

1 **Table 1: Annual incidence estimates for women who engage in sex work (WESW) and area-year-age-matched total population women**

Study ^a	Country	Study period	Study location ^b	Mid-point year	Age group (years) ^c	WESW new HIV infections	Person-years (py)	WESW incidence/100py	Total female population incidence/100 py ^d	IRR ^e
Ali (2020)^e	Zimbabwe	2011-2017	Zimbabwe	2014	15-24	7	105	6.3 (5.3, 7.6)	1.12	5.64
					25-39	6	175	3.3 (1.3, 4.2)	0.92	3.58
Botswana MoH (2013)^f	Botswana	2012	Gaborone, Francistown, Kasane	2012	15-39	46	450	12.5 (7.3, 17.1)	1.65	7.57
Project Ubuzima Braunstein (2011)	Rwanda	2006-2008	Kigali	2007	15-39	3	91	3.3 (0.0, 7.0)	0.47	6.96
Chabata (2021)	Zimbabwe	2017-2019	Chinhoyi	2018	15-24	16	226	7.1 (4.3, 11.5)	0.51	13.83
					Karoi	11	193	5.7 (3.2, 10.3)	0.48	11.96
					Kwekwe	12	278	4.3 (2.5, 7.6)	0.71	6.04
					Zvishavane	9	210	4.3 (2.2, 8.2)	0.68	6.28
Chersich (2014)	Kenya	2006-2007	Mombasa (Kisauni and Chaani)	2007	15-39	10	381	2.6	0.58	4.54
Diabate (2018)	Benin	2008-2012	Cotonou	2010	15-39	6	425	1.4 (0.3, 2.5)	0.28	5.00
Faini (2022)	Tanzania	2018-2019	Dar es Salaam	2019	15-24	12	278	4.3	0.05	89.86
					25-34	5	234	2.1	0.06	36.35
					35-44	4	97	4.1	0.05	88.44
Forbi (2011)	Nigeria	2006	Nasarawa State	2006	15-34	71	590	12.0 (8.5, 15.4)	0.30	39.56

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Fowke (1996)	Kenya	1985-1994	Nairobi	1990	15-39	239	569	42.0	3.01	13.96
Ghys (2001)	Cote d'Ivoire	1994-1998	Abidjan	1996	15-39	11	68	16.3	1.79	9.11
Gilbert (2003)	Senegal	1985-1999	Dakar	1987	15-24	34	1628	2.1	0.01	219.90
			Dakar		25-34	91	5474	1.7	0.02	77.08
			Dakar		35-44	58	1939	3.0	0.01	201.70
			Dakar		45-49	12	260	4.6	0.01	597.00
Jones (2023)^g	Zimbabwe	2010-2019	Zimbabwe	2010	15-39	3	56	5.4 (3.2, 10.9)	1.33	4.04
				2011		6	139	4.3 (2.2, 14.6)	1.25	3.45
				2012		15	264	5.7 (1.9, 22.8)	1.16	4.88
				2013		12	410	2.9 (1.5, 8.1)	1.09	2.69
				2014		33	731	4.5 (2.5, 8.2)	1.01	4.46
				2015		62	1402	4.4 (3.6, 5.4)	0.93	4.78
				2016		58	1857	3.1 (2.5, 4.1)	0.82	3.81
				2017		94	2422	3.9 (3.3, 4.7)	0.71	5.46
				2018		114	2946	3.9 (3.3, 4.7)	0.57	6.75
				2019		44	1432	3.1 (2.1, 5.0)	0.49	6.32
Kasamba (2019)	Uganda	Cohort 1: 2008-2017 Cohort 2: 2013-2017	Kampala	2010	15-39	59	2007	2.9	1.06	2.74
				2014		46	1394	3.3	0.86	3.82
				2016		65	2138	3.0	0.77	3.89

