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Key Takeaways

- Although antiretroviral therapy (ART) is fully provided by the Brazilian Public Health System, there are significant recurrent costs associated with HIV in the Supplementary Health System (SHS) such as hospitalization, which substantially increase economic burden
- Depending on frequency, comorbidities and coinfections can have a significant impact on the economic burden of HIV
- Given the size of the population living with HIV in Brazil as well as the costs of HIV management, HIV prevention strategies should continue to be prioritized

Introduction

- Globally, in 2022, 39 million people were estimated to be living with HIV, 37.5 million adults and 1.5 million children (aged 0-14 years), while 1.3 million new infections and 630,000 AIDS-related deaths were reported¹
- In Brazil, in 2022, there were approximately 1 million people living with HIV, with a mortality ratio of 2.68²
 - From 2011 to 2022, the population living with HIV more than doubled (from 470,000 in 2011 to 990,000 in 2022)^{2,3}
- In Brazil, there is a lack of economic data regarding living with HIV

Objective

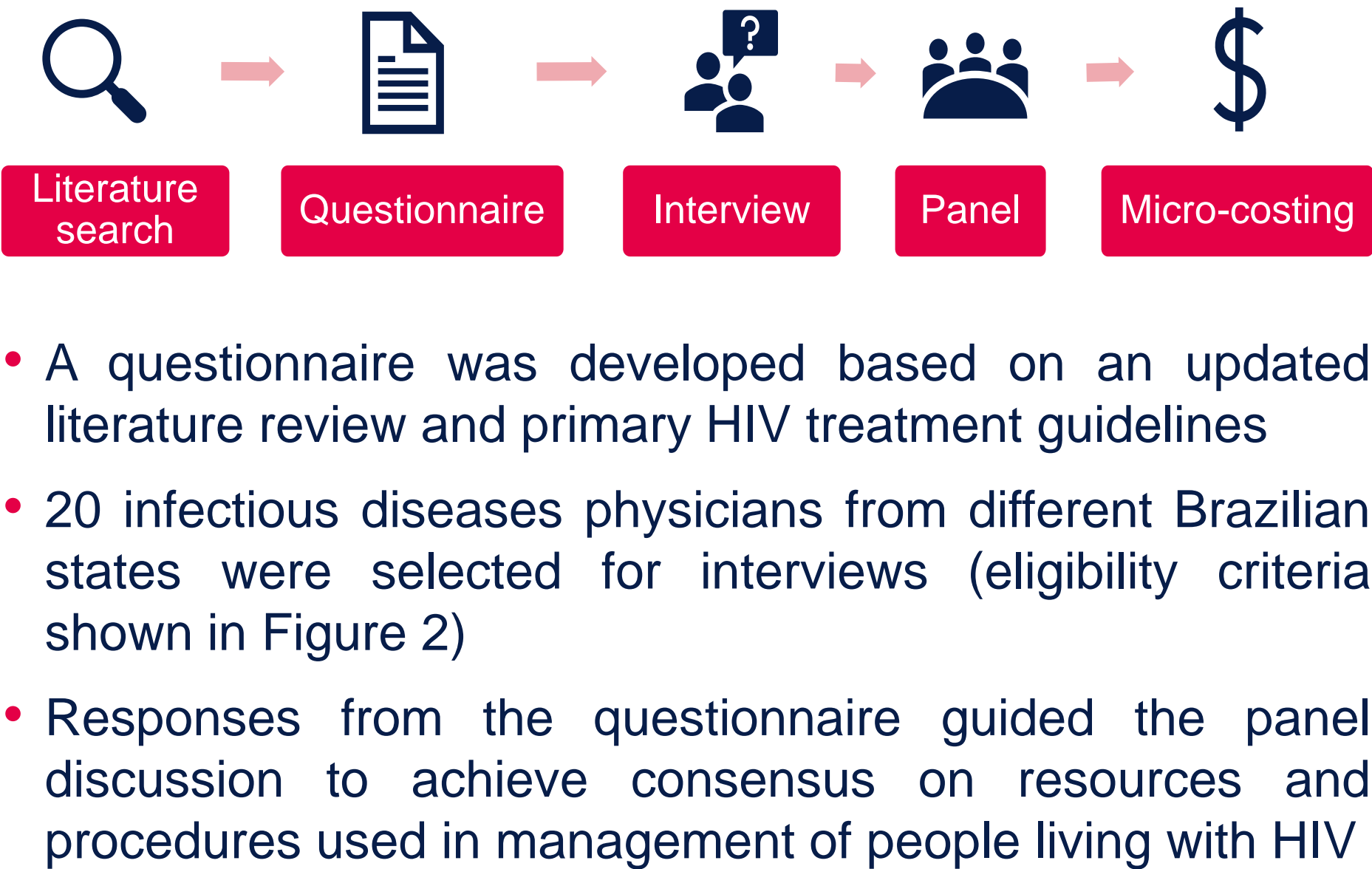
- This study aimed to estimate the cost per person living with HIV in the Brazilian SHS

