

# Modelling Report: EU27 Status Towards 2030 HIV Transmission Elimination, 2026 report

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# Updates since the 2025 report

This report updates the analysis presented in the ‘Modelling Report: EU27 Status Towards HIV Transmission Elimination’ published in September 2025 (1). Following the publication of the previous report, new European Centre for Disease Prevention and Control (ECDC) data became available (published November 2025), which showed that, for the first time since 2019, trajectories for new diagnoses began to decrease, reversing the recent trendlines (2). Many countries also reported categorical improvements in the percentage of people living with HIV who are diagnosed (our indicator for risk profiles).

We conducted updated analyses using the new data and generated updated predictions for new infections. Our new projections are lower than previously estimated. The core model structure and methods remain unchanged, and differences in results reflect countries’ reporting improvements and progress towards the Joint United Nations Programme on HIV/AIDS (UNAIDS) goals across the HIV continuum of care.

# Executive Summary

*Despite ongoing efforts to achieve the Sustainable Development Goal (SDG) 3.3 for HIV, approximately 25,000 new HIV diagnoses occur each year in the European Union / European Economic Area (EU/EEA) (2,3).*

On average, approximately half of these diagnoses are considered late stage (CD4 count < 350) (2). Delayed diagnosis is associated with worse health outcomes, increased risk of mortality and increased risk of onward transmission (4).

We used an HIV transmission model to estimate the number of new HIV infections within the EU27 countries, from 2025 through 2030, if current intervention levels stay the same. We also estimate the short- and long-term economic consequences of these new infections. Model results indicate that 242,000 (197,000 to 435,000) new infections are expected to occur by 2030 within the EU27. By 2030, approximately 44% (37% to 49%) of these new infections will be diagnosed, while the remaining infections will be diagnosed later.

The associated HIV care costs for all people living with HIV across the EU27 between 2025 and 2030 are predicted to be €48.8 billion to €78.7 billion between 2025 and 2030. The lifetime costs of 242,000 new infections acquired between 2025 through 2030 are estimated at €49.8 billion to €153.0 billion.

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*Our findings suggest that the EU27 is not on track to achieve the SDG 3.3 for HIV by 2030 without further investment in proactive interventions.*

HIV remains an important cross-border health issue across the EU27 and beyond. A coordinated EU27-level approach with reaffirmed political commitment and sustained, strategic financing is needed to achieve transmission elimination across the region.

# Highlights

## EU27 status towards HIV transmission elimination & future costs

### New infections acquired by 2030



Currently, there are

**~25,000**

new diagnoses of HIV in Europe each year <sup>(2)</sup>.



Around

**50%**

of individuals with HIV in Europe are diagnosed late (CD4count < 350), years after infection <sup>(5)</sup>.

Our modelling predicts between 2025–2030, there will be

**242,000**

new infections across the EU27, in the absence of increased intervention.



By 2030,

**107,000**

of these new infections will be diagnosed with the majority of the remaining cases to be diagnosed post–2030.

Our findings suggest that, without additional interventions, the **EU27 will not meet the SDG 3.3 target of a 95% reduction in HIV infections** from 2010 levels by 2030, as incidence is projected to rise from 2025–2030, rather than fall.

### Costs in the absence of further intervention



The immediate (2025 – 2030) health care costs for all people living with HIV across the EU27 is

**€48,8 - €78,7 billion\***

including existing and new diagnoses.



The estimated lifetime healthcare costs of these new HIV transmissions are

**€49,8- €153,0 billion\***

including the treatment and management costs over the long term.

### Future actions: Looking towards prevention



The estimated rise in new infections and subsequent healthcare costs requires proactive interventions, placing prevention at the centre of HIV response strategies.



A regional, EU–approach, combined with country–specific strategies are essential for reducing the burden of new infections and will avert significant HIV related health care costs beyond the political time horizon of the 2030 goal.

\*billion = 1,000,000,000

**Abbreviations:** EU= European Union; HIV= Human Immunodeficiency Viruses; SDG= Sustainable Development Goals

# 1. Background

*The European Centre for Disease Prevention and Control (ECDC) reports that there are an estimated 792,000 individuals living with HIV in 2024 in the European Union / European Economic Area (EU/EEA)(5)<sup>1</sup>. The countries of the EU have committed to achieving the global UNAIDS targets and the United Nations' Sustainable Development Goal (SDG) 3.3 (3,6–8).*

These goals aim to significantly reduce new infections, expand access to prevention tools such as pre-exposure prophylaxis (PrEP) and ensure equitable access to testing and care, particularly in key populations. Many countries aim to achieve HIV transmission elimination by 2030, often defined by a 95% reduction in transmissions since 2010 (9). This goal is supported by the countries' commitment to HIV as a political priority since the 2004 Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia (10).

