Research letter

Infectious Diseases

Regional burden and trends of sexually transmitted infections excluding HIV, 1990–2023: a GBD 2023 analysis

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Sexually transmitted infections (STIs) encompass a diverse group of infections and remain an important public health challenge, contributing to morbidity through complications such as infertility, pelvic inflammatory disease, and susceptibility to other infections [1, 2].

This study used publicly available estimates from the Global Burden of Disease (GBD) 2023 database accessed through the Global Health Data Exchange. Data were obtained from published literature, registries, hospital records, and national surveys, with standardised statistical modelling used where data were incomplete [3]. Five individual STI categories – chlamydial infection, genital herpes, gonococcal infection, syphilis, and trichomoniasis – were analysed [4]. Incidence and disability-adjusted life years (DALYs) were assessed from 1990 to 2023. Estimates were age-standardised per 100,000 population using the GBD reference population [5]. Data were stratified by region and SDI. Temporal trends were assessed using estimated annual percentage change (EAPC) from log-linear models, with 95% confidence intervals used to determine increasing, decreasing, or stable trends [6]. The study used de-identified aggregated data and therefore did not require ethical approval or informed consent. The study followed the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) [7].

Regional comparisons showed substantial heterogeneity in STI burden (Figures 1 A–D). The largest declines in ASDR occurred in Andean Latin America (EAPC –3.18%), Central Sub-Saharan Africa (–3.06%), and Eastern Sub-Saharan Africa (–2.48%), whereas ASDR increased in Southeast Asia (0.35%), the Caribbean (0.27%), and Tropical Latin America (0.27%). Regarding incidence, Oceania showed the fastest increase (EAPC 0.88%), followed by the Caribbean (0.25%) and Tropical Latin America (0.18%). In contrast, incidence declined in Western Sub-Saharan Africa, Australasia, and Eastern Sub-Saharan Africa.

Disease-specific regional trends also varied (Figures 1 C, D). DALY rates increased most notably for chlamydial and gonococcal infections in Tropical Latin America (EAPC 1.23% and 1.88%), respectively, and for gonococcal infection and trichomoniasis in Oceania (1.37% and 0.30%). Additional increases were observed for chlamydial infection in High-income Asia Pacific (0.77%) and Central Latin America (0.45%), genital herpes in South Asia