Methods

Delphi Panel

- To estimate costs related to HIV (including comorbidities, coinfections, and complications), resources and procedures used from diagnosis to treatment were captured using a Delphi panel approach that included 20 infectious diseases physicians (Figure 1)

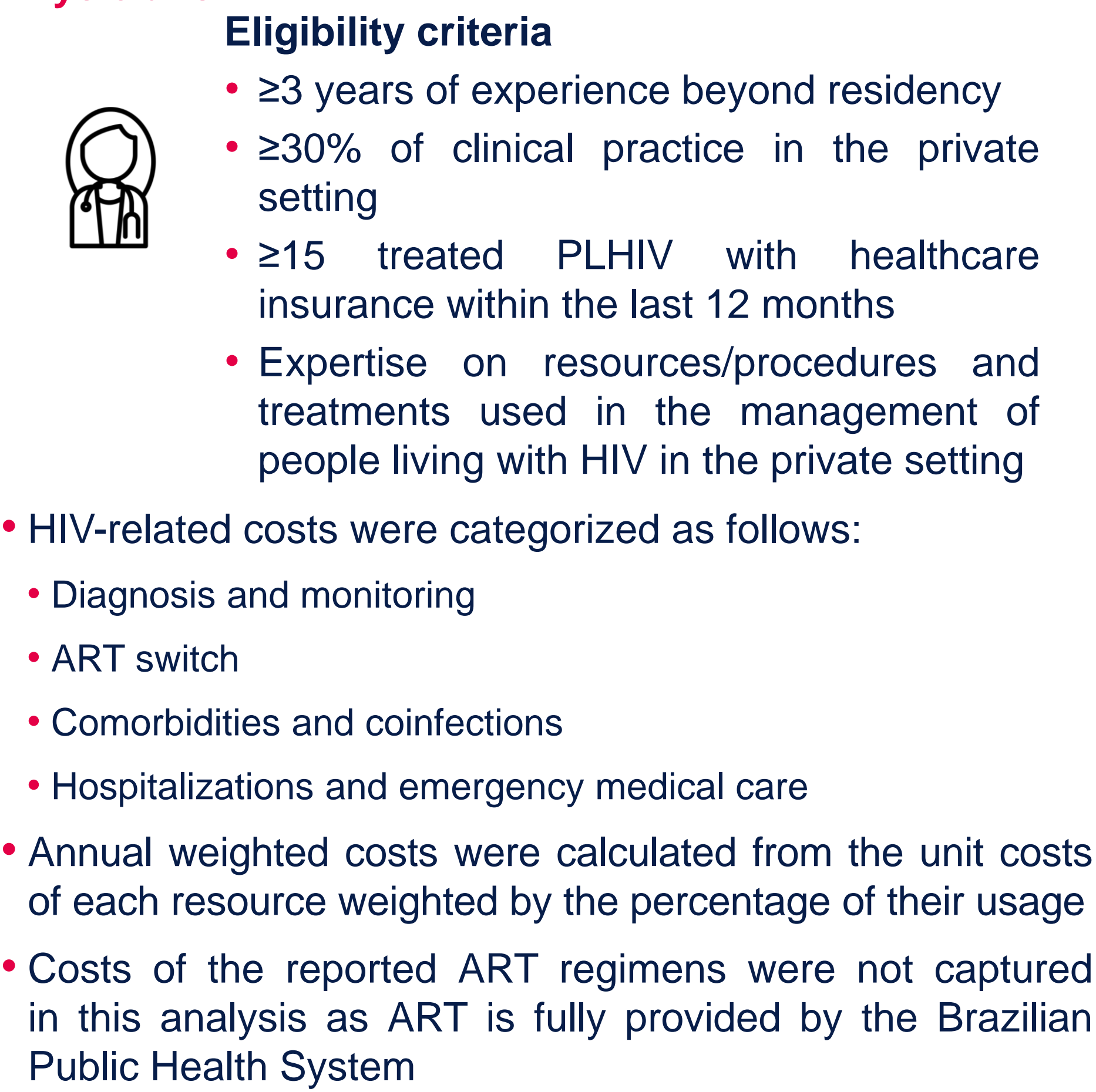
Figure 1. Delphi Panel Methodology



Costs