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*Despite recent efforts, there has only been a 35% reduction in new HIV diagnoses since 2010 in the EU/EEA (3) and, each year, approximately 25,000 new HIV diagnoses continue to be reported (2).*

Additionally, the uptake of HIV prevention interventions remains low across the region. Around 50% of individuals are still diagnosed late (CD4 count < 350), often years after acquiring HIV (5). Without new interventions and increased investment, most countries are unlikely to achieve the SDG 3.3 (3,6–8). Furthermore, recent reductions in global funding could challenge the existing progress toward HIV transmission elimination across Europe (11).

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<sup>1</sup> While contextual surveillance data is drawn from the EU/EEA as reported by the ECDC, our model estimates are for the EU27 countries.

## 2. Introduction

*Our research assesses the progress toward the HIV transmission elimination goals based on the current intervention levels and the status of the Joint United Nations Programme on HIV/AIDS (UNAIDS) targets across the 27 European Union countries (EU27).*

In this study, we estimate the total number of new HIV infections, both diagnosed and undiagnosed, that would happen between 2025 and 2030 if interventions continue at current levels. We also quantify the potential short- and long-term economic consequences in the absence of increased intervention efforts.

## 3. Methods

### 3.1. Transmission model adaptation

We adapted a previously published HIV transmission model by Massey *et al.*, 2023 (12) to estimate the future trajectory of new transmissions.

The model took 2024 as the baseline year and was run through 2030, producing new transmission estimates for 2025 to 2030 (6-year period), based on the scenario where intervention levels remain at current levels. The model incorporates country-level data on HIV incidence, diagnosis rates, treatment coverage, and prevention interventions (PrEP uptake, HIV testing, timeliness of diagnosis, timeliness of treatment initiation, and viral load suppression). The most recently available data were sourced to represent the best estimates for these inputs, and capture all updates provided within the November 2025 publication from the ECDC (5). Massey *et al.*, 2023, the previously published model, focused on men who have sex with men (MSM), however, the structure and design of the model are not MSM-specific, and in this analysis, the model has been populated with data for the general population, aged 15–64 years. Changes to the population due to migration were excluded, given the large geographic region the EU27 represents, the lack of data to make appropriate adjustments and uncertainties regarding future trends.

### 3.2. Modelling the number of new infections

We quantified the predicted number of new infections in the EU27 countries in five steps: (1) defining the risk profiles, (2) adapting the model for each risk profile, (3) running the model and aggregating results, (4) conducting uncertainty analyses, and (5) validating the results.

