but the continued rise in infections and deaths indicates that this expansion did not fully offset broader epidemic momentum.

The Philippine HIV trajectory is therefore best described not merely as increasing over time, but as having passed through a distinct acceleration phase in the 2000s, followed by continued expansion under only partial control. (See Table 5)

4.5 Discussion of Findings

The preceding results converge on a single core finding: the Philippine HIV profile is defined by persistent long-run escalation, a comparatively strong current transmission signal, and a weak treatment position within ASEAN. This section situates these results within the broader empirical and analytical context.

One of the central implications is that the Philippine case appears more concerning in terms of current transmission than in terms of cumulative prevalence. The Philippines did not emerge as the highest-prevalence country in the comparison set, yet it stood out most strongly in new infections and incidence. A country may show relatively high prevalence because it has carried a mature epidemic for a long time without that necessarily meaning it is the most rapidly intensifying case. The Philippine pattern suggests the opposite: an epidemic that remains highly active in the present period. Because the incidence indicator is specifically designed to measure new infections and prevention progress, its prominence in the Philippine results provides the strongest basis for interpreting the country as a current transmission concern.

The phase-based analysis adds temporal specificity. The most pronounced acceleration occurred in 2000–2010, especially for PLHIV, new infections, incidence, and deaths. The 2010–2024 period, although somewhat slower in annualized growth, did not represent reversal. The Philippine

trajectory therefore reflects a later acceleration phase whose consequences remain visible in the present structure of the burden. The precise drivers of this acceleration—whether changes in sexual behavior, urbanization, policy gaps, or testing patterns—lie beyond the scope of the present dataset, but the temporal signal itself is clear and warrants further investigation.

The coexistence of high incidence and the weakest ART coverage in the comparison set is a troubling combination. ART coverage is not only a treatment-access measure; it is closely related to epidemic control, survival, and reduced onward transmission. Although this study does not claim a direct causal effect, the pattern is consistent with incomplete epidemic control. Other ASEAN countries—Cambodia and Thailand, for example—combine stronger ART coverage with lower incidence rates. The Philippine response has not expanded treatment fast enough to neutralize the transmission momentum reflected in the incidence indicators.

The increase in AIDS-related deaths over the long run indicates that the epidemic's expansion translated into a meaningful fatal burden. The Philippines did not record the highest mortality count in 2024; those levels were higher in Indonesia, Thailand, Myanmar, and Viet Nam. The mortality rank being less extreme than the incidence rank may suggest that the Philippine situation is driven more by recent transmission pressure than by the largest accumulated mortality legacy, further reinforcing the interpretation that the country's epidemiological distinctiveness lies in dynamic expansion.

Because the study is based on official modeled estimates rather than administrative case counts, the results are suited to understanding comparative direction, relative intensity, and long-run movement. The modeled nature of the data means the findings should be interpreted as robust comparative signals rather than census-like enumerations.

Overall, the Philippines occupies a concerning position in the ASEAN HIV landscape because its epidemic appears more active in transmission terms than its prevalence rank alone would suggest, while its treatment coverage remains the weakest in the comparison set.

5. Conclusions, Recommendations, Study Implications, and Future Directions

5.1 Conclusions

The study draws four principal conclusions. First, a Philippines-centered HIV time-series analysis from 1990 to 2024 is feasible using official public data, particularly the annual HIV indicators disseminated through the World Bank and sourced from UNAIDS. The data proved sufficiently strong to support both a long-run national analysis and a variable-specific ASEAN comparative panel.

Second, the Philippine HIV profile followed a clear and sustained upward trajectory. Over the study period, the country experienced substantial increases in PLHIV, annual new infections, incidence rate, prevalence, and AIDS-related deaths. The epidemic did not stabilize; it expanded in both cumulative burden and current transmission terms.

Third, the Philippines occupies a distinctive and concerning regional position. It was not the highest-prevalence country, nor did it carry the largest burden or the highest death count. However, it ranked first in new infections and incidence rate while recording the weakest ART coverage. The Philippine case is therefore more alarming when viewed through the lens of current epidemic momentum than through prevalence alone.

Fourth, the epidemic did not intensify uniformly. The strongest acceleration occurred during 2000–2010, followed by continued expansion at a slower pace alongside improvements in treatment coverage.

The strongest indicators for publication-oriented analysis are PLHIV, new HIV infection rate, HIV prevalence rate, and AIDS-related deaths. ART coverage is analytically valuable but is better treated as a later-period indicator. Where cross-country comparisons are affected by uneven completeness or country-size differences, rate-based, growth-based, and index-based comparisons are more defensible than raw counts alone.

5.2 Recommendations

Based on the findings, several recommendations are proposed. First, HIV response planning in the Philippines should give greater priority to incidence-centered monitoring. Monitoring systems and policy reviews should emphasize new infections, incidence trends, and changes in transmission intensity alongside traditional reporting of prevalence and cumulative burden.

Second, the Philippine HIV response should intensify efforts to expand ART coverage. The comparative findings indicate a weaker treatment position than several ASEAN counterparts. Treatment access should be strengthened not only as a clinical objective but as a strategic epidemic-control measure. Policies that improve early diagnosis, linkage to care, and retention in treatment are especially important.

Third, prevention and treatment should be approached in a more integrated manner. A coherent response framework should connect case detection,

treatment initiation, adherence support, and long-run monitoring so that treatment expansion contributes to epidemic control rather than functioning only as a response to already accumulated burden.

Fourth, public-health agencies and researchers should make fuller use of official longitudinal HIV datasets for planning and evaluation. Future work should employ structured time-series analysis, growth-based interpretation, and comparative benchmarking to detect acceleration periods and monitor response effectiveness.