- For exams, procedures, and hospitalizations, the Brazilian hierarchical classification of medical procedures (CBHPM) and Planserv reference medical procedure list were used as references for costs
- For medication, the Brazilian official list price from CMED (Feb 2023) was used as a reference for costs

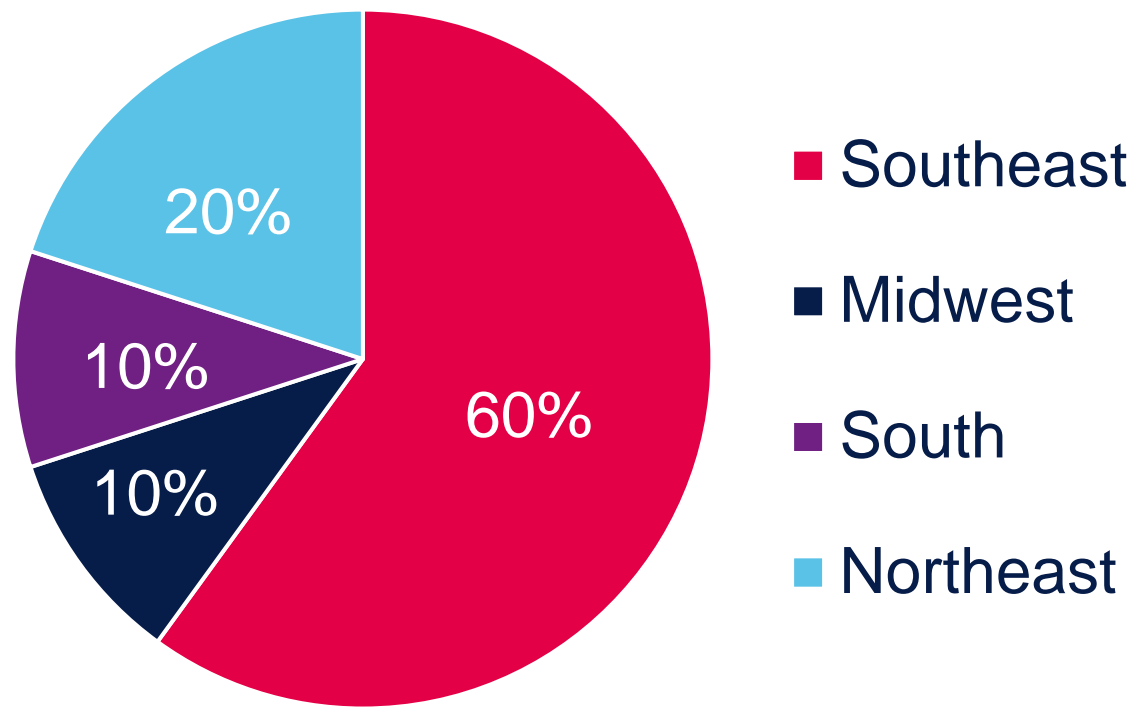
Figure 2. Eligibility Criteria for Infectious Diseases Physicians