#### Step 1: Defining risk profiles

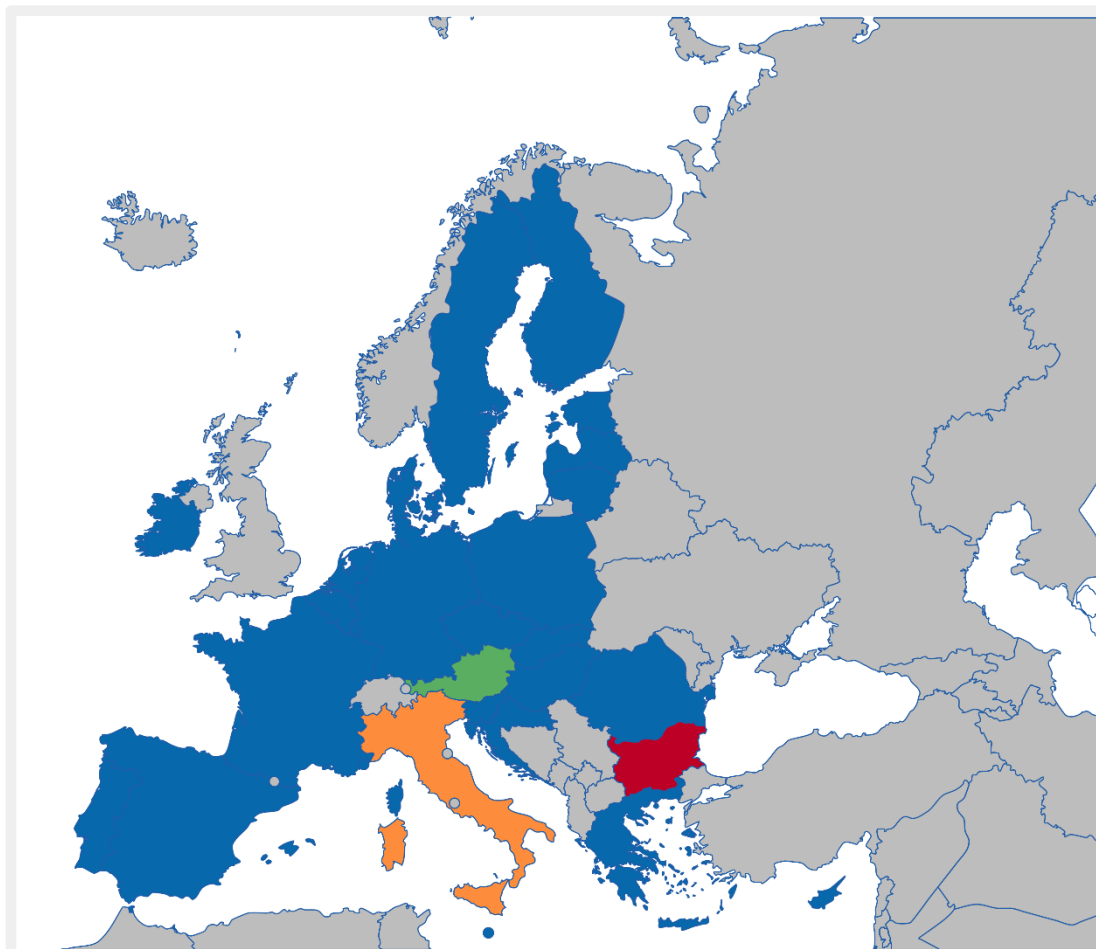
To provide a comprehensive overview of progress toward HIV transmission elimination goals across the EU27, while accounting for geographical and epidemiological variations among countries, we adopted a pragmatic, data-driven approach. We established three country archetypes (low, medium and high risk) based on access to and engagement in interventions. Each of the

EU27 countries was categorised into one of these archetype risk profiles (Appendix Table 1).

Multiple factors contribute to the risk of transmission of HIV. As this analysis focuses on the impact of engagement in prevention interventions, we based the categorisation on performance against the first UNAIDS target: the percentage of people living with HIV who were diagnosed within each country (Annex 1e, ECDC report 2025) (5). This statistic is robustly reported and serves as a likely proxy for other levels of engagement in the continuum of care and preventative services.

Based on this framework, we selected countries to represent each archetype (Austria: low risk, Italy: medium risk, Bulgaria: high risk; Figure 1). The selection was informed by data completeness, population size, and expert opinion regarding the representativeness of each risk profile.

**Figure 1:** Geographic region modelled (blue), with countries representing each archetype in green (low risk), orange (medium risk), and red (high risk)



## **Step 2: Adapting the model for each archetype**

We adapted and calibrated the model for each archetype by using national surveillance data and other publicly available sources (Appendix, Table 1) to populate the *current intervention status* for the country chosen for that archetype. This included data on HIV prevalence, diagnosis, screening and treatment parameters. To account for heterogeneity and geographic diversity across all countries and enable meaningful generalisations, we used parameters related to *population-level* characteristics, such as life expectancy in the HIV-negative population (Appendix Table 3) from Italy across the three archetypes to represent European-wide averages. These population-level inputs have minimal impact on the outcome. Additionally, parameters associated with the impact of antiretroviral therapy (ART) (e.g., ART effectiveness) and the natural history of HIV were kept as is in Massey *et al.* 2023 as these were not seen to vary by country (12).

## **Step 3: Running the model and aggregating baseline results**

After creating model adaptations for each archetype, we ran the three models to generate the baseline number of new infections (both diagnosed and undiagnosed) projected to occur from 2025 through 2030. The results were scaled up to the EU27-level based on the total adult population (ages 15–64) in each archetype (Appendix Table 3).

## **Step 4: Adding lower and upper bounds around the estimate**

For model inputs with the largest impact on new infections (annual testing rates, baseline transmission rate, percentage on treatment and percentage with viral load suppression), we identified a range of values to capture uncertainty around each input. For the percentage on treatment and with viral load suppression, the range was informed by the ECDC-reported values for the other countries within each archetype to capture heterogeneity in intervention levels.

