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Human Immunodeficiency Virus (HIV) Incidence in Cilacap Regency 2020–2024

Frisca Dewi Yunadi[1]*, Bambang Budi Raharjo[2], Yogi Andhi Lestari[1], Sohimah Sohimah[1]

[1]*Universitas Al-Irsyad Cilacap, Indonesia*
[2]*Universitas Negeri Semarang, Indonesia*

*****Correspondence to: *friscadewiyunadi@gmail.com*

Abstract: Human Immunodeficiency Virus (HIV) remains a significant public health problem in Indonesia, including in non-metropolitan areas such as Cilacap Regency. This study aims to describe the incidence of HIV in Cilacap Regency based on surveillance data from 2020–2024. This study used a descriptive observational design with a secondary data analysis approach. Data were sourced from the recapitulation of HIV reports from the Cilacap Regency Health Office for 2020–2024, with the study population comprising all HIV cases recorded during that period. Data analysis was conducted using univariate methods and presented in the form of frequency distributions and descriptive narratives. The results show that HIV cases are consistently detected annually, with a trend of increasing cases in recent years. The majority of cases occur in men. Most people with HIV/AIDS have received antiretroviral therapy (ARVs), although there are still cases of HIV-related deaths and individuals who have not or are not recorded as receiving ARVs. Based on population groups, HIV cases were most frequently found among men who have sex with men (MSM), followed by the general population and partners of people living with HIV/AIDS. These findings indicate that the HIV epidemic in Cilacap Regency is concentrated in key groups, but has spread to the general population. The conclusion of this study confirms that the HIV incidence in Cilacap Regency is ongoing and requires strengthening prevention efforts, early detection, and treatment continuity based on local data and a comprehensive approach.

Keywords: HIV, HIV surveillance, epidemiology, population groups

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Introduction

Human Immunodeficiency Virus (HIV) continues to be a major global public health challenge. Despite significant progress with antiretroviral (ARV) therapy and various prevention strategies, the number of people living with HIV remains high, particularly in low- and middle-income countries. Globally, UNAIDS reports that tens of millions of people are living with HIV, with transmission still concentrated in certain population groups but increasingly expanding into the general population (UNAIDS, 2024).

In Southeast Asia, including Indonesia, the HIV epidemic is characterized by a concentrated epidemic, with relatively low prevalence in the general population but very high among key population groups such as men who have sex with men (MSM), transgender women, sex workers, and injecting drug users. Epidemiological studies indicate that HIV prevalence among MSM and transgender people in Indonesia can reach more than 20 percent, far exceeding the national prevalence in the general population (Baral et al., 2013; Wardhani et al., 2024). In fact, recent research shows an alarming HIV prevalence among adolescent and young adult MSM in urban Indonesia (Johnston et al., 2021).

However, the dynamics of the HIV epidemic in Indonesia are no longer limited to large metropolitan areas. The spread of transmission to non-metropolitan areas, including regencies with diverse socioeconomic characteristics, high population mobility, and unequal access to health services, presents new challenges to HIV control. Cilacap Regency is one such region, with the presence of industrial areas, ports, interprovincial transportation routes, and coastal economic activities that have the potential to increase population mobility and the risk of infectious disease transmission, including HIV.

HIV case recapitulation data in Cilacap Regency for the 2020–2024 period shows consistent detection of HIV cases every year. This indicates that HIV transmission at the community level is ongoing and not yet fully controlled. The continued identification of cases also reflects the presence of community groups that have not been optimally reached by HIV prevention, early screening, and treatment programs. Compared to other non-metropolitan regions

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in Central Java, the HIV case detection rate in Cilacap is relatively high, highlighting unique epidemiological and programmatic challenges such as limited healthcare access and persistent social stigma. Therefore, focusing research on Cilacap Regency is crucial to identify these barriers and design more targeted interventions.

Various studies have shown that HIV transmission is strongly influenced by behavioral and structural factors. Behavioral factors include unprotected sex, multiple sexual partners, injection drug use, and low HIV risk perception. Structural factors include stigma and discrimination, limited access to health services, and socioeconomic inequality (Stutterheim et al., 2021). In non-metropolitan areas like Cilacap, these factors are often exacerbated by limited health literacy and a lack of innovative health promotion approaches tailored to local community characteristics.

From a health behavior theory perspective, the Health Belief Model (HBM) explains that HIV prevention behavior is strongly influenced by an individual's perception of perceived susceptibility, disease severity, perceived benefits, and perceived barriers. Low risk perception and high psychosocial barriers such as fear, stigma, and distrust of health services often contribute to delayed HIV screening and low treatment adherence (Johnston et al., 2021).