Results

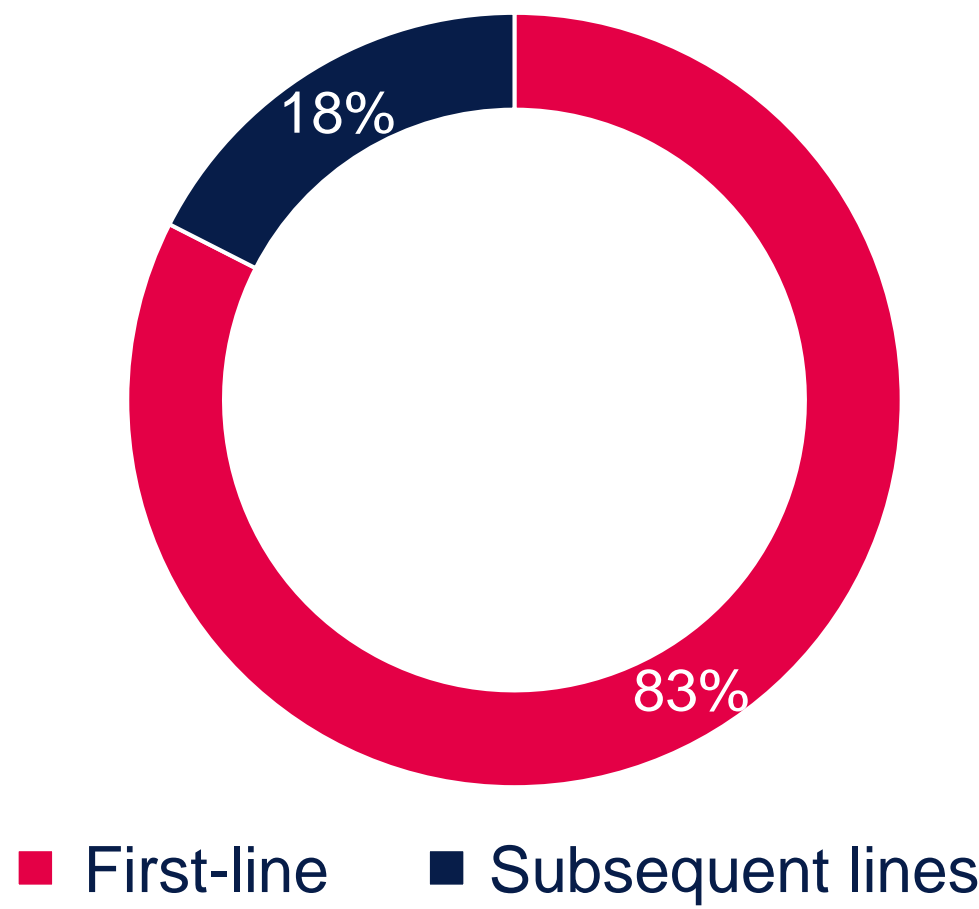
- Participating physicians were distributed across Brazilian regions, with 60% in the southeast (Figure 3)
- The number of treated PLHIV per year reported by physicians varied widely (range, 30 to 2,400), with an average of 423 PLHIV

Figure 3. Distribution of Physicians in Brazilian Regions



- The majority of physicians (15 out of 20) reported that at least 80% of their patients (PLHIV) were currently being treated with first-line (Figure 4)

Figure 4. Distribution of People Living With HIV in First and Subsequent Lines of Treatment



Diagnosis and Monitoring

- Physicians reported that they followed the procedures recommended in the Brazilian National Clinical Protocol and Therapeutic Guideline (PCDT) for HIV treatment, along with other additional procedures in a smaller proportion, according to personal clinical practice
- Diagnosis and monitoring costs were weighted according to frequency of use for each procedure:

Table 1. Average of Diagnosis and Annual Monitoring Costs

Category	Average cost
Diagnosis	BRL 4,932.35
Annual monitoring	BRL 2,889.20

ART Switch

- Physicians reported that the primary reasons for ART switch were related to therapeutic failure and adverse events

Table 2. Average Cost of Clinical Exams for ART Switch

Category	Average cost
ART switch exams	BRL 1,598.95

Comorbidities and Coinfections

- This analysis was restricted to mild comorbidities and coinfections as these are managed by the physicians interviewed and might be underestimated
- Medicine management costs were reported as out of pocket; only exams and medical appointments were included in this analysis, leading to an average weighted cost of BRL 1,830.61 for comorbidities (Table 3) and BRL 984.48 for coinfections (Table 4)

Table 3. Comorbidity Costs

Comorbidities	Annual occurrence in PLHIV (%)	Annual weighted cost
Hypertension	25.30%	R\$ 225.33
Dyslipidemia	18.55%	R\$ 13.65
Diabetes	16.90%	R\$ 8.41
Obesity	13.90%	R\$ 135.27
Depression	9.10%	R\$ 396.25
Osteopenia	5.70%	R\$ 26.73
Chronic kidney failure	4.85%	R\$ 347.37
Anxiety disorder	4.25%	R\$ 677.61
Total	—	R\$ 1,830.61

Table 4. Coinfection Costs

Coinfections	Annual occurrence in PLHIV (%)	Annual weighted cost
Syphilis	12.75%	R\$ 4.27
Hepatitis B	7.60%	R\$ 238.64
Hepatitis C	3.15%	R\$ 74.44
Pneumocystosis ¹	3.00%	R\$ 275.93
Neurotoxoplasmosis	2.65%	R\$ 243.74
Herpes	2.50%	R\$ 2.23
Tuberculosis	2.30%	R\$ 40.54
Urethritis	2.25%	R\$ 206.95
Esophageal candidiasis	1.50%	R\$ 137.96
Neurocryptococcosis	1.00%	R\$ 91.98
Oral candidiasis	0.75%	—
HTLV	0.25%	R\$ 25.28
Pneumonia ²	0.25%	R\$ 2.65
Total	—	R\$ 984.48

1. Cost related to hospitalization procedures.
2. Cost related to outpatient procedures.

HIV Treatment

- The following ART regimens were the most commonly reported by physicians for each therapy line:
 - First-line: tenofovir disoproxil fumarate (TDF) + lamivudine (3TC) + dolutegravir (DTG)
 - Second-line: TDF + 3TC + darunavir/ritonavir (DRV/r)
 - Third-line: DRV/r + DTG + etravirine (ETR)
- The ART therapies listed above are provided by the Brazilian Public Health System, and costs were not estimated in this analysis

Hospitalizations and Emergency Medical Care

- Physicians reported that, on average, only 3% of people living with HIV progress to AIDS in the private setting due to high adherence to ART
- Among people living with AIDS, need for hospitalization was reported for 51% (8%-100%), with ICU for 42% (0%-100%) and emergency department for 7% (1%-15%)
- Length of stay in the ICU was 7 days (0-14) and in the general hospital ward was 10 days (7-14)

Figure 5. Length of Stay in General Hospital Ward and ICU and Corresponding Costs



Conclusions

- The purpose of this study was to identify the primary costs associated with HIV in the private setting; future analyses that consider severity of disease and costs associated with other specialties beyond infectious diseases are encouraged as these aspects were not fully captured in this analysis
- Results presented here suggest that comorbidities and coinfections can have a significant impact on economic burden of PLHIV depending on recurrence and frequency
- Hospitalization can also have a substantial impact, particularly if stays in the ICU are required and if hospitalizations are for AIDS-related illnesses
- Considering the size of the population living with HIV, it is important to continue promoting and emphasizing HIV prevention strategies to reduce both the incidence of HIV and the associated economic burden