We ran two scenarios to estimate the lower and upper bounds for new infections:

- **Lower bound** (“Optimistic” scenario): Assumes lower transmission rates, higher testing levels, more individuals on treatment and more with viral load suppression.
- **Upper bound** (“Pessimistic” scenario): Assumes higher transmission rates, lower testing levels, fewer on treatment and fewer with viral load suppression.

## Step 5: Results validation

To validate the results, baseline (2024) modelled results and projected trendlines for the number of new infections were compared to recent trends in surveillance data, including the ECDC 2025 report, and baseline transmission rates were calibrated to match UNAIDS estimates for new infections (2,13).

## 3.3. Calculating costs

Costs were estimated using base case new infections for both *lifetime costs for new infections* acquired from 2025 through 2030 and the *immediate costs associated with HIV care for all people living with HIV* in the EU27 from 2025 through 2030. These are two different indicators, with some people represented in both, and hence are not mutually exclusive. Low and high values were estimated to account for the heterogeneity and uncertainty in the standard of care and associated costs across the EU27 countries, and were calculated using the baseline number of predicted new infections.

### 3.3.1 Lifetime costs of new infections acquired between 2025 and 2030

We calculated the lower bound of lifetime ART costs for new infections acquired between 2025 and 2030 by multiplying each additional infection by the estimated lifetime ART cost (Appendix Table 4). The lifetime ART cost was calculated using the median annual cost of ART per person across the EU27 countries (14), adjusted to 2025 values using standard inflation rates (15). Although the ECDC-reported annual ART costs reflect

the inclusion of generics at the time of publication, we assume the use of generics will continue to rise, resulting in lower medication costs for countries over time. Therefore, for the lower bound estimates, we applied a 2% annual reduction in ART costs over the lifetime horizon to reflect the increasing use of generics. The 2% annual cost reduction was determined based on evidence from studies that assessed the impact of generics on costs over time in European countries where generics have been widely adopted (16,17).

We assumed an average lifetime ART duration of 32.5 years. This was based on data from Italy (14), taking the difference between the mean age at diagnosis and life expectancy among people living with HIV who are on ART (18,19). Costs associated with additional aspects of HIV care, such as background disease management costs and those related to opportunistic infections or other sequelae, were excluded in the lower bound estimate.

To calculate the upper bound of lifetime HIV costs, we added an estimate for all direct medical costs to the ART costs over the lifetime. This estimate was based on a comparison between the maximum bound of healthcare costs published in a report by Radu *et al*, 2025 (20), and ECDC-reported ART costs (14) across six EU countries: France, Germany, Italy, Spain, Ireland and Poland. The healthcare costs include hospitalisation, diagnostic tests, primary care and outpatient consultations, in addition to the ART costs (21).

The analysis indicated that within the EU27, ART medication costs may represent only ~62% of all direct healthcare costs for people living with HIV. We used this proportion to adjust the annual cost to include all direct healthcare costs. This adjusted figure was then used to calculate the lifetime total direct medical costs for new infections.

### **3.3.2 Immediate (2025 – 2030) cost of treating all people living with HIV**

The immediate short-term (2025–2030) costs for all people living with HIV were also estimated.

First, we estimated the lower bound of costs (ART only) for *new diagnoses* across the EU27 by calculating the total number of person-years on ART for individuals who will acquire HIV in 2025–2030. This was done by

running the model to estimate the number of *new diagnoses* for each year from 2025 through 2030. We then adjusted for the proportion of patients who are engaged in care and receiving ART (5), excluding those diagnosed but not receiving care. We then multiplied this estimate of the person-years of individuals on ART by the annual ART cost (as previously defined).

Second, we added to this the ART costs for people living with HIV *who were already diagnosed before 2025* and would receive care from 2025 through 2030. This was based on published data for the total number of diagnosed people living with HIV, adjusted for both diagnosis rates and treatment engagement, using available ECDC data (22). The resulting estimate of individuals on ART was multiplied by the annual ART cost.

For the upper-bound estimate of short-term costs for all people living with HIV, we added the direct medical costs associated with all HIV treatment and management for those engaged in care, as previously determined. All short-term costs exclude medical expenses for those undiagnosed or unengaged in care.

Notably, all cost estimates excluded the broader costs to society, such as lost productivity or carer costs.

## 4. Results

### 4.1. New infections and diagnoses

The model results indicate that if current HIV intervention levels remain unchanged, 242,000 new infections (estimated range 197,000 to 435,000, inclusive of diagnosed and undiagnosed) are projected to occur across the EU27 between 2025 and 2030. The high upper bound reflects the uncertainty in the high-risk group with a wider range of input values assessed.

