

**Web extra material****Epidemiology of herpes simplex virus type 2 in Latin America and the Caribbean: systematic review, meta-analyses, and meta-regressions**

Manale Harfouche MPH<sup>a,b</sup>, Haifa Maalmi PhD<sup>a,c</sup>, and Laith J. Abu-Raddad PhD<sup>a,b,d</sup>

<sup>a</sup> *Infectious Disease Epidemiology Group, Weill Cornell Medicine-Qatar, Cornell University, Qatar Foundation - Education City, Doha, Qatar*

<sup>b</sup> *World Health Organization Collaborating Centre for Disease Epidemiology Analytics on HIV/AIDS, Sexually Transmitted Infections, and Viral Hepatitis, Weill Cornell Medicine-Qatar, Cornell University, Qatar Foundation – Education City, Doha, Qatar*

<sup>c</sup> *Institute for Clinical Diabetology, German Diabetes Center, Leibniz Center for Diabetes Research at Heinrich Heine University Dusseldorf, Dusseldorf, Germany;*

<sup>d</sup> *Department of Population Health Sciences, Weill Cornell Medicine, Cornell University, New York, New York, US*

## Table of Contents

<b>Table S1.</b> Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist. <sup>1</sup> .....	3
<b>Table S2.</b> Data sources and search criteria for systematically reviewing HSV-2 epidemiology in Latin America and the Caribbean. ....	5
<b>Box S1.</b> Definitions of population type classifications <sup>a</sup> . ....	7
<b>Table S3.</b> Studies reporting HSV-2 seroconversion rate or incidence rate in Latin America and the Caribbean. ....	8
<b>Table S4.</b> Studies reporting HSV-2 seroprevalence in Latin America and the Caribbean by population type.....	9
<b>Figure S1.</b> Forest plots presenting the outcomes of the pooled mean herpes simplex virus type 2 (HSV-2) seroprevalence among the different at risk populations in Latin America and the Caribbean. ....	13
A) General populations.....	13
B) Intermediate-risk populations.....	17
C) High-risk populations.....	18
D) STI clinic attendees and symptomatic populations (mixed women and men).....	19
F) HIV positive individuals and individuals in HIV discordant couples.....	20
G) Other populations .....	21
<b>Table S5.</b> Univariable and multivariable meta-regression analyses for HSV-2 seroprevalence among the different at risk populations in Latin America and the Caribbean using each of country's income and country <i>instead</i> of subregion in the multivariable meta-regression.....	22
<b>Table S6.</b> Univariable and multivariable meta-regression analyses for HSV-2 seroprevalence among the different at-risk populations in Latin America and the Caribbean using the year of data collection as the temporal variable. The analysis using year of publication as the temporal variable is found in Table 3 of main text. ....	24
<b>Table S7.</b> Studies reporting proportions of HSV-2 virus isolation in clinically-diagnosed genital ulcer disease and in clinically-diagnosed genital herpes in Latin America and the Caribbean. ....	26
<b>Figure S2.</b> Forest plots presenting the outcomes of the pooled mean proportions of HSV-2 virus isolation in clinically-diagnosed genital ulcer disease and in clinically-diagnosed genital herpes in Latin America and the Caribbean. ....	27
A) Patients with GUD .....	27
B) Patients with genital herpes.....	28
<b>Table S8.</b> Summary of the precision assessment and risk of bias assessment for the studies reporting HSV-2 seroprevalence in Latin America and the Caribbean. ....	29
<b>References</b> .....	30

**Table S1.** Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist.<sup>1</sup>

Section/topic	#	Checklist item	Reported in main text on
<b>Title</b>			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	p.1
<b>Abstract</b>			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	p. 2
<b>Introduction</b>			
Rationale	3	Describe the rationale for the review in the context of what is already known.	p. 5-6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	p. 5-6
<b>Methods</b>			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	NA
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	p. 6; Box 1
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	p. 6; Box 1
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Table S2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	p. 6; Box 1
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	p. 6; Box 1
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	Box 1
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	p. 7; Box 1
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	p. 7; Box 1
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I <sup>2</sup> ) for each meta-analysis.	p. 7; Box 1
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	p. 7; Box 1
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating	p. 7; Box 1

		which were pre-specified.	
<b>Results</b>			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	p. 7-8; Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	p. 8 and p. 11; Tables S3, S4, and S7
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	p. 11; Table S8
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	p. 7-11; Tables 1, 2, and 3; Figures S1 and S2
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	p. 9-10; Tables 1, 2, and 4; Figures S1 and S2
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	p. 11; Table S8
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	p. 9-10; Table 3; Tables S5 and S6
<b>Discussion</b>			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	p. 12-14
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	p. 14
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	p. 14-15
<b>funding</b>			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	p. 3

Abbreviations: NA = Not applicable, p = page

**Table S2.** Data sources and search criteria for systematically reviewing HSV-2 epidemiology in Latin America and the Caribbean.