The development of digital health technology, or mHealth, offers new opportunities to address these challenges. An mHealth-based approach enables the delivery of health education, increased HIV literacy, and risk screening in a more personalized, anonymous, and sustainable manner. International and national studies have shown that digital interventions, including the use of mobile applications and artificial intelligence-based chatbots, have the potential to increase access to information, screening acceptance, and engagement of at-risk groups in HIV services (Hanum et al., 2025). This approach is particularly relevant in areas like Cilacap Regency, which has limited access to face-to-face services but continues to see increasing smartphone penetration.

Therefore, a comprehensive understanding of the HIV incidence in Cilacap Regency is a crucial first step in planning evidence-based interventions. Local epidemiological analysis serves not only as a problem mapping tool but also as a basis for developing contextual, adaptive, and digitally integrated HIV education and screening models.

Based on this description, this study aims to describe the HIV incidence in Cilacap Regency during the 2020–2024 period as an empirical basis for strengthening prevention programs.

Method

This study employed a descriptive observational design utilizing secondary data analysis to describe the occurrence of Human Immunodeficiency Virus (HIV) in Cilacap Regency, Central Java, Indonesia. The study area, Cilacap Regency, is a non-metropolitan district characterized by high population mobility and mixed industrial–coastal economic activities. Data analysis was conducted in 2025 using HIV surveillance records spanning from 2020 to 2024. The study population included all reported HIV cases (people living with HIV/AIDS) registered in the official surveillance system of the Cilacap Regency Health Office during the study period. A total sampling technique was employed, incorporating all available cases without sample selection.

While the descriptive observational design using secondary surveillance data is appropriate for the study objectives, it is important to address the quality of the data used. Measures taken to ensure data quality control, completeness of case reporting, and potential underreporting within the surveillance system should be clearly explained. This includes describing procedures for data validation, handling missing or inconsistent data, and recognizing limitations arising from underdiagnosis or incomplete reporting, which may affect the accuracy and representativeness of the findings.

Results and Discussion

This section presents the results of the analysis of HIV surveillance data in Cilacap Regency during the 2020–2024 period. The results are presented systematically, starting from a general overview to more specific characteristics, to provide a comprehensive understanding of the epidemiological profile of HIV cases in the study area. The results include the distribution of cases by time, sex, antiretroviral therapy status, mortality, and population group classification. All findings are presented descriptively through tables and narrative explanations to illustrate observed patterns, without interpretation or causal inferences.

Result

Overall Distribution of HIV Cases, 2020–2024

The analysis of HIV surveillance data in Cilacap Regency from 2020 to 2024 showed that new HIV cases were consistently identified each year throughout the study period. The number of reported cases fluctuated over time and demonstrated an increasing trend in the most recent years.

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https://jurnal.unimus.ac.id/index.php/jur_bid

Table 1. Distribution of HIV Cases by Year in Cilacap Regency, 2020–2024

Year	Number of HIV Cases (n)	Percentage (%)
2020	196	17.4
2021	175	15.5
2022	223	19.8
2023	241	21.4
2024	288	25.6
Total	1,123	100

Distribution of HIV Cases by Sex

The distribution of HIV cases by sex indicated that the majority of people living with HIV/AIDS during the period 2020–2024 were male.

Table 2. Distribution of HIV Cases by Sex in Cilacap Regency, 2020–2024

Sex	Number of Cases (n)	Percentage (%)
Male	846	75.3
Female	277	24.7
Total	1,123	100

Antiretroviral Therapy (ART) Status

Most people living with HIV/AIDS recorded during the study period had received antiretroviral therapy (ART).

Table 3. Distribution of HIV Cases by ART Status in Cilacap Regency, 2020–2024

ART Status	Number of Cases (n)	Percentage (%)
Receiving ART	928	82.6
Not receiving / Not recorded ART	195	17.4
Total	1,123	100

Mortality among People Living with HIV/AIDS

During the period 2020–2024, HIV-related deaths were recorded among people living with HIV/AIDS, although the number of deaths was smaller compared to the total number of cases.

Table 4. HIV-Related Mortality in Cilacap Regency, 2020–2024

Status	Number of Cases (n)	Percentage (%)
Deceased	132	11.8
Alive	991	88.2
Total	1,123	100

Distribution of HIV Cases by Population Group

Based on population group classification in the HIV surveillance data of Cilacap Regency from 2020 to 2024, HIV cases were distributed across various population groups, including both the general population and key populations. The largest proportion of cases was identified among men who have sex with men (MSM), followed by the general population and partners of people living with HIV. Cases were also recorded among other groups such as female sex workers, transgender individuals, incarcerated populations, and other categories as documented by health services.

