



Comparative analysis of HIV epidemiology and program coverage in ASEAN countries

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ABSTRACT

HIV/AIDS remains a substantial public health challenge in the ASEAN region. Although ASEAN countries have committed to achieving the UNAIDS 95-95-95 targets, significant variation persists in HIV epidemiology and program coverage across member states. This study aims to compare sociodemographic characteristics, epidemiology, and HIV program coverage among ASEAN countries. A descriptive comparative approach was employed using secondary data from UNAIDS, WHO, UNDP, and the World Bank. Variables analyzed included demographic indicators, human development, economic capacity, health financing, HIV epidemiology, antiretroviral therapy (ART) coverage, and prevention of mother-to-child transmission (PMTCT). (Results) The findings revealed wide disparities in demographic indicators, health financing, HIV epidemiology, and program coverage among ASEAN member states. Thailand reported the highest HIV prevalence, while the Philippines recorded the highest number of new infections. Thailand and Indonesia had the largest populations of people living with HIV. Cambodia, Malaysia, and Thailand demonstrated the highest ART and PMTCT coverage, whereas other countries reported relatively lower service coverage (Conclusions) The HIV epidemic and program coverage in ASEAN remain marked by substantial disparities. Strengthening health systems, expanding comprehensive HIV care, and enhancing regional collaboration are critical to accelerating progress toward the 2030 AIDS elimination target.

Keywords: HIV, AIDS, ART, PMTCT, ASEAN.

1. Introduction

Human Immunodeficiency Virus (HIV) remain among the most pressing global public health issues (IHME, 2025). Since HIV was first identified in 1981, it has infected millions of people worldwide (Melhuish & Lewthwaite, 2022). In 2024 alone, an estimated 40.8 million people were living with HIV, 1.3 million people were newly infected, and approximately 630,000 people died from HIV-related illnesses (UNAIDS, 2025a).

The Association of Southeast Asian Nations (ASEAN) is a multilateral organization comprising 11 countries in Southeast Asia. This region, home to approximately 695 million people, faces a diverse and complex HIV/AIDS epidemic (UN DESA, 2026; UNAIDS, 2025a). The member states vary significantly in terms of health system capacity, and socio-economic development (UNDP, 2025; WHO, 2025b). According to the Global AIDS Update 2024, an estimated 2.1 million people in Southeast Asia were living with HIV, with about 86,400 new infections reported that year (UNAIDS, 2025b).

The HIV epidemic in ASEAN countries is concentrated, with high prevalence among key populations, including sex workers, men who have sex with men (MSM), people who inject drugs, and transgender individuals (UNAIDS, 2025c). Unsafe sex has become the dominant transmission route in many countries, while transmission through shared injection equipment is an increasing concern in several parts of the region

(UNAIDS, 2025c). Additional factors such as stigma, and discrimination of key populations frequently act as major barriers to accessing prevention and treatment services (Alibudbud, 2024; Griensven et al., 2021).

HIV and AIDS place a significant burden on health systems. It is estimated that HIV-related deaths in the ASEAN region total approximately 49,000 annually (UNAIDS, 2024). Beyond the health toll, HIV and AIDS incur substantial socio-economic impacts (Beck et al., 2001). The increasing number of people living with HIV (PLHIV) inevitably raises healthcare costs and places strain on families, who often serve as primary caregivers. Many affected households face income loss and financial hardship (Owusu et al., 2025). A UNDP study found that HIV-affected households had lost their savings and were significantly more likely to fall into debt to cover medical costs or lost income compared to unaffected households (UNDP Asia-Pacific Regional Center, 2011a). The impact of HIV and AIDS also extends to education. Another UNDP publication reported that Girls in HIV-affected household are more less likely to be attending the school and most likely to have dropped out (UNDP Asia-Pacific Regional Center, 2011b).

Globally, the target set by UNAIDS, known as 95-95-95, aims for 95% of PLHIV to know their status, 95% of those diagnosed to receive antiretroviral therapy (ART), and 95% of those on ART to achieve viral suppression (UNAIDS, 2011). This target has been reaffirmed by ASEAN member states through the ASEAN Leaders' Declaration on Ending Inequalities and Getting on Track to End AIDS by 2030 (ASEAN, 2022). This high-level political commitment provides a common framework for action among ASEAN member states. Accordingly, all ASEAN countries have been working to update their national policies, including strategies to reach key populations, reform punitive laws, and strengthen community-led responses.