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Kassanje (2022)^f	South Africa	2019	South Africa	2019	15-49	190	4130	4.6 (1.5, 8.5)	1.1	4.18
Kaul (2004)	Kenya	1998-2002	Nairobi	2000	15-39	16	495	3.2	1.2	2.67
Kerrigan (2017)	Tanzania	2015-2017	Mafinga	2002	15-39	10	144	6.9	2.28	3.04
Kilburn (2018)	South Africa	2012-2015	Mpumalanga	2014	15-19	41	1273	3.2	1.85	1.74
Laga (1994)	DRC	1988-1991	Kinshasa	1988	15-39	70	880	11.7	0.32	36.55
Lyons (2020)	Senegal	2015-2017	Dakar, Mbour, Theis	2016	15-39	4	303	1.3 (0.5, 3.5)	0.01	151.2
Malama (2022)	Zambia	2012-2017	Ndola, Lusaka	2015	15-44	24	884	2.7	1.59	1.73
McClelland (2015)^g	Kenya	1993-2017	Mombasa	1993	15-39	20	335	6.0	3.02	1.97
				1994		36	228	15.8	2.72	5.83
				1995		24	213	11.3	2.29	4.92
				1996		29	325	8.9	1.86	4.80
				1997		41	364	11.3	1.56	7.24
				1998		31	271	11.4	1.30	8.78
				1999		24	207	11.6	1.13	10.28
				2000		16	188	8.5	0.99	8.65
				2001		8	216	3.7	0.88	4.22
				2002		19	251	7.6	0.81	9.34
				2003		14	245	5.7	0.73	7.80
				2004		13	263	5.0	0.69	7.22

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				2005		14	271	5.2	0.65	7.98
				2006		8	228	3.5	0.60	5.80
				2007		7	244	2.9	0.58	4.98
				2008		4	211	1.9	0.54	3.51
				2009		9	163	5.5	0.52	10.73
				2010		3	187	1.6	0.48	3.34
				2011		3	283	1.1	0.45	2.37
				2012		2	334	0.6	0.41	1.47
				2013		4	280	1.4	0.37	3.84
				2014		5	225	2.2	0.34	6.57
				2015		5	222	2.3	0.31	7.25
				2016		4	216	1.9	0.27	6.78
				2017		3	237	1.3	0.24	5.27
McKinnon (2015)	Kenya	2008-2011	Nairobi	2010	15-39	34	1514	2.2 (1.6, 3.1)	0.58	3.78
Nagot (2005)	Burkina Faso	1998-2002	Bobo-Dioulasso	2000	15-39	19	594	3.2 (1.9, 4.9)	0.18	17.72
Naicker (2015)	South Africa	2004-2006	Durban	2005	25-49	10	248	4.0 (1.9, 7.4)	1.82	2.22
					15-24	8	59	13.5 (5.8, 26.6)	2.53	5.32
Nouaman (2022)	Cote d'Ivoire	2016-2017	San Pedro	2017	15-39	4	188	3.3	0.08	43.75
			Abidjan			3	293	1.6	0.14	11.08
Price (2012)	Kenya	2008	Kilifi	2007	15-39	9	339	2.7 (1.4, 5.1)	0.36	7.51
			Nairobi			2	527	0.4 (0.1, 1.5)	0.70	0.57
Priddy (2011)	Kenya	2008	Nairobi (Mukuru District)	2008	15-39	5	89	5.6 (1.6, 12.0)	0.66	8.54

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Riedner (2006)	Tanzania	2000-2003	Mbeya Region	2002	15-39	19	99	19.2	1.32	14.56
Roddy (1998)	Cameroon	1994-1996	Yaounde, Douala	1995	15-39	46	698	6.6	0.70	9.40
Thirumurthy (2021)^g	Kenya	2017-2020	Siaya County	2018	15-39	0	939	0.0	0.41	0.00
Van Damme (2002)	South Africa	1996-2000	KwaZulu-Natal	1998	15-39	30	182	16.5	2.96	5.57
	Benin		Cotonou			10	121	8.3	0.77	10.79
	Cote d'Ivoire		Abidjan			5	67	7.4	1.40	5.29
Van der Loeff (2001)	Guinea-Bissau	1989-1998	Guinea-Bissau	1994	15-39	3	126	2.4 (0.7, 7.4)	0.41	5.78
					40-49	7	160	4.4 (2.1, 9.2)	0.22	19.89
					50-59	5	67	7.5 (3.1, 18.0)	0.12	60.77