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*Our model predicts that the zero-transmission goal will not be met by 2030 under current intervention levels, with incidence expected to increase each year by an average of 1.6% between 2025 and 2030.*

Based on current screening rates within each risk profile, our model predicts that by 2030, only 107,000 (44%, estimated range 37% to 49%) of these newly acquired infections will be diagnosed. The remaining new infections are likely to be diagnosed beyond this time horizon, in accordance with countries' current rates of diagnosis among people living with HIV and percentage diagnosed late (i.e., CD4 count <350).

### 4.2. Costs

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*The lifetime costs to the EU27 healthcare systems of treating 242,000 people who will acquire a new HIV infection by 2030 are estimated to be €49.8 billion to €153.0 billion.*

Focusing on the short-term period from 2025 through 2030, we estimated that the costs for HIV treatment and management for those who are linked to care and receiving treatment, including existing and newly diagnosed patients, will be between €48.8 billion and €78.7 billion. This estimate excludes the medical costs for individuals who are either undiagnosed or diagnosed but not engaged in care.

## 5. Discussion

### 5.1. New infections and diagnoses

This work represents a pragmatic and timely analysis aimed at generating broad, EU-level estimates of HIV transmission and evaluating whether the SDG 3.3 can be achieved by 2030.

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*Our findings suggest the EU27 is not on track to reach the HIV transmission elimination goal by 2030 under current intervention levels, and approximately 242,000 new infections are predicted to occur between the start of 2025 through 2030 (6-year period).*

The number of predicted infections is lower than our previous estimate, which was based on 2023 data (1). In 2021, many countries began experiencing sustained upward trends in new diagnoses, and 2024 was the first year the trend began to flatten (2). While some of these increased diagnoses were attributable to delays in diagnosis due to the COVID-19 pandemic and care access issues, there was also uncertainty about the future trendline, given global funding cuts and permanent pandemic-related disruptions to services. New evidence indicates that, in the past year, trajectories are improving in line with pre-pandemic trends (5).

Our new infections estimate is intended to complement, not replace, the EU-level estimates produced by the ECDC or the country-level estimates produced by individual countries, as we model the scenario where intervention levels remain constant at 2024 levels, which our model indicates is not sufficient to alter the new infection trajectory to a downward trend.

We predict 107,000 (44%) of the new infections acquired between 2025 and 2030 in the EU27 will be diagnosed by 2030, with the remainder being diagnosed after 2030. It is important to note that this number is not directly comparable to new diagnoses reported by the ECDC (5). The reported number of ~25,000 new diagnoses in 2024 in the EU/EEA region from the ECDC report includes infections acquired in 2024 *and* in previous years that had not yet been diagnosed, whilst excluding infections transmitted in 2024 but not yet diagnosed.

## 5.2. Costs

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*HIV treatment and care costs through 2030 for all people living with HIV were projected to be €48.8 billion to €78.7 billion in our model, with lifetime costs for the new infections acquired between 2025 and 2030 estimated between €49.8 billion and €153.0 billion across the EU27.*

Our cost estimates likely underestimate the full economic burden of HIV to society, as they only reflect direct medical costs (inclusive of treatment and management costs) and do not account for the broader societal or fiscal costs (e.g., social care, productivity loss, disability and transfer payments, etc.).

## 5.3. Strengths and limitations

Modelling allows us to account for the delay between infection and diagnosis by estimating the total number of new infections, including those not yet diagnosed and identified through surveillance. Delayed detection can restrict the interpretation of surveillance data for new infection projections, with around 50% of diagnoses reported late (2). Our approach also allows us to apply consistent methods and assumptions across all countries, despite incomplete HIV surveillance data reporting across the EU27, and our methods create a way to predict new infections without full surveillance data for all countries. To our knowledge, no previous studies have estimated incidence projections for the EU27 region in the existing literature.

Many assumptions had to be made to generate results, as is typically necessary with models. A significant generalising assumption is that the HIV transmission rates and levels of prevention interventions will be similar across countries within the same risk profile. Some parameters were also generalised from our 'medium' risk profile, however, these parameters have minimal impact on the outcomes. Our uncertainty analyses address data gaps and reporting delays around inputs as well as heterogeneity within the three archetypes, and the ranges used were informed by the ECDC-reported

values for the other countries within each archetype (5). Additionally, our estimates are generated for the general population (rather than specific sub-populations), as that is the level at which high-quality data are available, and results can be generalised around the region. We recognise, however, that there are wide disparities across population groups, and that interventions are most effective when focused within key populations.