Despite political endorsement, progress toward the global targets has varied across ASEAN member states. Significant disparities exist in fiscal and health system capacity (WHO, 2025b). Some countries have successfully increased ART coverage, expanded Prevention of Mother-to-Child Transmission (PMTCT) services, and improved Early Infant Diagnosis (EID) coverage (UNAIDS, 2024). Others continue to face substantial challenges in expanding the coverage of the services, improving patient adherence to treatment, and strengthening program monitoring and evaluation (UNAIDS, 2024).

Although international report provides HIV data for individual country, comparative literature analyzing demographic, economic capacity, health financing, HIV epidemiology, and program coverage across ASEAN countries remains limited. A comprehensive approach is needed to provide a clearer picture of the variation between countries, identify the gaps in program implementation, and support the exchanges of the best practices in HIV control at the regional level.

The present study aims to compare the sociodemographic characteristics, economic capacity, health financing, HIV epidemiology, and HIV program coverage among ASEAN member states. It is expected to provide a landscape of the HIV epidemic situation in each country and could be input for strengthening regional collaboration and policies to accelerate the achievement of AIDS elimination target 2030.

2. Methods

This study employed a desk review approach. Data were retrieved from the global database published by the United Nation, and International Development Agencies, including UN statistics, United Nation Development Program (UNDP), World Health Organizations (WHO), Joint United Nations Programme on HIV/AIDS (UNAIDS), and the World Bank. We compared demographic characteristics, economic capacity, health financing, HIV epidemiology, and HIV program coverage across nine ASEAN countries: Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, and Viet Nam. Singapore and Brunei Darussalam were excluded due to insufficient epidemiological and HIV program data in the UNAIDS and WHO database. Timor Leste was not included, as it only recently joined ASEAN, and was not part of the ASEAN Leader's declaration.

Sociodemographic indicators analyzed including number of populations, Total Fertility Rate per woman (TFR), life expectancy at birth, and the Human Development Index (HDI). The number of populations, TFR, and life expectancy data were obtained from the UN Population Division Data Portal (UN DESA, 2024). The HDI data were retrieved from the UNDP database (UNDP, 2025). As the HDI data for 2024 had not yet been released, the most recent available HDI data were used.

Economic capacity, and health financing data indicators included Gross National Income (GNI) per capita, the percentage of health expenditure relative to the GDP, and per capita health expenditure in current international dollar adjusted Purchasing Power Parity (PPP). These data were obtained from the World Bank Database. As the health expenditure data for 2024 were not yet available, data from 2023 were used (World Bank, 2024).

Key epidemiological data included the estimate number of PLHIV (adult, children, and total), HIV prevalence among adults aged 16 to 49 years, the number of new HIV infections among adults and children,

HIV Incidence per 1,000 populations (adults aged 16-49), and AIDS-related deaths among adult and children. All data points were for 2024 and were obtained from the UNAIDS Country Factsheets and WHO database (UNAIDS, 2024; WHO, 2025a)

Program coverage indicators included the estimated ART coverage (total, children and adults), estimated percentage of pregnant women living with HIV who received antiretroviral for PMTCT, Final MTCT rate including breastfeeding period, and percentage of infants born to women living with HIV receiving a virological test within two months of birth (EID coverage). All program coverage data were for 2024 and were obtained from the UNAIDS Country Factsheets and WHO databases (UNAIDS, 2024; WHO, 2025a)..

3. Results

Table 1 shows that Indonesia is the most populated country in ASEAN (283.49 million), followed by the Philippines and Viet Nam, while Lao PDR has the smallest population. Life expectancy at birth was highest in Malaysia (76.82 years) and Thailand (76.56 years), whereas Myanmar recorded the lowest (67.10 years). The total fertility rate (TFR) varied across member states, with Thailand reporting the lowest (1.20) and Cambodia the highest (2.55). In terms of the Human Development Index, Malaysia achieved the highest score (0.82), followed by Thailand (0.80) and Viet Nam (0.77).