- 2 a. Referenced study taken as the primary study from which estimates extracted from, or from whom unpublished estimates were received.
- 3 b. Area used to match WESW incidence to total female population incidence estimates to calculate incidence rate ratios (IRR).
- 4 c. Age group used to match WESW incidence to total female population incidence estimates; when no age information was specified a default of 15-39
- 5 years was used.
- 6 d. Incidence matched to WESW estimate by subnational location, midpoint year, and age group.
- 7 e. IRR calculated by dividing study-reported WESW incidence by area-year matched total population female incidence. Total population female incidence
- 8 in 2022 extracted from Naomi, the UNAIDS-supported district-level estimation model,²² and extrapolated parallel to national-level female HIV incidence
- 9 trajectories from UNAIDS Global HIV Estimates 2022, National Spectrum estimates.^{23,24}
- 10 f. Incidence estimate derived from serial cross-sectional prevalence testing with no estimate of person-years or number of new infections. The number of
- 11 person-years was imputed using the median number of person-years across all studies and split proportionally according to the denominator in each
- 12 age group. Imputed person-years values were then multiplied by the study-reported HIV incidence to back-calculated the number of HIV infections.

13 g. Incidence estimate derived from recent infection testing with a mean duration of recent infection of six months. The number of person-years was derived
14 by multiplying the number of tested individuals by 0·5.

15 h. Unpublished WESW incidence and person-years of follow-up obtained through personal communications with study authors.

16 IRR = incidence ratio ratio; WESW = women who engage in sex work; py = person-years; DRC = Democratic Republic of Congo

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Table 2: Study characteristics

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified^a
Ali (2020)¹⁵	Zimbabwe	18-39	Women who self-reported exchanging sex for money in the past 30 days and had been living or working in the survey site for at least 6 months	Cross-sectional respondent-driven sampling surveys conducted between 2011-2017 at sex-work hotspots	Prevalence back calculation, pooling data from RDS surveys. Estimation of HIV incidence from analysis of HIV prevalence patterns	
Braunstein (2011)⁴⁰	Rwanda	Median: 24, Range: 18-46	Women who had exchanged sex for money at least once in the last month and/or currently having sex with multiple partners plus having sex at least twice per week (all enrolled women self-identified as sex workers)	Cohort recruited through community meetings conducted by community mobilisers	Seroconversion at follow-up 6-12 months after baseline survey. Midpoint estimation between last HIV-negative and first-HIV positive test	41,42
Botswana MoH (2013)³⁸	Botswana	18+	Women who received either money or a gift or incentive in exchange for sexual favours within the past three months	Time-location sampling at hotspots for recruitment to cross-sectional IBBS survey	Recent infection testing algorithm. BED incidence assay	
Chabata (2021)⁴³	Zimbabwe	18-24	Young women who had exchanged sex for money and/or material support in the past month , and explicitly stated that sex acts with men would not have happened in the absence of an exchange, and if they were not planning to move from the site within the next 6 months.	Non-randomised plausibility evaluation of DREAMS on HIV incidence. Respondent-driven sampling with seeds selected from sex-work hotspots identified through a community mapping	Seroconversion at follow-up 24 months post-recruitment. Midpoint estimation between an HIV-negative and HIV-positive test.	

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified ^a
Chersich (2014) ⁴⁴	Kenya	16+ Mean: 25.1, SD: 5.2	Women reporting receipt of money in exchange for sex as part of their livelihood in the last 6 months , sexually active in the past 3 months, and not pregnant at the time of enrolment	Cohort recruited in locations with existing community links through long-standing service provision by implementers and peers through snowball sampling	Seroconversion between quarterly follow-ups. Midpoint estimation between an HIV-negative and HIV-positive test	
Diabete (2018) ⁴⁵	Benin	≥ 18	Women attending Dispensaire IST, the main clinic dedicated to WESW in Cotonou	Clinic recruited cohort; all women attending invited to participate	Seroconversion between quarterly follow-ups. Midpoint estimation between an HIV-negative and HIV-positive test.	
Faini (2022) ⁴⁶	Tanzania	18-45	Women self-identifying as sex workers who resided within Dar es Salaam, reported to have exchanged sexual intercourse for money within the past month , considered themselves to be at increased risk for HIV infection and willing to undergo pregnancy testing.	Respondent driven sampling recruited cohort	Seroconversion follow-up visits at 3, 6, 9, and 12 months. Midpoint estimation between an HIV-negative and HIV-positive test	
Forbi (2011) ⁴⁷	Nigeria	18-35	Active WESW living in brothels within Nasarawa state of North Central Nigeria (results show all reported >1 partner/week)	Cross-sectional cohort recruited from brothels	Recent infection testing algorithm. BED assay. Calculation used Hargrove adjustments ¹⁰⁴ and McWalter and Welte's correction. ¹⁰⁵	
Fowke (1996) ⁴⁸	Kenya		WESW of lower socioeconomic status (from a slum area in Nairobi) who practice prostitution from their home	Cohort recruited from an existing community-based cohort established in 1985	Seroconversion between follow-ups every 6 months. Midpoint estimation.	