Despite the assumptions made in our model, the research offers several methodological strengths that highlight its robustness and relevance. First, we used a well-established HIV transmission model (12), which was informed by and updated with the most recent epidemiological and surveillance data, including that from the ECDC (2,5). This approach enhances transparency and replicability. Second, we calculated EU-level outcomes by subdividing the region into risk profiles based on progress towards UNAIDS goals and aggregating the results according to the adult population size within each risk profile. This provides a more accurate approximation of HIV transmission compared to generalising across the entire region. Finally, the projections for the number of new diagnoses aligned with national surveillance data, supporting the external validity of our estimates.

## 6. Conclusions

*Our findings suggest that the EU27 will not achieve the SDG 3.3 targets by 2030, and new infections are projected to increase without further levels of intervention.*

The estimated rise in the number of new HIV infections and subsequent healthcare costs underscores the urgent need for proactive measures, such as prevention and public health initiatives, to end the HIV epidemic. While treatment remains crucial in reducing the impact of HIV on both individuals and the healthcare system, many individuals in Europe are experiencing HIV-related health complications and associated costs over their lifetime (23,24).

We use a pragmatic approach to generate an aggregate estimate to inform policy at the EU27-level, and provide an indicator for progress on implementing the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia, which emphasised HIV as a political priority (10).

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*HIV remains an important cross-border health issue across the EU27 and beyond, and a coordinated EU27-level approach with reaffirmed political commitment and sustained, strategic financing is needed to achieve transmission elimination across the region.*

While EU27-level investment is needed, tailored country-specific strategies, from a treatment-focused approach to prevention, are essential given the heterogeneity across the region. The individual countries are best equipped to determine which prevention interventions are most suitable, attainable and effective for their population. Future work should focus on a more granular analysis of specific sub-populations and targeted interventions that could most effectively reduce HIV transmission and help achieve national and international public health goals.

Our work also highlighted gaps and inconsistencies in HIV surveillance data across the EU27. Strengthened and more consistent HIV surveillance and monitoring systems across countries will be essential to support evidence-based decision-making, enable better targeting of interventions and monitoring of progress toward the 2030 goals.

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*Investing in prevention now will provide long-term benefits, beyond the political time horizon of the 2030 goal, through a significant reduction of future transmissions, improved early diagnosis, and decreased health and economic burden of HIV on individuals, the healthcare system and society as a whole (25).*

## 7. Statements

### **Ethics Approvals**

Ethics approval was not required for this study since it did not include primary data collection. All data used were already published or available on request.

### **Funding Statement & Acknowledgements**

This work was commissioned and funded by Gilead Sciences. The work was carried out independently by Aquarius Population Health. We thank the experts who provided feedback on the report and figures, including the European AIDS Clinical Society (EACS) 2025 attendees.

## 8. Appendices

### Appendix Table 1:

Categorisation of EU27 countries based on percentage diagnosed within the country (as an indicator for access to HIV prevention interventions)

High risk <sup>1</sup>	Medium risk <sup>2</sup>	Low risk <sup>3</sup>
Bulgaria*	Belgium	Austria*
Croatia	Estonia	Cyprus
Czechia	Finland	Denmark
Lithuania	France	Latvia
Malta	Germany	Luxembourg
Poland	Greece	Sweden
Romania	Hungary <sup>†</sup>	
Slovakia	Ireland	
Slovenia	Italy*	
	Netherlands	
	Portugal	
	Spain	

\*Countries serving as a representative of the profile.

<sup>†</sup>As the indicator (percentage diagnosed), as well as data for the other 95–95–95 targets, was not available for Hungary, we based its categorisation on the percentage diagnosed for Central Europe as a whole, which is lower than the percentage for Western Europe and higher than that of Eastern Europe (5).