<b>PubMed (last searched: March 12, 2020)</b>
(Simplexvirus[MeSH] OR Herpes Simplex[MeSH] OR Herpes Genitalis[MeSH] OR Herpes Hominis[Text] OR HSV type-2[Text] OR HSV type 2[Text] OR HSV2[Text] OR HSV-2[Text] OR HSV [Text] OR Human herpes virus[Text] OR Herpes simplex virus type 2[Text] OR Herpes simplex virus type-2[Text] OR herpes simplex virus 2[Text] OR herpes simplex virus-2[Text] OR herpes simplex type 2[Text] OR herpes simplex type-2[Text] OR herpes simplex 2[Text] OR herpes simplex-2[Text] OR Herpesvirus type 2[Text] OR Herpesvirus type-2[Text] OR Herpesvirus 2[Text] OR Herpesvirus-2[Text] OR Herpes virus type 2[Text] OR Herpes virus type-[Text] OR Herpes virus [Text] OR Herpes virus-2[Text] OR genital herpes[Text] OR Herpes Genitalis[Text] OR Stomatitis Herpetic[Text] OR Herpes Labialis[Text]) AND (“Latin America”[MeSH] OR “Central America”[MeSH] OR “South America”[Mesh] OR “Caribbean Region”[MeSH] OR “Mexico”[MeSH]) OR (Anguilla*[Text] OR Aruba*[Text] OR Antigua and Barbuda[Text] OR Argentin*[Text] OR Bahamas*[Text] OR Barbados*[Text] OR Beliz*[Text] OR Bermuda*[Text] OR Bolivia*[Text] OR Brazil*[text] OR “British Virgin Islands”[Text] OR Latin America[Text] OR Latin American*[Text] OR Caribbean*[Text] OR Cayman Islands[Text] OR Chile*[Text] OR Colombia*[Text] OR Costa Rica*[Text] OR Cuba*[Text] OR Curacao*[Text] OR Central America[Text] OR Central American*[text] OR Dominica*[Text] OR Dominican republic[Text] OR Ecuador*[Text] OR El Salvador[Text] OR French Guiana[Text] OR Grenad*[Text] OR Guadeloup*[Text] OR Guatemal*[Text] OR Guyan*[Text] OR Haiti*[Text] OR Honduras*[Text] OR Jamaic*[Text] OR Martiniqu*[Text] OR Montserrat*[Text] OR Mexic*[Text] OR Nicaragua*[Text] OR Panama*[Text] OR Paraguay*[Text] OR Peru*[Text] OR Puerto Rico[Text] OR Puerto Rica*[text] OR Saint Kitts and Nevis[Text] OR Saint Lucia[Text] OR Saint Vincent and the Grenadines[Text] OR Suriname*[Text] OR Saint Martin[Text] OR Sint Maarten[Text] OR South America[Text] OR South American*[Text] OR Trinidad and Tobago[Text] OR Turks and Caicos[Text] OR Uruguay*[Text] OR United States Virgin Islands[Text] OR Venezuel*[Text])
<b>Embase (last searched: March 12, 2020)</b>
(exp Herpes simplex/ or exp Herpesviridae/) OR (Herpes simplex or Herpes simplex virus or HSV type-2 or HSV type 2 or HSV2 or HSV-2 or HSV 2 or human herpes virus or Herpes simplex virus type 2 or Herpes simplex virus type-2 or herpes simplex virus 2 or herpes simplex virus-2 or herpes simplex type 2 or herpes simplex type-2 or herpes simplex 2 or herpes simplex-2 or Herpesvirus type 2 or Herpesvirus type-2 or Herpesvirus 2 or Herpesvirus-2 or Herpes virus type 2 or Herpes virus type-2 or Herpes virus 2 or Herpes virus-2 or genital herpes or Herpes Genitalis or herpes labialis or herpetic stomatitis).mp.) AND (exp "Antigua and Barbuda"/ or exp Argentina/ or exp Aruba/ or exp Bahamas/ or exp Barbados/ or exp Belize/ or exp Bolivia/ or exp Brazil/ or exp "Virgin Islands (British)"/ or exp Cayman Islands/ or exp Chile/ or exp Colombia/ or exp Costa Rica/ or exp Cuba/ or exp Curacao/ or exp Dominica/ or exp Dominican Republic/ or exp Ecuador/ or exp El Salvador/ or exp French Guiana/ or exp Grenada/ or exp Guadeloupe/ or exp Guatemala/ or exp Guyana/ or exp Haiti/ or exp Honduras/ or exp Jamaica/ or exp Martinique/ or exp Mexico/ or exp Montserrat/ or exp Nicaragua/ or exp Panama/ or exp Paraguay/ or exp Peru/ or exp Puerto Rico/ or exp Saint Lucia/ or exp "saint martin (dutch)"/ or exp "saint martin (french)"/ or exp Suriname/) or (exp "Trinidad and Tobago"/ or exp "Virgin Islands (U.S.)"/ or exp Uruguay/ or exp Venezuela/ or exp South America/ or exp Central America/ or exp Caribbean/ or exp "Caribbean (person)"/ or exp Caribbean Netherlands/ or exp Caribbean Islands/ or exp South American/ or exp Central American/ or exp Latin America/) or (Antigua or Argentina or Argentinian or Aruba or Aruban or Bahamas or Belize or belizian or Bolivia or Bolivian or Brazil or Brazilian or British virgin islands or Cayman islands or Chile or Chilean or Colombia or Colombian or Costa Rica or costa Rican or Cuba or Cuban or Curacao or Dominica or Dominican or Dominican republic or Ecuador or Ecuadorian or el Salvador

or el Salvadorian ).mp. or (French Guiana or Grenada or Guadeloupe or Guatemala or Guatemalan or Guyana or Haitian or Honduras or Honduran or Jamaica or Jamaican or Martinique or Mexico or Mexican or Montserrat or Nicaragua or Nicaraguan or panama or Panamanian or Paraguay or Paraguayans or Peru or Peruvian\* or Puerto Rico or Puerto Ricans or saint Lucia or saint Lucian or Latin America\* or south American\* or central American\*).mp. or ((Turks and caicos) or (saint Vincents and the grenadines) or (saint kitts and the nevis)).mp.