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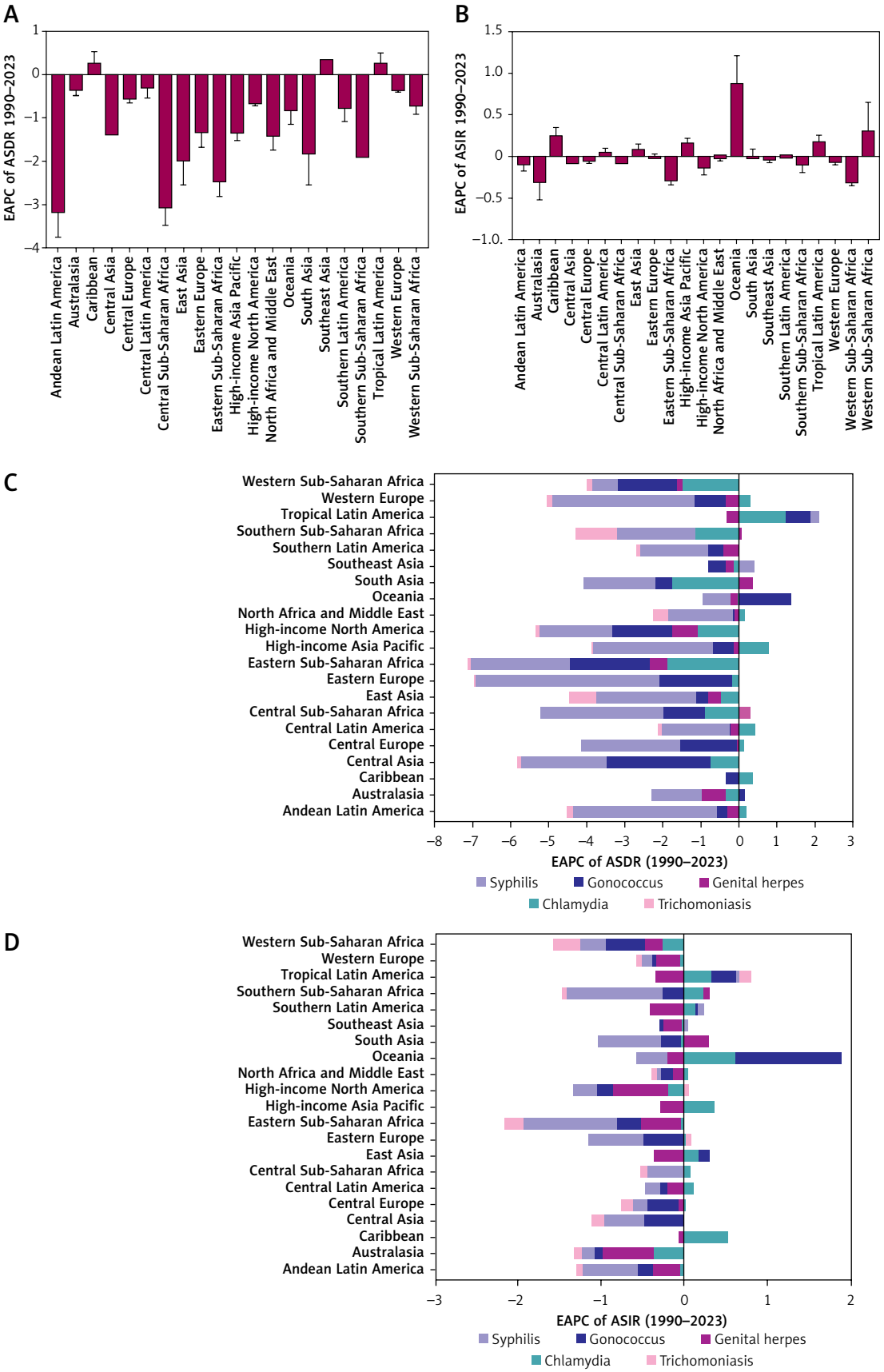

Figure 1. Regional trends in sexually transmitted infections (STIs) excluding HIV across GBD geographical regions from 1990 to 2023. Panels **A** and **B** show the estimated annual percentage change (EAPC) in the age-standardised DALY rate (ASDR) and age-standardised incidence rate (ASIR), respectively, for cumulative STIs excluding HIV. Panels **C** and **D** show the EAPC in ASDR and ASIR, respectively, for individual STI categories across GBD geographical regions