Table 1. Comparison of sociodemographic indicators among ASEAN Members, 2023-2024

Country	Population (million, 2024)	Life Expectancy (year, 2024)	TFR (2024)	HDI (2023)
Cambodia	17.64	70.82	2.55	0.61
Indonesia	283.49	71.29	2.11	0.73
Lao PDR	7.77	69.22	2.40	0.62
Malaysia	35.56	76.82	1.54	0.82
Myanmar	54.50	67.10	2.10	0.61
Philippines	115.84	69.95	1.89	0.72
Thailand	71.67	76.56	1.89	0.80
Viet Nam	100.99	74.74	1.20	0.77

Table 2 highlights differences in economic capacity and health financing among ASEAN countries. Malaysia reported the highest GNI per capita (PPP I\$37,510), followed by Thailand (PPP I\$24,110), while Myanmar had the lowest (PPP I\$5,900). Regarding health financing, the Philippines allocated the highest proportion of health expenditure to GDP (5.10%), whereas Indonesia allocated the lowest (2.70%). Health expenditure per capita also showed wide disparities, with Malaysia and Thailand recording the highest values, while Lao PDR and Myanmar reported relatively low levels.

Table 2. Comparison of economic indicators and health financing among ASEAN Members, 2023-2024

Country	GNI per Kapita (PPP, Current I\$, 2024)	Health Expenditure (% of GDP, 2023)	Health Expenditure per capita (PPP, Current I\$, 2023)
Cambodia	7,920	4.62	350.11
Indonesia	16,050	2.70	416.59
Lao PDR	9,170	2.02	123.25
Malaysia	37,510	3.96	1,441.22
Myanmar	5,900	4.46	293.19
Philippines	13,350	5.10	560.42
Thailand	24,110	4.54	1,066.75
Viet Nam	15,850	4.56	689.55

Table 3 indicates that Thailand and Indonesia had the largest estimated numbers of people living with HIV (PLHIV), with 580,000 and 570,000 respectively. HIV prevalence among adults aged 15-49 years was highest in Thailand (0.9%) and Myanmar (0.7%), while the Philippines recorded the lowest (0.2%). In terms of HIV incidence, the Philippines reported the highest number of new infections (approximately 29,000 cases per year), slightly higher than Indonesia (28,000 cases per year). AIDS-related deaths were highest in Indonesia (27,000 annually), followed by Thailand (12,000) and Myanmar (6,400).

Table 3. Comparison of HIV/AIDS Epidemiology indicators among ASEAN Members, 2024

Country	Estimated PLHIV	Adult prevalence (15-49, %)	New HIV infections (annual)	AIDS-related deaths (annual)
Cambodia	76,000	0.6	1,200	1,100
Indonesia	570,000	0.3	28,000	27,000
Lao PDR	20,000	0.4	1,300	500
Malaysia	85,000	0.3	2,900	2,500
Myanmar	280,000	0.7	10,000	6,400
Philippines	190,000	0.2	29,000	2,000
Thailand	580,000	0.9	9,100	12,000
Vietnam	250,000	0.3	6,100	4,100

Table 4 presents disparities in HIV care coverage across ASEAN countries. Cambodia reported the highest overall ART coverage (89%), followed by Thailand (85%) and Myanmar (77%), while Indonesia had the lowest coverage. A similar pattern was observed for adult ART coverage. For pediatric ART coverage, Malaysia achieved the highest (91%), whereas the Philippines (20%) and Indonesia (22%) had the lowest. Regarding PMTCT, Malaysia reported full coverage (100%), while Indonesia recorded only 17%. Indonesia also had the highest mother-to-child transmission (MTCT) rate (15.2%), slightly higher than the Philippines (14.2%), while Malaysia reported the lowest (5.2%). Early Infant Diagnosis (EID) coverage was lowest in Indonesia (40%), compared to Thailand (92%) and Malaysia (91%), which achieved the highest levels

Table 4. Comparison of ART Coverage and PMTCT Prevention among ASEAN Members, 2024

Country	ART coverage (all ages, %)	ART coverage adults (%)	ART coverage children (%)	PMTCT coverage (%)	Final MTCT rate (%)	EID coverage (%)
Cambodia	89	90	56	97	7.8	75
Indonesia	31	31	22	17	15.2	40
Lao PDR	60	60	66	63	10.5	70
Malaysia	60	57	91	100	5.2	91
Myanmar	77	77	64	56	11.0	65
Philippines	43	43	20	8	14.2	48
Thailand	85	82	64	97	5.8	92
Vietnam	78	78	70	80	8.5	84