**LILACS (last searched: March 12, 2020)**

((tw:(herpes)) OR (tw:(herpesvirus 2)) OR (tw:(herpes simplex)) OR (tw:(hsv type-2)) OR (tw:(hsv type 1)) OR (tw:(hsv2)) OR (tw:(hsv-2)) OR (tw:(hsv 2)) OR (tw:(human herpes virus)) OR (tw:(herpes simplex virus type 2)) OR (tw:(herpes simplex virus type-2)) OR (tw:(herpes simplex virus 2)) OR (tw:(herpes simplex virus-2)) OR (tw:(herpes simplex type 2)) OR (tw:(herpes simplex type-2)) OR (tw:(herpes simplex 2)) OR (tw:(herpes simplex-2)) OR (tw:(herpesvirus type 2)) OR (tw:(herpesvirus type-2)) OR (tw:(herpesvirus 2)) OR (tw:(herpesvirus-2)) OR (tw:(herpes virus type 2)) OR (tw:(herpes virus type-2)) OR (tw:(herpes virus 2)) OR (tw:(herpes virus-2)) OR (tw:(genital herpes)) OR (tw:(herpes genitalis)) OR (tw:(stomatitis herpetic))) AND (pais\_assunto:( "america do sul" OR "brasil" OR "oceania" OR "mexico" OR "argentina" OR "caribe ingles" OR "caribe" OR "chile" OR "america central" OR "colombia" OR "venezuela" OR "jamaica" OR "peru" OR "cuba" OR "costa rica" OR "puerto rico" OR "panama" OR "bolivia" OR "haiti" OR "ecuador" OR "guyana francesa" OR "guyana" OR "barbados" OR "trinidad y tobago" OR "uruguay" OR "honduras" OR "el salvador" OR "guatemala" OR "paraguay" OR "nicaragua" OR "republica dominicana" OR "dominica" OR "bahamas" OR "grenada" OR "martinica" OR "santa lucia" OR "suriname"))

Abbreviations: HSV-2 = Herpes simplex virus type 2.

**Box S1.** Definitions of population type classifications<sup>a</sup>.

1. **General populations** (populations at low risk): these include populations at lower risk of exposure to HSV-2, such as antenatal clinic attendees, blood donors, and pregnant women, among others.
2. **Intermediate-risk populations**: these include populations who presumably have frequent sexual contacts with populations engaging in high sexual risk behavior, and have therefore a higher risk of exposure to HSV-2 than the general population. These comprise prisoners, people who inject drugs, and truck drivers, among others.
3. **High-risk populations**: these include populations at high risk of exposure to HSV-2 as a consequence of specific sexual risk behaviors such as female sex workers, men who have sex with men, male sex workers, and transgender populations, among others.
4. **HIV positive individuals and individuals in HIV discordant couples**: these include populations who are HIV positive or are in a spousal relationship with an HIV positive individual.
5. **STI clinic attendees and symptomatic populations**: these include patients attending STI clinics, or have clinical manifestations related to an STI.
6. **Other populations**: these include populations not satisfying above definitions, or populations with an undetermined risk of acquiring HSV-2 infection such as cervical cancer patients and their spouses.

<sup>a</sup> These population types were selected based on our understanding of HIV/STI epidemiology and the variability of risk of exposure in different population types, as informed by existing literature on HIV and STIs.<sup>2-6</sup>

Abbreviations: HSV-2 Herpes simplex virus type 2, STI = Sexually transmitted infection, HIV = Human immunodeficiency virus.

**Table S3.** Studies reporting HSV-2 seroconversion rate or incidence rate in Latin America and the Caribbean.

Author, year	Year(s) of data collection	Country	Original study design	Population characteristics	HSV-2 serological assay	Sample size	Follow-up duration	Person-years of follow-up	HSV-2 Seroconversion rate (%)	HSV-2 Incidence rate (per 100 person-years)
<b>General populations</b>										
Lupi, 2011 <sup>7</sup>	1996-97	Brazil	Cohort	Blood donors	ELISA	110	1 year	-	2.0	-
Sánchez-Alemán, 2010 <sup>8</sup>	2001-05	Mexico	Cohort	Female students	ELISA	376	-	466.2	5.6	4.5
Sánchez-Alemán, 2010 <sup>8</sup>	2001-05	Mexico	Cohort	Male students	ELISA	128	-	203.0	5.5	4.5
<b>Intermediate-risk populations</b>										
Konda, 2013 <sup>9</sup>	2001-03	Peru	RCT	Men engaging in risky behaviors	ELISA	1,741	2 years	-	3.4	-
<b>High-risk populations</b>										
Castillo, 2015 <sup>10</sup>	2009-11	Peru	RCT	Transgender women	ELISA	40	18 months	-	-	12.2
Castillo, 2015 <sup>10</sup>	2009-11	Peru	RCT	MSM	ELISA	217	18 months	-	-	17.9
Konda, 2013 <sup>9</sup>	2001-03	Peru	RCT	Bisexual men	ELISA	311	2 years	-	4.6	-
Konda, 2013 <sup>9</sup>	2001-03	Peru	RCT	MSM	ELISA	93	2 years	-	13.4	-
Lupi, 2011 <sup>7</sup>	1996-97	Brazil	Cohort	MSM	ELISA	103	1 year	-	8.00	-
Sanchez, 2009 <sup>11</sup>	1998-00	Peru	Cohort	MSM	WB	55	335 days	-	-	10.4
Sanchez, 2009 <sup>11</sup>	1998-00	Peru	Cohort	HIV negative MSM	WB	42	335 days	-	11.9	-
<b>HIV positive individuals and individuals in HIV discordant couples</b>										
Sanchez, 2009 <sup>11</sup>	1998-00	Peru	Cohort	HIV positive MSM	WB	13	335 days	-	30.8	-
Yanez Alvarez, 2011 <sup>12</sup>	2003-05	Mexico	Cohort	People living with HIV	ELISA	131	1.5 years	174.0	51.1	38.5

Abbreviations: ELISA = Enzyme-linked immunosorbent assay, HIV = Human immunodeficiency virus, HSV-2 = Herpes simplex virus type 2, MSM = Men who have sex with men, RCT = Randomized controlled trial, WB = Western blot.