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified ^a
Ghys (2001) ⁴⁹	Cote d'Ivoire	Median: 27, IQR: 22-32	WESW attending the Clinique de Confiance, a HIV/STD clinic only available for those who are WESW or their stable sex partners.	Intervention study - peer educator recruited for a survey before recruitment of HIV-negative WESW for the study	Seroconversion between follow-ups ever six months. (from: HIV negative to HIV-1 seropositive; HIV-2 seropositive to both HIV-2 and HIV-1 seropositive; HIV-negative to HIV-2 seropositive). Midpoint estimation.	
Gilbert (2003) ⁵⁰	Senegal	Mean: 30.4, Range: 19-56	Registered sex workers (self-identifying SWs were required by government to register and regularly attend a health clinic)	Clinic recruited cohort	Seroconversion between follow-ups every 6 months. Midpoint estimation.	51-53
Jones (2022) ¹⁹	Zimbabwe	Median age at first test 27	Women attending programme clinics - predominantly cis-women who self-identify as selling sex.	Routinely collected clinic data from CeSHHAR Zimbabwe's Key Populations Programme, which encompasses a national sex worker programme including community outreach	Seroconversion between two tests after first attending the programme. Midpoint estimation.	54,55
Kasamba (2019) ⁵⁶	Uganda	18+ (under 18 included if pregnant, had children or provided for their own livelihood)	Women who reported engaging in commercial sex (self-identified WESW or received money, goods, or other favours in exchange for sex) or employed in an entertainment facility. Analysis included only those who reported only source of income at follow-up was sex work alone, or sex work and another job (results excluded for those who did not undertake sex work)	Peer recruited cohort at mapped sex work hotspots	Seroconversion between 3-monthly follow-ups. Random estimation with uniform distribution.	57-61

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified ^a
Kassanje (2022) ¹⁴	South Africa	18+ Median: 32, IQR 27–38	Cisgender women who had sold or transacted in sex in the preceding 6 months and worked in one of the districts that were studied.	Cross-sectional respondent driven sampling survey recruitment at hotspots visited by outreach programmes	Recent infection testing algorithm. Kassanje method for incidence calculation. MDRI 145, FRR 0·50%	
Kaul (2004) ⁶²	Kenya	18+ Mean: 29·1, SD: 7·8	Women who reported having received money or gifts in exchange for sex over the past month	RCT recruited through a series of community visits assisted by peer educators.	Seroconversion between follow-ups every 6 months.	63–68
Kerrigan (2017) ⁶⁹	Tanzania	18+ Mean: 27·8	Women who reported exchanging sex for money in the past month.	RCT recruited through time location sampling at entertainment venues	Seroconversion between baseline and follow-up at 18 months.	
Kilburn (2018) ²⁴	South Africa	Recruited ages 13–20, enrolled in high school. Median 15, IQR: 14–17	Young women who reported transactional sex (where they felt that they had to have sex with a male partner as he gave them money or gifts) with any partner in the past 12 months	RCT recruited through the Agincourt Health and Social Demographic Surveillance System (HDSS). Participants visited at home to check eligibility for enrolment	All participants were assessed before randomization and then reassessed annually at 12, 24, and 36 months until they graduated from high school or the study ended,	70
Laga (1994) ⁷¹	Democratic Republic of Congo		Women who self-identified as sex workers	Cohort study (recruitment method not reported)	6-monthly HIV-1 incidence rates were computed assuming that seroconversion had occurred at mid-point between the first positive HIV-1 serological test and the last negative one.	72
Lyons (2020) ⁷³	Senegal	18+ Mean: 38·5, IQR: 30–45	Women aged assigned the female sex at birth and having been engaged in sex work as a primary source of income during the year prior to enrolment.	Cohort recruited through respondent driven sampling with additional purposive sample recruitment	Time to event survival analysis - seroconversion date was the diagnosis date. 4-month follow-up visits	