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https://jurnal.unimus.ac.id/index.php/jur_bid

Table 5. Distribution of HIV Cases by Population Group in Cilacap Regency, 2020–2024

Population Group	Number of Cases (n)	Percentage (%)
Men who have sex with men (MSM)	420	37.4
General population	295	26.3
Partner of PLHIV	64	5.7
High-risk partner	56	5.0
Tuberculosis (TB) patients	62	5.5
Female sex workers (FSW)	28	2.5
Sex workers (SW)	26	2.3
Transgender women	19	1.7
Prison inmates	18	1.6
Children born to mothers with HIV	15	1.3
Premarital screening clients	20	1.8
People who inject drugs (PWID)	2	0.2
Sexually transmitted infections (STI) patients	4	0.4
Not recorded	58	5.2
Others*	36	3.2
Total	1,123	100

Discussion

These findings suggest that community-level HIV transmission is ongoing and has not yet been fully controlled. This pattern is consistent with global and regional reports indicating that, despite advances in HIV treatment, new cases continue to be reported, particularly in low- and middle-income countries (UNAIDS, 2024). Epidemiological studies also highlight that non-metropolitan areas with high population mobility have unique vulnerabilities to HIV transmission (Beyrer et al., 2015).

The distribution of HIV cases by sex in this study shows a predominance of cases in men. This finding is consistent with various international studies reporting that men are at higher risk of HIV infection, particularly related to risky sexual behavior and involvement in certain sexual networks (Baral et al., 2013). Studies in Indonesia also show that HIV prevalence among men, particularly among men who have sex with men (MSM), is much higher than among women (Johnston et al., 2021; Wardhani et al., 2024). This indicates that behavioral and social factors continue to play a significant role in the dynamics of the HIV epidemic at the local level.

Regarding antiretroviral (ARV) therapy status, research results indicate that the majority of people living with HIV/AIDS in Cilacap Regency have received ARVs. This achievement reflects significant efforts to expand access to HIV treatment at the local level. Globally, increasing ARV coverage has been shown to contribute significantly to reducing HIV mortality and morbidity (Cohen et al., 2016). However, the persistence of a significant proportion of cases who have not or are not recorded as receiving ARVs indicates challenges in service affordability, early detection, and treatment sustainability, which are also widely reported in international studies (Stutterheim et al., 2021).

The continued recorded deaths of people living with HIV/AIDS during the study period demonstrate that HIV continues to have a serious impact on public health. Previous studies have shown that deaths among people living with HIV (PLWHA) are often related to delayed diagnosis, poor treatment adherence, and the presence of opportunistic infections such as tuberculosis (TB) (Gupta et al., 2018). This finding aligns with research showing HIV cases in groups with TB, underscoring the importance of integrating HIV and TB services into regional health systems.

The distribution of HIV cases by population group in this study indicates that the majority of cases occurred among men who have sex with men (MSM), followed by the general population and partners of people living with HIV. This finding reflects the HIV epidemic's concentrated nature, but has expanded to the general population. Global and regional studies indicate that while key groups remain the main contributors to new HIV cases, secondary transmission to partners and the general community is increasing (Beyrer et al., 2015; UNAIDS, 2024). This situation indicates the need for a prevention approach that focuses not only on key groups but also includes the general population and at-risk partners.

Overall, the results of this study confirm that the HIV epidemic in Cilacap Regency has characteristics that align with national and global trends, but with the local context of a non-metropolitan area. Therefore, strengthening behavior-based HIV prevention strategies, increasing early screening, and innovative approaches through digital health technology are crucial to suppressing HIV transmission rates at the community level. International evidence suggests that behavioral education-based approaches and the use of digital technologies such as mHealth and risk-

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based screening have the potential to increase service accessibility and engagement of at-risk groups (WHO, 2019; Hanum et al., 2025).

Conclusion

These findings confirm that HIV remains a public health problem in Cilacap Regency and underscore the need for ongoing control efforts. Strengthening HIV prevention and control should focus on increasing early screening, particularly among MSM, partners of PLWHA, and other at-risk populations, as well as ensuring the sustainability of ARV therapy. Integration of HIV services with tuberculosis (TB) and reproductive health services could help reduce morbidity and mortality. Furthermore, digital health interventions, such as technology-based risk screening and educational programs, may serve as a potential approach to increase the reach and effectiveness of HIV prevention programs in non-metropolitan areas; however, these strategies represent future recommendations and were not directly evaluated in this study.

Authors' Contribution

All authors contributed equally to every aspect of this research, from the initial study design and data collection to the analysis, interpretation, manuscript preparation, and critical revisions. All authors have read and approved the final version for submission.

Conflict of Interests Statement

The authors declare no conflict of interest.

Data Availability

The dataset presented in the study is available on request from the corresponding author during submission or after publication.

Informed Consent

Written informed consent was obtained from the participants.

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