**Table S4.** Studies reporting HSV-2 seroprevalence in Latin America and the Caribbean by population type.

Author, year	Year(s) of data collection	Country	Study site	Original study design <sup>a</sup>	Sampling method	Population	HSV-2 serological assay	Sample size	HSV-2 seroprevalence (%)
<b>General populations</b>									
Abraham, 2003 <sup>13</sup>	2000	Mexico	Community	CS	CRS	Male students	WB	517	4.1
Abraham, 2003 <sup>13</sup>	2000	Mexico	Community	CS	CRS	Female students	WB	381	7.9
Alberts, 2013 <sup>14</sup>	2005-09	Mexico	Community	CS	Conv	Mexican men	ELISA	1,312	8.8
Alberts, 2013 <sup>14</sup>	2005-09	Brazil	Community	CS	Conv	Brazilian men	ELISA	1,388	38.4
Almeida, 2017 <sup>15</sup>	2011-14	Brazil	Outpatient clinic	CS	Conv	Patients with benign nodules	ELISA	83	28.0
Ashley-Morrow, 2004 <sup>16</sup>	2000-01	Mexico	Community	CS	Conv	Mexican women	WB	94	44.6
Ashley-Morrow, 2004 <sup>16</sup>	2000-01	Costa Rica	Community	CS	Conv	Costa Rican women	WB	94	42.5
Ashley-Morrow, 2004 <sup>16</sup>	2000-01	Argentina	Community	CS	Conv	Argentinian women	WB	97	39.1
Boulos, 1992 <sup>17</sup>	1986-88	Haiti	Community	CS	Conv	Pregnant Haitian women	ELISA	89	54.0
Cárcamo, 2012 <sup>18</sup>	2002	Peru	Community	CS	CRS	18-29 years old women	ELISA	1,486	13.6
Cárcamo, 2012 <sup>18</sup>	2002	Peru	Community	CS	CRS	18-29 years old men	ELISA	1,176	13.5
Carvalho, 1999 <sup>19</sup>	1993-97	Brazil	Outpatient clinic	CS	Conv	Pregnant women	WB	102	22.6
Carvalho, 1999 <sup>19</sup>	1993-97	Brazil	Community	CS	Conv	College students	WB	101	6.9
Clark, 2008 <sup>20</sup>	2003-04	Peru	Community	CS	Conv	Healthy men	ELISA	1,797	16.0
Clemens, 2010 <sup>21</sup>	1996-97	Brazil	Community	CS	CRS	General population in Brazil	ELISA	1,090	11.3
Conde-Glez, 2013 <sup>22</sup>	2005-06	Mexico	Community	CS	MSCS	General population in Mexico	ELISA	3,616	9.9
Conde-Gonzalez, 2003 <sup>23</sup>	2000-00	Mexico	Community	CS	CRS	Women from the general population	WB	730	29.3
Cowan, 2003 <sup>24</sup>	1992-00	Brazil	Community	CS	Conv	Male blood donors	ELISA	398	25.9
Cowan, 2003 <sup>24</sup>	1992-00	Brazil	Community	CS	Conv	Female blood donors	ELISA	84	42.9
Cowan, 2003 <sup>24</sup>	1992-00	Brazil	Community	CS	Conv	Antenatal clinic attendees	ELISA	399	29.3
Cowan, 2003 <sup>24</sup>	1992-00	Brazil	Community	CS	Conv	1-15 years old children	ELISA	697	2.4
Da-Rosa santos, 1996 <sup>25</sup>	1994-94	Brazil	Community	CS	Conv	Blood donors	ELISA	155	29.1
De Sanjose, 1994 <sup>26</sup>	1985-88	Colombia	Community	CC	RS	Healthy women	ELISA	237	49.8
Domercant, 2017 <sup>27</sup>	2012-12	Haiti	Outpatient clinic	CS	Conv	Pregnant women	ELISA	784	30.5
Gabster, 2019 <sup>28</sup>	2018-18	Panama	Community	CS	CRS	Female students	ELISA	273	10.2
Gabster, 2019 <sup>28</sup>	2018-18	Panama	Community	CS	CRS	Male student	ELISA	286	15.7
Gonzalez, 2006 <sup>29</sup>	2004-04	Brazil	Community	CS	CRS	Blood donors	ELISA	1,600	15.6
Gonzalez, 2015 <sup>30</sup>	2012-13	Brazil	Community	RCT	CRS	Blood donors in the intervention arm	ELISA	6,298	10.4
Gonzalez, 2015 <sup>30</sup>	2012-13	Brazil	Community	RCT	CRS	Blood donors in the control arm	ELISA	5,569	11.1
Gutierrez, 2006 <sup>31</sup>	-	Mexico	Community	CS	MSCS	Mexican adolescents in poor urban areas	ELISA	753	12.0
Gutierrez, 2007 <sup>32</sup>	2002-03	Mexico	Community	CS	CRS	School students	ELISA	1,429	18.9
Herrera-Ortiz, 2013 <sup>33</sup>	2006-09	Mexico	Outpatient clinic	CS	Conv	Pregnant women	ELISA	2,300	14.5
Juarez-Figueroa, 1997 <sup>34</sup>	1992-92	Mexico	Community	CS	Conv	Men getting tested for HIV	WB	538	28.8
Konda, 2005 <sup>35</sup>	2000-02	Peru	Community	CS	CRS	Women from the general population	EIA	965	20.0
Konda, 2005 <sup>35</sup>	2000-02	Peru	Community	CS	CRS	Men from the general population	EIA	670	7.0
Lazcano-Ponce, 2001 <sup>36</sup>	1994-96	Mexico	Community	CS	CRS	Women from Mexico	WB	730	29.8
Levett, 2005 <sup>37</sup>	-	Barbados	Outpatient clinic	CS	Conv	Pregnant women	ELISA	122	40.2
Levett, 2005 <sup>37</sup>	-	Barbados	Community	CS	Conv	Blood donors	ELISA	184	34.2
Lupi, 2011 <sup>7</sup>	1996-97	Brazil	Community	Cohort	Conv	Male blood donors	ELISA	155	29.0
Moreira, 2018 <sup>38</sup>	2015-16	Brazil	Hospital	CC	Conv	Mothers of children without congenital malformation	ELISA	160	47.1
Moreira, 2018 <sup>38</sup>	2015-16	Brazil	Hospital	CC	Conv	Mothers of children with congenital malformation	ELISA	32	28.1
Munoz, 1995 <sup>39</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Healthy women	ELISA	141	67.3
Munoz, 1995 <sup>39</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Healthy men	ELISA	126	64.3
Munoz, 1995 <sup>39</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Healthy men	ELISA	73	56.2
Nascimento, 2007 <sup>40</sup>	1995-03	Brazil	Outpatient clinic	CS	Conv	1-2 years old children	WB	249	1.6
Nascimento, 2008 <sup>41</sup>	2003-03	Brazil	Community	CS	Conv	Blood donors in Brazil	ELISA	3,493	26.4
Nascimento, 2009 <sup>42</sup>	2003-04	Brazil	Community	CS	Conv	Non-American population	ELISA	181	29.8
Nascimento, 2009 <sup>42</sup>	2003-04	Brazil	Community	CS	Conv	Blood donors	ELISA	1,121	35.8