<sup>1</sup> Represents 20% of the EU27 population, with the highest incidence and/or <90% of people living with HIV diagnosed

<sup>2</sup> Represents 74% of the EU27 population, with medium incidence and/or ≥90% to <95% people living with HIV diagnosed

<sup>3</sup> Represents 6% of the EU27 population, with lower incidence and/or ≥95% of people living with HIV diagnosed

## Appendix Table 2:

Model epidemiology inputs (HIV prevalence, prevention, screening, diagnosis and treatment): Austria, Italy and Bulgaria

Parameter	Mean (LB, UB) <sup>1</sup>	Archetype Country	Source
<b>HIV prevalence</b>			
Total HIV infected population	0.11%	Austria	ECDC, Continuum of Care report, 2024 (5)
	0.33%	Italy	
	0.08%	Bulgaria	
Total HIV uninfected population	99.9%	Austria	
	99.8%	Italy	
	99.9%	Bulgaria	
Number of existing people living with HIV (pre-2025)	7,741	Austria	
	146,880	Italy	
	3,988	Bulgaria	
<b>HIV prevention</b>			
Uninfected patients using PrEP	0.03% <sup>2</sup>	All	Nozza <i>et al.</i> , 2024 (26)
Uninfected patients not using PrEP	99.97%	All	Calculated
Uninfected patients newly adopting PrEP annually	0.002%	All	Author's calculations based on data on PrEP utilisation among UK heterosexuals (12)
Uninfected patients discontinuing PrEP	1.48% <sup>2</sup>	All	Coyer <i>et al.</i> , 2020 (27)
Relative reduction in incidence for individuals on PrEP	80%	All	Nichols <i>et al.</i> , 2016 (28)

Parameter	Mean (LB, UB) <sup>1</sup>	Archetype Country	Source
<b>HIV screening</b>			
Annual testing probability (CD4 count > 200)	6.0% (4.5%, 7.5%)	Austria	HIV in Austria summary report, 2024 (29), varied by $\pm 1.5$ percentage points from baseline
	4.34% (3.91%, 4.77%)	Italy	Background screening rate in Monforte <i>et al</i> , 2025 (4), derived from (30), with the assumption of increased indicator-based testing for people living with HIV, varied by $\pm 10\%$ of baseline
	6.96% (6.26%, 7.65%)	Bulgaria	Clinica.bg, Prevention, 2022 (31), varied by $\pm 10\%$ of baseline
Annual testing probability (CD4 count < 200)	100% (90%, 100%)	Austria	Assumption based on Massey <i>et al</i> , 2023 (12), varied by 10% of baseline, with an upper limit of 100%
	84% (75.6%, 92.4%)	Italy	ECDC, Continuum of HIV Care report, 2023 (22), varied by $\pm 10\%$ of baseline
	84% (75.6%, 92.4%)	Bulgaria	ECDC, Continuum of HIV Care report, 2023 (22), varied by $\pm 10\%$ of baseline
<b>HIV diagnoses</b>			
Proportion infected and undiagnosed	3%	Austria	ECDC, Continuum of HIV Care report, 2024 (5)
	5%	Italy	
	13%	Bulgaria	
Probability of diagnosis within 3 months of infection	26%	All	Massey <i>et al</i> , 2023 (32)
<b>HIV treatment</b>			
ART infectiousness reduction	100%	All	Assumption
Probability of starting ART within 3 months	98.6%	All	ISS, HIV and AIDS case diagnosis report, 2024 (19)

Parameter	Mean (LB, UB) <sup>1</sup>	Archetype Country	Source
Proportion of diagnosed and on treatment	96% (95%, 97%)	Austria	ECDC, Continuum of HIV Care report, 2024 (5), varied based on risk profiles for countries % of individuals on ART treatment
	94% (91%, 97%)	Italy	
	71% (68%, 86%)	Bulgaria	
Proportion of diagnosed and not on treatment	4%	Austria	Calculated from above
	6%	Italy	
	29%	Bulgaria	
Probability of starting ART within 6 months (>200 CD4 count)	95.2%	All	Massey <i>et al.</i> , 2023 (12)
Probability of starting ART within 6 months (<200 CD4 count)	98%	All	Assumption based on Massey <i>et al.</i> , 2023 (12), Croxford <i>et al.</i> , 2018 (33)
CD4 count at diagnosis:			
CD4>500	22.1%	Austria	ISS, HIV and AIDS case diagnosis report, 2024 (19)
	22.1%	Italy	
	27.5%	Bulgaria	Distribution of late diagnosis (assumed to be CD4<350), Emilova <i>et al.</i> , 2025 (34) weighted based on Polish CD4+ count distributions, medichub, 2018 (35)
500≥CD4≥350	17.9%	Austria	ISS, HIV and AIDS case diagnosis report, 2024 (19)
	17.9%	Italy	
	15.6%	Bulgaria	Distribution of late diagnosis (assumed to be CD4<350), Emilova <i>et al.</i> , 2025 (34) weighted based on Polish CD4+
350>CD4>200	18.6%	Austria	ISS, HIV and AIDS case diagnosis report, 2024 (19)
	18.6%	Italy	
	44.4%	Bulgaria	Distribution of late diagnosis (assumed to be CD4<350), Emilova <i>et al.</i> , 2025 (34) weighted based on