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified ^a
Malama (2022) ¹⁶	Zambia	18-45	Women who reported currently exchanging sex for money.	Community recruited cohort through peers and health care workers at bars, lodges, and street	First visit 1 month after enrolment, then 2 months later and then quarterly.	
McClelland (2015) ¹⁸	Kenya	18+ Median: 31, IQR: 26-37	Participants self-reported exchanging sex for cash or in-kind payment. The majority of women reported working in bars, where they met local male clients	1993-1997: Clinic recruited cohort with outreach meetings in bars. 1998-2017: Cohort recruited through peer-led community outreach meetings at bars	Seroconversion estimated between monthly follow-ups. For women who acquired HIV and VL first detected at/after seroconversion, the date of infection was estimated at midpoint between the last seronegative and first seropositive test. For women with a detectable VL prior to seroconversion (i.e., HIV RNA detected but antibodies were not), infection date was estimated as 17 days before the positive VL	74-90
McKinnon (2015) ⁹¹	Kenya		Anyone enrolled at the 'SWOP-City clinic,' a sex worker outreach program offering integrated HIV prevention, care & treatment services	Community recruited cohort at hotspots through peers and health care workers	Seroconversion between quarterly follow-ups.	
Nagot (2005) ⁹²	Burkina Faso	15-56	Professional sex workers ("seaters" and "roamers", averaging 18 to 28 clients per week) and non-professional sex workers (waitresses, fruit/beer sellers, students - who did not identify as a sex worker but reported an average of 2-3 clients per week)	Community recruited cohort at workplaces through peers	Seroconversion during follow-up visits which took place every 3 months	

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified ^a
Naicker (2015) ⁹³	South Africa	18+	Self-identifying sex workers	Purposively recruited cohort through community liaison partners	Seroconversion during monthly follow-ups. Midpoint estimation.	⁹⁴
Nouaman (2022) ⁹⁵	Cote d'Ivoire	18+ Median: 25, IQR: 21-29	WESW working at a site of prostitution at the time of the study.	Cross-sectional convenience sample recruitment by CBO staff	Recent infection testing algorithm. MDRI 0·3 years, FRR 0·013	
Price (2012) ⁹⁶	Kenya	Kilifi: Median:25, Range: 18–65 Nairobi: Median: 28, Range: 18–59	Women who had received goods or money for sex	Cohort recruitment through hotspots, VCT centres and peer recruitment	Seroconversion between quarterly follow-ups.	
Priddy (2011) ⁹⁷	Kenya	Mean: 28, Range: 18-55	Women age 18–60, HIV negative, not pregnant, and who reported exchanging sex for money or gifts at least three times in the past month.	Cohort recruited HIV-negative women who attended education sessions for female sex workers in the Mukuru neighbourhood of Nairobi	Seroconversion at follow-up 6 months after baseline.	
Riedner (2006) ⁹⁸	Tanzania	16-39	Women working in modern and traditional bars, guesthouses and hotels.	Cohort recruited from project sites (seem to be hotspots)	Seroconversion between 3-monthly follow-ups. Midpoint estimation.	
Roddy (1998) ⁹⁹	Cameroon	18-45 Mean: 26	Female sex workers residing in Yaoundé or Douala, Cameroon, who averaged at least four sexual partners per month	RCT recruitment not clear	Seroconversion at yearly follow-up	

Study	Country	Study population age	Definition of women who engage in sex work (WESW)	Study design and recruitment	Incidence estimation method	Additional papers identified ^a
Thirumurthy (2021) ¹⁷	Kenya	18+ Median 25, IQR: 22-31	Women who reported sex work as their primary or secondary source of income with ≥2 male sexual partners in the previous 4 weeks.	Cohort recruited through random sampling in beach and hotspot clusters from a list of all eligible WESW	Seroconversion between 6-monthly follow-ups.	
Van Damme (2002) ¹⁰⁰	Benin, Cote d'Ivoire, South Africa	18+ (16+ South Africa)	No explicit sex work definition provided	RCT clinic recruitment	Seroconversion between follow-ups occurring every 2 months. Midpoint estimation.	¹⁰¹
Van der Loeff (2001) ¹⁰²	Guinea Bissau	15+ Median: 28.5, IQR: 21.2-43.5	Commercial sex workers (no further definition given)	Cohort recruited from a string of villages in northwest Guinea-Bissau	Seroconversion between first survey (occurring between 1989 and 1992) and second survey (occurring between 1996 and 1998).	

- a. Instances where multiple papers from the same study were identified; these papers were not used for quality assessment or incidence estimate extraction.