Nascimento, 2009 <sup>42</sup>	2003-04	Brazil	Community	CS	Conv	Amerindian population	ELISA	339	7.4
Oberle, 1989 <sup>43</sup>	1984-85	Costa Rica	Community	CS	CRS	Healthy women	Monoclonal antibody	766	39.4
Patnaik, 2007 <sup>44</sup>	1995-97	Peru	Hospital	CS	Conv	Middle-aged women in Peru	WB	171	35.7
Patnaik, 2007 <sup>44</sup>	1995-97	Colombia	Community	CS	Conv	Middle-aged women in Colombia	WB	65	56.9
Patzi-Churqui, 2020 <sup>45</sup>	2015-19	Bolivia	Community	CS	Conv	Healthy women	WB	389	53.0
Paz-Bailey, 2009 <sup>46</sup>	2006-06	Honduras	Community	CS	MSCS	Honduran-Garifuna participants	ELISA	791	51.1
Rodriguez, 2003 <sup>47</sup>	1993-94	Costa Rica	Community	Cohort	CRS	Women from the Guanacaste cohort	ELISA	1,100	38.4
Sanchez, 1996 <sup>48</sup>	1991-92	Peru	Outpatient clinic	CS	CRS	>18 years old women	WB	201	21.5
Sanchez, 1996 <sup>48</sup>	1991-92	Peru	Outpatient clinic	CS	CRS	>18 years old men	WB	281	7.7
Sanchez-Aleman, 2005 <sup>49</sup>	2000-01	Mexico	Community	CS	Conv	Students from Mexico	WB	340	5.9
Sánchez-Alemán, 2008 <sup>50</sup>	2001-03	Mexico	Community	CS	Conv	University students	WB	711	4.0
Sánchez-Alemán, 2010 <sup>8</sup>	2003-05	Mexico	Community	CS	Conv	University students	ELISA	592	2.2
Sierra, 2011 <sup>51</sup>	2002-03	Colombia	Community	CS	CRS	Sexual active women	ELISA	869	19.1
Sierra, 2011 <sup>51</sup>	2002-03	Colombia	Community	CS	CRS	Not sexually active women	ELISA	57	1.7
Smith, 2001 <sup>52</sup>	1990-91	Brazil	Outpatient clinic	CC	Conv	Middle-aged women	ELISA	181	42.0
Smith, 2002 <sup>53</sup>	-	Peru	Hospital	CC	Conv	Peruvian women	WB	171	35.7
Smith, 2002 <sup>53</sup>	-	Colombia	Community	CC	Conv	Colombian women	WB	65	56.9
Uribe-Salas, 2009 <sup>54</sup>	2000-00	Mexico	Community	CS	MSCS	Adults in Mexico	ELISA	6,156	17.3
Vaccarella, 2006 <sup>55</sup>	1997-00	Argentina	Community	CS	RS	Healthy women	ELISA	907	37.0
Weinberg, 1993 <sup>56</sup>	1988-89	Brazil	Hospital	CS	Conv	Pregnant women of low socioeconomic status	WB	60	46.0
Weinberg, 1993 <sup>56</sup>	1988-89	Brazil	Hospital	CS	Conv	Pregnant women of middle socioeconomic status	WB	94	36.0
Zamilpa-Mejía, 2003 <sup>57</sup>	1994-95	Mexico	Outpatient clinic	CS	Conv	Women in Mexico city	WB	448	18.1
Zamilpa-Mejía, 2003 <sup>57</sup>	1994-95	Mexico	Outpatient clinic	CS	Conv	Women in Cuernavaca city	WB	388	28.3
<b>Intermediate-risk populations</b>									
Benzaken, 2012 <sup>58</sup>	2009	Brazil	Community	CS	Conv	Individuals attending the leisure circuit	ELISA	585	62.1
Celentano, 2010 <sup>59</sup>	2001-01	Peru	Community	CS	Conv	Promiscuous women	ELISA	294	43.5
Celentano, 2010 <sup>59</sup>	2001-01	Peru	Community	CS	Conv	Promiscuous men	ELISA	2,645	24.4
Clark, 2009 <sup>60</sup>	2003-05	Peru	Community	CS	CRS	Women in slums	ELISA	320	40.6
Couture, 2008 <sup>61</sup>	2006-07	Haiti	Community	CS	Conv	Clients of FSWs in Haiti	ELISA	351	22.0
Konda, 2005 <sup>35</sup>	2000-02	Peru	Community	CS	TLS	Men from a socially marginalized population	EIA	919	20.7
Konda, 2005 <sup>35</sup>	2000-02	Peru	Community	CS	TLS	Women from a socially marginalized population	EIA	108	42.6
Pinho, 2011 <sup>62</sup>	2003-05	Brazil	Community	CS	Conv	Brazilian truck drivers	ELISA	799	26.6
Sabido, 2011 <sup>63</sup>	2008-09	Guatemala	Community	CS	Conv	Clients of FSWs	ELISA	351	3.4
Uribe-Salas, 1995 <sup>64</sup>	1993-93	Mexico	Community	CS	Conv	Men working in bars	WB	171	32.4
Villaruel-Torrico, 2018 <sup>65</sup>	2013-13	Bolivia	Prison	CS	Conv	>16 years old female prisoners	ELISA	219	62.6
<b>High-risk populations</b>									
Brito, 2015 <sup>66</sup>	2013	Dominican Republic	Community	CS	SS	MSM and transgender women	ELISA	100	38.0
Cárcamo, 2012 <sup>18</sup>	2002-03	Peru	Community	CS	CRS	18-29 years old FSWs	ELISA	381	67.0
Castillo, 2015 <sup>10</sup>	2009-11	Peru	Community	RCT	SS	Transgender men	ELISA	208	80.7
Castillo, 2015 <sup>10</sup>	2009-11	Peru	Community	RCT	SS	25-35 years old MSM	ELISA	510	65.0
Clark, 2009 <sup>60</sup>	2003-05	Peru	Community	CS	CRS	Male sex workers	ELISA	2,424	13.0
Clark, 2009 <sup>60</sup>	2003-05	Peru	Community	CS	CRS	MSM	ELISA	541	69.0
Conde-Glez, 1999 <sup>67</sup>	1992-92	Mexico	Outpatient clinic	CS	Conv	FSWs in Mexico	WB	997	60.8
Creswell, 2010 <sup>68</sup>	2008	El Salvador	Community	CS	RDS	FSWs	ELISA	663	82.6
Da-Rosa santos, 1996 <sup>25</sup>	1994-94	Brazil	Community	CS	Conv	FSWs in Brazil	ELISA	20	75.0
Gotuzzo, 1994 <sup>69</sup>	1991-92	Peru	Outpatient clinic	CS	Conv	FSWs in Peru	WB	400	82.2
Hakre, 2013 <sup>70</sup>	2009-11	Panama	Community	CS	TLS	FSWs in Panama	ELISA	999	74.2
Hakre, 2014 <sup>71</sup>	2011-12	Panama	Community	CS	RDS	MSM in David city	ELISA	203	38.4
Hakre, 2014 <sup>71</sup>	2011-12	Panama	Community	CS	RDS	MSM in Panama city	ELISA	305	62.6
Hakre, 2014 <sup>71</sup>	2011-12	Panama	Community	CS	RDS	MSM in Colon	ELISA	91	72.9
Hernandez, 2011 <sup>72</sup>	2009-10	Nicaragua	Community	CS	RDS	MSM	ELISA	632	39.9
Konda, 2005 <sup>35</sup>	2000-02	Peru	Community	CS	TLS	MSM	EIA	167	72.5
Lama, 2006 <sup>73</sup>	2002-03	Peru	Community	CS	SS	MSM	ELISA	3,280	46.3