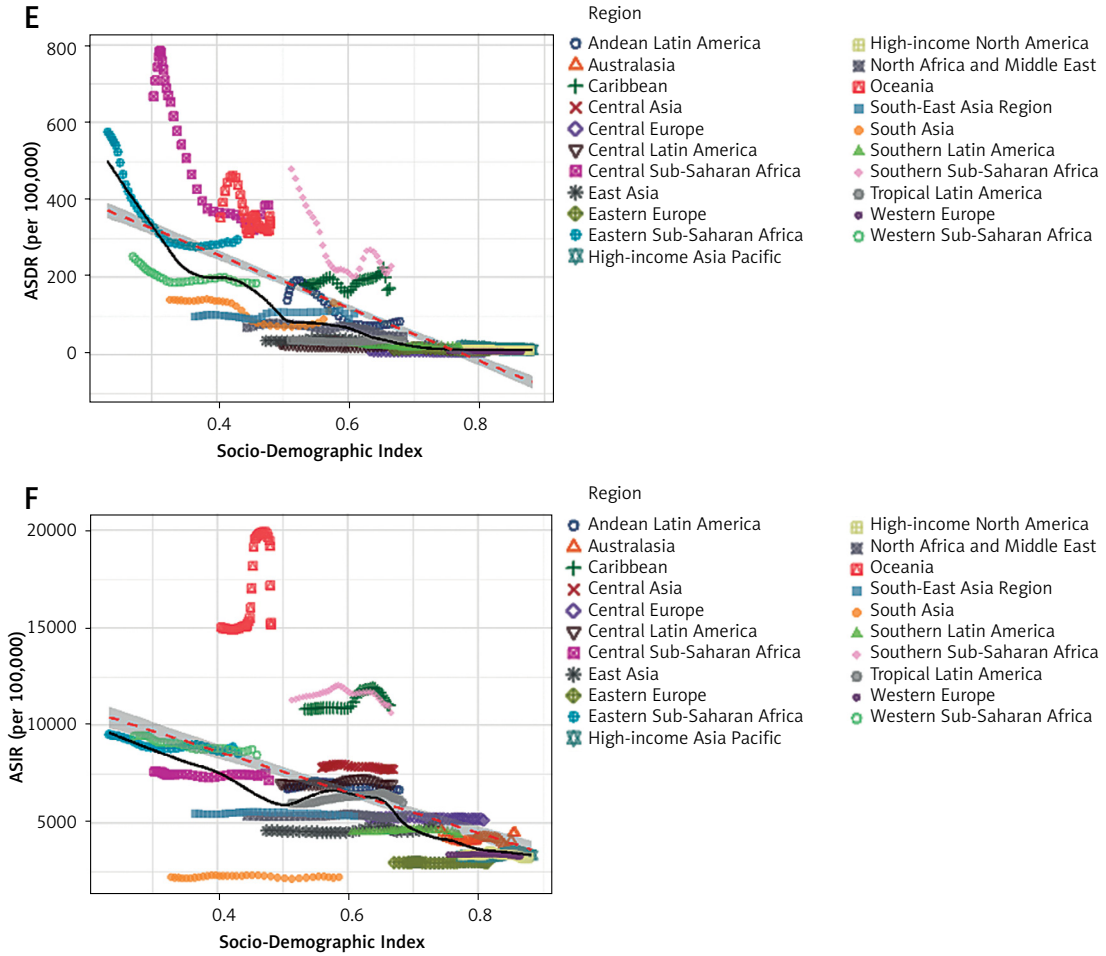

Figure 1. Cont. Panels **E** and **F** show regional ASDR and ASIR, respectively, in relation to the socio-demographic index (SDI) across GBD geographical regions

(0.37%), and syphilis in Southeast Asia (0.41%). Regarding incidence, Oceania showed increases in gonococcal infection (1.89%), chlamydial infection (0.62%), and trichomoniasis (0.37%), while the Caribbean showed an increase in chlamydial infection (0.53%). High-income Asia Pacific showed increasing chlamydial incidence (0.37%), and South Asia showed increases in genital herpes (0.29%) and trichomoniasis (0.19%). Regional ASDR and ASIR values in 2023, together with percentage changes from 1990 to 2023, are summarised in Table I.

Regional ASDR and ASIR generally decreased with increasing SDI, although substantial heterogeneity persisted among regions at comparable SDI levels (Figures 1 E, F). Latin America, Central Sub-Saharan Africa, and Eastern Sub-Saharan Africa experienced the greatest improvements in DALYs, whereas Southeast Asia, the Caribbean, and Tropical Latin America showed increasing burden. Oceania had the greatest increase in incidence, particularly for gonococcal and trichomonas infections, while Australasia and Western Sub-Saharan Africa showed declining incidence. Antimicrobial resistance, particularly in *N. gonorrhoeae* and *M. genitalium*, further complicates treatment and poses a growing public health threat [8–10]. These findings highlight the need for region specific strategies to address screening gaps and improve access to care in high-burden areas. Women of reproductive age remain disproportionately affected, reflecting both biological vulnerability and reproductive consequences such as infertility and pelvic inflammatory disease [1]. Although DALY rates declined in several regions, incidence increased in others, suggesting that reductions in disease-related disability have not been accompanied by uniform reductions in STI occurrence.

This study has several limitations. GBD estimates depend on available data and modelling assumptions and may not adequately capture within-country differences. Underreporting, limited diagnosis and testing, and changes in testing practices may influence temporal trends [11–13]. Finally, HIV was excluded from this analysis, which may underestimate the overall STI burden, particularly in regions where HIV is common.