Fifth, future research should incorporate subnational Philippine data where available, examining whether the national transmission profile is driven disproportionately by specific localities or phases of the care continuum.

Sixth, future studies should consider combining official international estimate series with Philippine surveillance and programmatic data—using modeled estimates for long-run comparative analysis and national surveillance data for more detailed operational interpretation.

Finally, rate-based, growth-based, and indexed comparisons should continue to be used in regional benchmarking, as they reduce distortion from country-size differences and uneven completeness.

5.3 Implications of the Study

The findings carry implications at several levels. For public health interpretation, the Philippine HIV situation should not be assessed through prevalence alone. A country may appear moderate by that measure yet still be experiencing an active and intensifying transmission problem. In the Philippine case, the more policy-relevant concern is not how much burden has accumulated, but how strongly the epidemic continues to reproduce itself.

For treatment policy, the coexistence of high transmission and weak ART coverage implies that prevention and treatment cannot be treated as separate domains. The Philippine response requires a more integrated framework in which diagnosis, treatment access, retention in care, and transmission reduction function as mutually reinforcing components.

For regional benchmarking, the Philippines' not-highest prevalence rank may lead to understatement of its regional significance if burden-stock interpretations dominate. The country's position is better understood through the lens of epidemic momentum; it may warrant closer attention precisely because its present trajectory is more alarming than its prevalence rank suggests.

For temporal analysis, the phase-based results indicate that recent burden levels are the outcome of cumulative structural intensification—particularly the 2000–2010 acceleration—rather than short-term fluctuation. Analyses should attend to turning points and changing epidemic phases rather than relying only on single-point comparisons.

For methodology, the study demonstrates that official annual HIV estimates can support publication-oriented longitudinal research when handled with discipline. Variable-specific panels, rate-based comparison, and indexed trend analysis are often more defensible than raw-count comparisons where country size and uneven continuity could distort results.

Finally, the Philippine HIV situation should not be discussed in a way that minimizes concern simply because some neighboring countries show higher prevalence or larger cumulative burdens. A more accurate interpretation must distinguish between stock burden and flow intensity, between historical accumulation and current transmission, and between treatment expansion and effective epidemic control.

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7. Tables

Table 1. Dataset coverage and recommended sample

Variable	Official series window	Non-missing observations in assembled file	Best balanced sample	Use in main paper
People living with HIV	1990–2024	315	9 countries	Yes
New HIV infections	1990–2024	279	7 countries	Secondary
New HIV infection rate	1990–2024	314	8 countries	Yes
HIV prevalence rate	1990–2024	315	9 countries	Yes
AIDS deaths	1990–2024	314	8 countries	Yes
ART coverage	2000–2024	224	8 countries	Later-period model

Table 2. Long-Run HIV Trends in the Philippines, 1990–2024

Indicator	Start Year	Start Value	End Year	End Value	Absolute Change	Multiple Increase
People living with HIV	1990	200	2024	220,000	219,800	1,100.0x
New HIV infections	1990	100	2024	30,000	29,900	300.0x
New HIV infection rate	1990	0.01	2024	0.48	0.47	48.0x
HIV prevalence rate	1990	0.10	2024	0.30	0.20	3.0x
AIDS deaths	1990	100	2024	2,300	2,200	23.0x
ART coverage	2000	0	2024	40	40	n/a

Table 3. Philippines and ASEAN Comparison in 2024

Country	PLHIV	New infections	Incidence rate	Prevalence rate	AIDS deaths	ART coverage
Philippines	220,000	30,000	**0.48**	0.3	2,300	**40**
Myanmar	290,000	9,700	0.33	0.9	6,200	75
Lao PDR	21,000	1,100	0.27	0.4	500	64
Thailand	570,000	7,900	0.23	**1.0**	9,100	88
Indonesia	570,000	n/a	0.15	0.4	**24,000**	41
Cambodia	76,000	1,200	0.13	0.5	1,000	**92**
Malaysia	84,000	2,500	0.13	0.3	2,200	60
Viet Nam	270,000	5,900	0.11	0.4	4,200	74
Singapore	7,900	n/a	n/a	0.1	n/a	n/a

n/a = no usable value in the 2024 extract for that indicator.

Table 4. Relative Position of the Philippines in 2024

Indicator	Philippines value	ASEAN rank in sample	Interpretation
People living with HIV	220,000	5th of 9	High, but not largest stock burden
New HIV infections	30,000	**1st of 7**	Highest annual case flow
New HIV infection rate	0.48	**1st of 8**	Highest transmission intensity
HIV prevalence rate	0.3	Joint 7th of 9	Not highest-prevalence case
AIDS deaths	2,300	5th of 8	Mid-to-upper mortality burden
ART coverage	40	**8th of 8**	Weakest treatment coverage

Table 5. Phase-Based Growth of Core HIV Indicators in the Philippines

Indicator	1990–2000 CAGR	2000–2010 CAGR	2010–2024 CAGR	Fastest-growth phase
People living with HIV	19.6%	**31.8%**	19.1%	2000–2010
New HIV infections	17.5%	**24.8%**	14.3%	2000–2010
New HIV infection rate	0.0%	**25.9%**	11.9%	2000–2010
HIV prevalence rate	0.0%	0.0%	**8.2%**	2010–2024
AIDS deaths	0.0%	**17.5%**	11.5%	2000–2010
ART coverage	n/a	n/a*	**16.0%**	2010–2024

*CAGR was not computed for ART coverage in 2000–2010 because the baseline value in 2000 was zero.