Lupi, 2011 <sup>7</sup>	1996-97	Brazil	Community	Cohort	Conv	MSM	ELISA	170	39.4
Morales-Miranda, 2008 <sup>74</sup>	2006	Honduras	Community	CS	RDS	FSWs	ELISA	808	61.4
Nascimento, 2007 <sup>40</sup>	1995-03	Brazil	Outpatient clinic	CS	Conv	MSM	WB	29	45.0
Perez-Brumer, 2013 <sup>75</sup>	2007-07	Peru	Outpatient clinic	CS	Conv	MSM in Lima	ELISA	560	55.4
Perla, 2012 <sup>76</sup>	2002-03	Peru	Community	CS	SS	FSWs in Peru	ELISA	211	80.1
Rodrigues, 2009 <sup>77</sup>	1994-98	Brazil	Community	CS	Conv	MSM	ELISA	403	45.7
Sanchez, 1998 <sup>78</sup>	1991-92	Peru	Outpatient clinic	CS	Conv	FSWs registered for routine examination	WB	283	82.0
Sanchez, 1998 <sup>78</sup>	1991-92	Peru	Outpatient clinic	CS	Conv	FSWs not registered for routine examination	WB	116	82.8
Sanchez, 2007 <sup>79</sup>	2002-02	Peru	Community	CS	SS	MSM	ELISA	1,328	51.0
Sanchez, 2009 <sup>11</sup>	1998-00	Peru	Outpatient clinic	Cohort	SS	MSM	WB	82	41.5
Shah, 2014 <sup>80</sup>	2008-08	El Salvador	Community	CS	RDS	MSM	ELISA	703	48.1
Shah, 2014 <sup>80</sup>	2008-08	El Salvador	Community	CS	RDS	FSWs	ELISA	768	82.3
Silva-Santisteban, 2012 <sup>81</sup>	2009-09	Peru	Community	CS	RDS	Transgender women in Lima	ELISA	436	79.4
Soto, 2007 <sup>82</sup>	2001-02	El Salvador	Outpatient clinic	CS	MSCS	FSWs from El Salvador	ELISA	136	95.7
Soto, 2007 <sup>82</sup>	2001-02	El Salvador	Community	CS	TLS	MSM from El Salvador	ELISA	81	56.5
Soto, 2007 <sup>82</sup>	2001-02	Guatemala	Outpatient clinic	CS	MSCS	FSWs from Guatemala	ELISA	589	88.6
Soto, 2007 <sup>82</sup>	2001-02	Guatemala	Community	CS	TLS	MSM from Guatemala	ELISA	362	43.3
Soto, 2007 <sup>82</sup>	2001-02	Honduras	Outpatient clinic	CS	MSCS	FSWs from Honduras	ELISA	457	91.1
Soto, 2007 <sup>82</sup>	2001-02	Honduras	Community	CS	TLS	MSM from Honduras	ELISA	316	50.9
Soto, 2007 <sup>82</sup>	2001-02	Nicaragua	Outpatient clinic	CS	MSCS	FSWs from Nicaragua	ELISA	553	82.1
Soto, 2007 <sup>82</sup>	2001-02	Nicaragua	Community	CS	TLS	MSM from Nicaragua	ELISA	269	53.8
Soto, 2007 <sup>82</sup>	2001-02	Panama	Outpatient clinic	CS	MSCS	FSWs from Panama	ELISA	560	73.0
Soto, 2007 <sup>82</sup>	2001-02	Panama	Community	CS	TLS	MSM from Panama	ELISA	515	44.3
Uribe-Salas, 1999 <sup>83</sup>	1992-93	Mexico	Community	CS	TLS	FSWs in Mexico city	WB	757	65.1
Uribe-Salas, 2003 <sup>84</sup>	1998-98	Mexico	Community	CS	Conv	FSWs in Mexico	WB	468	85.7
Zunt, 2006 <sup>85</sup>	-	Peru	Community	CS	SS	HTLV-II seronegative MSM	ELISA	2,621	44.9
Zunt, 2006 <sup>85</sup>	-	Peru	Community	CS	SS	HTLV-II seropositive MSM	ELISA	33	93.9
<b>STI clinic attendees and symptomatic populations</b>									
Carvalho, 1999 <sup>19</sup>	1993-97	Brazil	Outpatient clinic	CS	Conv	STI clinic attendees	WB	96	53.1
Martinez, 2005 <sup>86</sup>	2003-03	Chile	Outpatient clinic	CS	Conv	STI clinic attendees	ELISA	200	43.0
Nascimento, 2007 <sup>40</sup>	1995-03	Brazil	Outpatient clinic	CS	Conv	STI clinic attendees	WB	137	51.0
<b>HIV positive populations and HIV sero-discordant couples</b>									
Batista, 2009 <sup>87</sup>	2002	Brazil	Community	Cohort	Conv	HIV positive patients	ELISA	145	61.4
Boulos, 1992 <sup>17</sup>	1986-88	Haiti	Community	CS	Conv	HIV positive pregnant Haitian women	ELISA	95	88.0
Da-Rosa Santos, 1996 <sup>25</sup>	1994-94	Brazil	Community	CS	Conv	HIV positive patients	ELISA	85	73.0
Domercant, 2017 <sup>27</sup>	2012-12	Haiti	Outpatient clinic	CS	Conv	HIV positive women	ELISA	144	71.5
Levett, 2005 <sup>37</sup>	-	Barbados	Outpatient clinic	CS	Conv	HIV positive adults	ELISA	120	77.5
Lima, 2018 <sup>88</sup>	2005-08	Brazil	Outpatient clinic	Cohort	Conv	Pregnant women with HIV	ELISA	134	59.7
Nascimento, 2007 <sup>40</sup>	1995-03	Brazil	Outpatient clinic	CS	Conv	HIV patients with GUD	WB	30	87.0
Nascimento, 2007 <sup>40</sup>	1995-03	Brazil	Outpatient clinic	CS	Conv	HIV positive patients	WB	40	62.0
Paz-Bailey, 2012a <sup>89</sup>	2006-06	Honduras	Outpatient clinic	CS	Conv	HIV positive patients	ELISA	810	77.9
Paz-Bailey, 2012b <sup>90</sup>	2008-08	El Salvador	Outpatient clinic	CS	Conv	HIV positive patients	ELISA	760	84.5
Sanchez, 2009 <sup>11</sup>	1998-00	Peru	Outpatient clinic	Cohort	SS	MSM who seroconverted to HIV	WB	26	42.3
Santos, 2006 <sup>91</sup>	2001-02	Brazil	Outpatient clinic	CS	Conv	HIV positive patients	ELISA	150	52.0
Yanez Alvarez, 2011 <sup>12</sup>	2003-05	Mexico	Outpatient clinic	Cohort	Conv	HIV positive patients	ELISA	301	48.5
<b>Other populations<sup>b</sup></b>									
Almeida, 2017 <sup>15</sup>	2011-14	Brazil	Outpatient clinic	CS	Conv	Patients with malignant nodules	ELISA	100	18.0
Bahena-Roman, 2020 <sup>92</sup>	2008-11	Mexico	Outpatient clinic	CS	Conv	Women with cervical related diseases	ELISA	644	25.0
Boulos, 1992 <sup>17</sup>	1986-88	Haiti	Community	CS	Conv	HTLV-I seropositive pregnant Haitian women	ELISA	45	82.0
Calderon, 2018 <sup>93</sup>	2014-15	Peru	Outpatient clinic	CS	Conv	Women with cancer	ELISA	44	36.4
Castle, 2003 <sup>94</sup>	1993-97	Jamaica	Outpatient clinic	CC	Conv	Women with low grade cervical neoplasia	ELISA	201	60.9
Castle, 2003 <sup>94</sup>	1993-97	Jamaica	Outpatient clinic	CC	Conv	Women with cervical neoplasia grade 2	ELISA	117	61.6
Castle, 2003 <sup>94</sup>	1993-97	Jamaica	Outpatient clinic	CC	Conv	Women with cervical neoplasia grade 3	ELISA	92	73.5
Conde-Gonzalez, 2003 <sup>23</sup>	2000-00	Mexico	Community	CS	CRS	Women with cervical cancer	WB	408	46.8
Conde-Gonzalez, 2003 <sup>23</sup>	2000-00	Mexico	Community	CS	CRS	Women with cancer	WB	128	22.6