In conclusion, STI burden showed substantial regional and socioeconomic disparities from 1990

Table I. Regional burden and percentage change in sexually transmitted infections excluding HIV across GBD geographical regions, 1990–2023

GBD geographical regions	DALYs		Incidence	
	ASR, 2023 (95% UI)	PC 1990–2023	ASR, 2023 (95% UI)	PC 1990–2023
Andean Latin America	87.55 (43.98, 152.31)	–38.34 (–48.03, –25.26)	6691.42 (5121.71, 8943.22)	–1.22 (–6.77, 5.38)
Australasia	11.32 (7.03, 18.47)	–17.05 (–25.86, –9.80)	4506.62 (3380.28, 6035.38)	–13.31 (–21.85, –4.97)
Caribbean	172.01 (86.24, 310.41)	–5.38 (–22.48, 16.51)	11035.26 (8603.23, 14035.89)	1.84 (–1.92, 6.37)
Central Asia	22.77 (16.04, 31.24)	–30.84 (–38.38, –21.81)	7755.51 (5716.79, 10607.87)	–1.08 (–6.06, 3.49)
Central Europe	10.13 (6.23, 16.47)	–16.53 (–26.95, –7.97)	5160.40 (3859.73, 6780.05)	–1.91 (–4.62, 0.50)
Central Latin America	27.10 (18.51, 41.57)	–12.95 (–20.43, –6.15)	6999.47 (5457.66, 8908.99)	–0.48 (–2.69, 1.68)
Central Sub-Saharan Africa	385.81 (178.02, 688.33)	–42.15 (–54.26, –26.07)	7188.57 (5814.06, 8713.60)	–5.88 (–9.48, –2.14)
East Asia	25.47 (13.51, 41.95)	–31.45 (–43.61, –17.02)	4850.04 (3804.55, 6030.47)	4.91 (2.16, 7.85)
Eastern Europe	12.21 (8.56, 18.83)	–18.02 (–27.92, –7.87)	2999.62 (2371.59, 3799.84)	–0.03 (–1.83, 2.18)
Eastern Sub-Saharan Africa	298.54 (147.58, 526.34)	–48.06 (–58.40, –37.95)	8564.82 (6913.84, 10510.31)	–10.34 (–12.61, –8.14)
High-income Asia Pacific	13.91 (9.35, 20.44)	–39.42 (–56.66, –18.92)	3359.84 (2623.83, 4303.99)	1.05 (–2.16, 4.71)
High-income North America	11.57 (6.52, 20.15)	–14.86 (–20.92, –10.44)	3231.99 (2551.99, 4015.04)	–3.20 (–5.00, –1.08)
North Africa and Middle East	48.93 (25.73, 85.05)	–32.04 (–43.19, –19.88)	5256.01 (4000.20, 6868.99)	–2.36 (–4.95, 0.53)
Oceania	337.79 (152.20, 599.16)	–4.91 (–31.64, 31.53)	15173.65 (11786.62, 18634.48)	1.01 (–5.92, 8.12)
South Asia	129.71 (58.06, 242.48)	–9.23 (–26.16, 9.23)	2239.21 (1767.97, 2784.14)	–0.29 (–1.95, 1.35)
Southeast Asia	106.33 (50.37, 193.06)	8.31 (–10.44, 31.31)	5340.49 (4136.59, 6852.08)	–2.54 (–4.43, –0.62)
Southern Latin America	20.05 (14.40, 28.41)	–32.60 (–41.80, –23.24)	4381.08 (3297.35, 5839.86)	–3.09 (–8.53, 3.93)
Southern Sub-Saharan Africa	229.67 (111.36, 409.74)	–52.14 (–60.77, –41.22)	10662.50 (8661.80, 13177.07)	–5.65 (–9.67, –2.18)
Tropical Latin America	37.98 (30.37, 49.96)	–2.36 (–11.51, 7.48)	6061.20 (4781.37, 7628.19)	0.45 (–2.12, 2.85)
Western Europe	8.81 (5.44, 14.16)	–12.55 (–19.86, –5.60)	3304.80 (2520.55, 4435.26)	–2.85 (–5.86, 0.09)
Western Sub-Saharan Africa	184.89 (95.18, 321.38)	–27.17 (–37.14, –15.69)	8504.69 (6784.77, 10427.45)	–10.06 (–11.94, –8.46)

to 2023. Although DALY rates declined in several regions, increasing incidence persisted in others. Continued attention to surveillance, antimicrobial resistance, screening, treatment access, and integration of STI control into reproductive health initiatives is needed to sustain progress and achieve WHO 2030 targets.

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Ethical approval

Not applicable.

Conflict of interest

The authors declare no conflict of interest.

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