



Late HIV Diagnosis: Updated Definitions, Recent Trends and Strategic Directions

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Description

Late Diagnosis (LD) of HIV continues to be a major global health challenge, resulting in poorer outcomes as increased morbidity, mortality and ongoing transmission risk despite decades of advances in testing and treatment [1-3]. Recent years have seen advancements in how LD is defined and a growing knowledge on the epidemiology, risk factors and strategies for improvement across diverse regions.

The standard definition of LD presentation with a CD4 count below 350 cells/ μ L or with an AIDS-defining event has been used for surveillance for over a decade [1,4]. However, this definition may misclassify individuals with acute HIV infection as late presenters, particularly in settings with expanded testing and Pre-Exposure Prophylaxis (PrEP) programs [5]. In response, the EuroTEST initiative and partners proposed an updated definition that reclassifies those with documented recent infection (such as a negative HIV test within 12 months or evidence of seroconversion illness) as not late [6]. This adjustment, now being adopted in some settings, aiming to avoid overestimation of LD and sharpen focus on missed diagnostic opportunities.

Across Europe, approximately 50% of newly diagnosed individuals continue to present late, with particularly high rates in Eastern Europe, parts of the Mediterranean and among older adults, migrants and certain key populations [2,7,8]. In a Turkish regional cohort, late diagnosis rates remained high 47% by the revised definition with a significant proportion diagnosed during the COVID-19 pandemic, highlighting the persistent burden of LD and the pandemic's disruptive impact on routine HIV services [9]. Similar rates have been documented in multi-center studies from Spain, Poland and other Turkish cohorts, supporting the global relevance of this challenge [10-12]. In China, recent analyses continue to show that over 60% of People Living With HIV (PLWH) are diagnosed at late stages, with older age and heterosexual transmission consistently

associated with increased risk [13-15]. In a study from northern India, 77.6% of People Living with HIV (PLHIV) presented late for care and we can see high prevalences of LD all over the world including Europe [16-21]. The COVID-19 pandemic has further exacerbated these trends. Interruptions in HIV testing and care have been associated with reduced diagnoses but an increase in the proportion of advanced cases and AIDS-related mortality in countries as diverse as Brazil, Germany, Turkey and Poland [22-25].

Risk factors for LD are well-documented. Older age, male gender, heterosexual transmission, lower educational attainment, being immigrant and intravenous drug use are associated with delayed diagnosis in multiple settings [9-12,14,26-28]. Stigma, discrimination, lack of knowledge, limited access to healthcare and low risk perception are recurring barriers, as are health system issues such as missed opportunities for testing in primary and emergency care [10,29-31]. Notably, a substantial proportion of late presenters had prior healthcare encounters where HIV testing was not offered, suggesting significant potential for improvement *via* provider-initiated testing guided by indicator conditions.

LD is linked to poorer virological and immunological outcomes, higher rates of opportunistic infections, increased healthcare costs and higher short-term and long-term mortality despite rapid ART initiation and modern regimens [3,9,32,33]. These consequences highlight the urgent need for earlier diagnosis and Antiretroviral Therapy (ART) to maximize individual and public health benefits. Mathematical models estimate that thousands of AIDS-related events and deaths could be averted each year in Europe alone if diagnosis and ART initiation occurred earlier [7,33]. Recent guidelines and studies emphasize a multifaceted approach to reduce LD:

- **Routine and opt-out testing:** Integrating HIV testing into routine healthcare, especially in primary care, emergency departments and for patients with indicator conditions, increases the chance of early detection [29,34,35].



- **Community and targeted testing:** Outreach to high-risk and underserved populations, including migrants, sex workers and intravenous drug users is essential for closing diagnostic gaps [14,26,36].
- **Reducing stigma and raising awareness:** Community engagement and education campaigns can mitigate stigma and improve risk perception in every aspect of population particularly the older heterosexual men, encouraging earlier testing [27,36].
- **Service integration and resilience:** Strengthening health system resilience, particularly in the face of public or global health disruptions like COVID-19, ensures continuity of HIV services and supports vulnerable groups [22,24].

As a conclusion late HIV diagnosis remains a critical public health issue that transcends national borders and healthcare systems. The adoption of revised LD definitions may allow more precise monitoring and a better focus on avoidable delays in diagnosis. Despite some regional progress, LD rates remain stubbornly high especially among older male adults, vulnerable populations and during periods of health system disruption. Reducing LD is essential not only for individual patient outcomes, but also for achieving global HIV control targets, including the UNAIDS 95-95-95 goals. Achieving progress in HIV control will require sustained investment in diverse and accessible testing, integration of HIV services with general healthcare, persistent efforts to reduce stigma and resilient health systems, all adapted to local needs.

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