De Sanjose, 1994 <sup>26</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Women with CIN III	ELISA	243	60.8
DeBritton, 1993 <sup>35</sup>	1986-87	Panama	Hospital	CS	Conv	Women with cervical cancer	WB	189	57.0
Munoz, 1995 <sup>39</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Women with invasive cancer	ELISA	121	75.2
Munoz, 1995 <sup>39</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Husbands of women with invasive cancer	ELISA	52	59.6
Munoz, 1995 <sup>39</sup>	1985-88	Colombia	Outpatient clinic	CC	Conv	Husbands of women with CIN III	ELISA	120	60.8
Smith, 2002 <sup>53</sup>	-	Brazil	Outpatient clinic	CC	Conv	Brazilian women with squamous-cell carcinoma	WB	145	55.2
Smith, 2002 <sup>53</sup>	-	Brazil	Outpatient clinic	CC	Conv	Brazilian women with adeno- or adenocarcinoma	WB	16	43.8
Smith, 2002 <sup>53</sup>	-	Colombia	Outpatient clinic	CC	Conv	Colombian women with squamous-cell carcinoma	WB	78	61.5
Smith, 2002 <sup>53</sup>	-	Peru	Outpatient clinic	CC	Conv	Peruvian women with squamous-cell carcinoma	WB	166	56.6
Smith, 2002 <sup>53</sup>	-	Peru	Outpatient clinic	CC	Conv	Peruvian women with adeno- or adenocarcinoma	WB	24	66.7
Stone, 1995 <sup>96</sup>	1982-84	Costa Rica	Community	CC	Conv	Women with cervical carcinoma	WB	415	54.7
Stone, 1995 <sup>96</sup>	1982-84	Costa Rica	Community	CC	Conv	Women with invasive cervical cancer	WB	149	57.8