Parameter	Mean (LB, UB) <sup>1</sup>	Archetype Country	Source
			Polish CD4+ count distributions, Pula <i>et al</i> (36)
CD4<200	41.4%	Austria	ISS, HIV and AIDS case diagnosis report, 2024 (19)
	41.4%	Italy	
	12.6%	Bulgaria	Distribution of late diagnosis (assumed to be CD4<350), Emilova <i>et al.</i> , 2025 (34) weighted based on Polish CD4+ count distributions, Pula <i>et al</i> (36)
Proportion virologically suppressed	89% (87%, 94%)	Austria	ECDC, Continuum of HIV Care report, 2024 (5), varied based on risk profiles for countries % of individuals on VLS
	93% (92%, 94%)	Italy	
	95% (82%, 98%)	Bulgaria	

<sup>1</sup>Lower bound assumes lower transmission rates, higher testing levels, more individuals with HIV diagnosed and more with viral load suppression. Upper bound assumes higher transmission rates, lower testing levels, fewer diagnosed and fewer with viral load suppression.

<sup>2</sup>Calculated from the number of individuals in active follow-up

<sup>3</sup>Calculated from 3-year cumulative probability; utilising UK data as no country-specific data available

**Abbreviations:** AIDS: Acquired Immunodeficiency Syndrome; ART: antiretroviral treatment; ECDC: European Centre for Disease Prevention and Control; HIV: human immunodeficiency virus; ISS: Istituto Superiore Di Sanita (Higher Institute of Health); LB: Lower bound; PrEP: Pre-exposure Prophylaxis; STI: sexually transmitted infection; UK: United Kingdom; UB: Upper bound; VLS: viral load suppression

## Appendix Table 3:

Model population inputs: Austria, Italy, and Bulgaria

Parameter	Mean	Archetype Country	Source
Total adult (15 – 64) population	6,026,458	Austria	Eurostat, Population age structure by major groups, 2024 (37)
	37,446,731	Italy	
	4,002,644	Bulgaria	
% of males of total population	49	All	Istat, Resident population, 2025 (38)
Life expectancy	83	All	Istat, Demographic indicator, 2024 (39)
Uninfected starting median age	43 <sup>1</sup>	All	ISS, HIV and AIDS case diagnosis report, 2022 (40)
Infected starting median age	41	All	ISS, HIV and AIDS case diagnosis report, 2024 (19)
Average growth per year	-0.11	All	Istat, Population and household projections, 2024 (41)
Average increase in median age per year	0.11	All	
Average increase in median age per year, infected population	0.58	All	Smit et al., 2015 & Smit et al., 2017 (42,43)

<sup>1</sup>Derived by weighting the mid-point of reported age categories by associated n values

**Abbreviations** AIDS: Acquired Immunodeficiency Syndrome; HIV: human immunodeficiency virus; Istat: Istituto Nazionale di Statistica (National Institute of Statistics); ISS: Istituto Superiore Di Sanita (Higher Institute of Health)

## Appendix Table 4:

Model cost inputs

Parameter	Mean	Source
Annual cost of ART per person (€), base	12,070	ECDC, HIV treatment and care, 2017 (14), inflated to 2025 using the European Union Consumer Price Index, 2025 (15).
Annual total direct medical costs (€), upper bound	19,032	Author's calculation based on the median annual cost of ART (14,15) and the proportion of ART cost relative to the total healthcare costs (20). Author's calculation based on the median annual cost of ART (14,15) and the proportion of ART cost relative to the total healthcare costs (20).
Annual national reduction in ART costs per person, lower bound	2%	Author's calculation based on longitudinal data for France and the Netherlands (16,17).
Expected lifetime treatment duration (in years)	32.5	Author's calculation based on the difference between age at diagnosis ISS, HIV and AIDS case diagnosis report, 2024 (19) and age of death for individuals on treatment from Trickey <i>et al.</i> , 2023 (18).

**Abbreviations** AIDS: Acquired Immunodeficiency Syndrome; ART: antiretroviral treatment; ECDC: European Centre for Disease Prevention and Control; HIV: human immunodeficiency virus; ISS: Istituto Superiore Di Sanita (Higher Institute of Health)

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