4. Discussion

Differences in demographic characteristics and Human Development Index (HDI) among ASEAN member states reflect variations in their capacity to support health development, including HIV/AIDS control. Malaysia and Thailand, with relatively higher HDI scores, life expectancy, and per capita income compared to most other ASEAN countries, demonstrate stronger structural capacity to sustain health programs. Prior evidence suggests that countries with higher levels of human development are more likely to achieve better access to healthcare, stronger health financing, and greater capacity to implement sustainable HIV prevention and treatment programs (Eren Korkmaz & Emecen, 2026; Kara, 2025; Lou et al., 2014). Conversely, countries with lower levels of development continue to face challenges related to inadequate resources, limited health infrastructure, and shortages of healthcare workers (Phelan et al., 2022). These constraints may hinder the delivery of HIV services and contribute to disparities in program coverage and outcomes.

Economic capacity and the level of investment in health are critical factors influencing the performance of HIV programs in each country (Brink et al., 2025). The results revealed that Malaysia and Thailand have higher health expenditure per capita compared to Indonesia. Limited health investment may affect the availability of screening services, antiretroviral treatment, laboratory facilities, and patient monitoring systems (Brazier et al., 2026; Zakumumpa et al., 2026). Therefore, increasing and sustaining health financing is an essential component for strengthening national responses to the HIV epidemic.

The present study demonstrated considerable variation in HIV epidemiology across ASEAN countries. Although Indonesia has a relatively lower HIV prevalence among adults than Thailand and Myanmar, it bears one of the largest HIV burdens in the region, with an estimated 570,000 people living with HIV and the highest number of AIDS-related deaths. This finding suggests that the large population size substantially contributes to the absolute burden of HIV in Indonesia. In addition, the high number of AIDS-related deaths may reflect persistent gaps in HIV case detection, timely initiation of antiretroviral therapy, retention in care, and achievement of viral suppression (Adawiyah et al., 2022; Lazuardi et al., 2018). In contrast, despite having the highest adult HIV prevalence in ASEAN, Thailand has maintained a considerably lower level of AIDS-related mortality relative to its HIV burden, indicating a more effective HIV service delivery system and stronger continuity of care (Harris & Thaiprayoon, 2022). Indonesia may accelerate the implementation of policies that have been successful in Thailand, including same-day ART initiation, expanding the authority of primary healthcare facilities to initiate and continue HIV treatment programs, and increasing budgetary support for community-led services (Teeraananchai et al., 2025; WHO, 2018).

Differences in HIV program coverage were most evident in the indicators of antiretroviral therapy coverage, prevention of mother-to-child transmission, and early infant diagnosis. Indonesia had the lowest ART coverage among the ASEAN countries, both overall and among children, and also demonstrated low PMTCT and EID coverage. In contrast, Malaysia, Thailand, and Cambodia achieved near-universal PMTCT coverage and relatively low final mother-to-child transmission rates. These findings suggest that successful HIV control programs depend not only on the capacity to provide antiretroviral treatment but also on the effective integration of HIV services with maternal and child healthcare, comprehensive screening, and continuity of care from diagnosis through long-term patient monitoring (Bulstra et al., 2021; Humphrey et al., 2023).

5. Conclusion

Overall, the results indicate that the HIV epidemic in ASEAN is still characterized by substantial disparities in both epidemiological outcomes and the implementation of HIV control programs. This finding underscores the urgent need for stronger regional collaboration to accelerate progress toward the UNAIDS 95-95-95 targets and the elimination of AIDS as a public health threat by 2030. Key strategies to strengthen the regional response include the exchange of best practices, enhancement of health information systems, improvement of healthcare worker capacity, and expansion of access to diagnosis, treatment, and monitoring services.

Furthermore, collaboration among ASEAN member states in sharing policy lessons and innovations is expected to reduce disparities in HIV care and improve the overall quality of services for people living with HIV. Such collective efforts will not only help bridge gaps in program implementation but also foster resilience and sustainability in national HIV responses across the region. Future studies may conduct longitudinal and comparative analyses to monitor trends in HIV epidemiology and evaluate the effectiveness of policies across ASEAN member states. In addition, research focusing on community-led interventions, health financing equity, and regional collaboration will be critical to reducing disparities and strengthening HIV responses in the region.

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