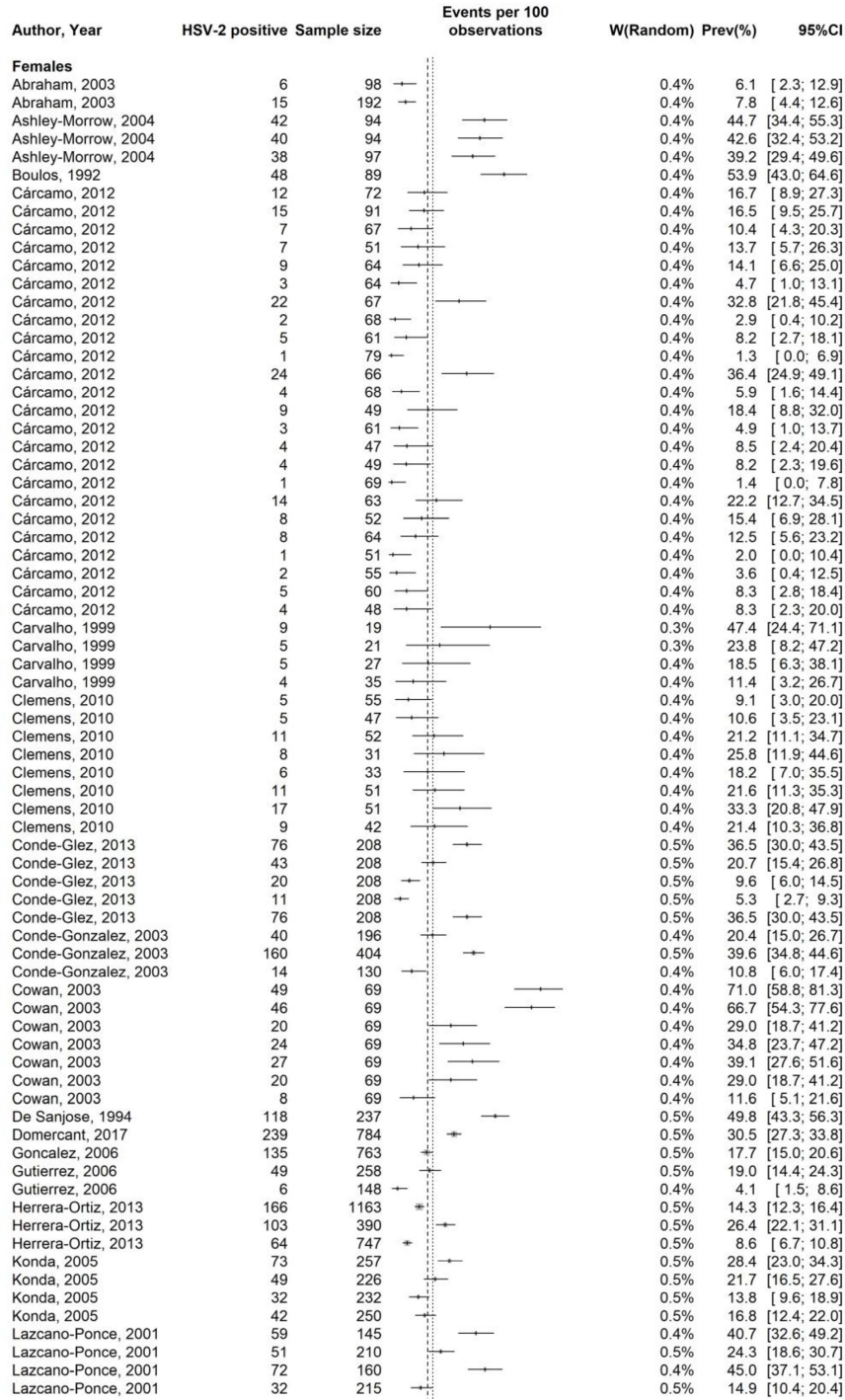
<sup>a</sup>The reported study design is the original study design (case control, cross sectional, cohort, or randomized controlled trial). The included seroprevalence measures are those for the baseline measures at the beginning of the study.

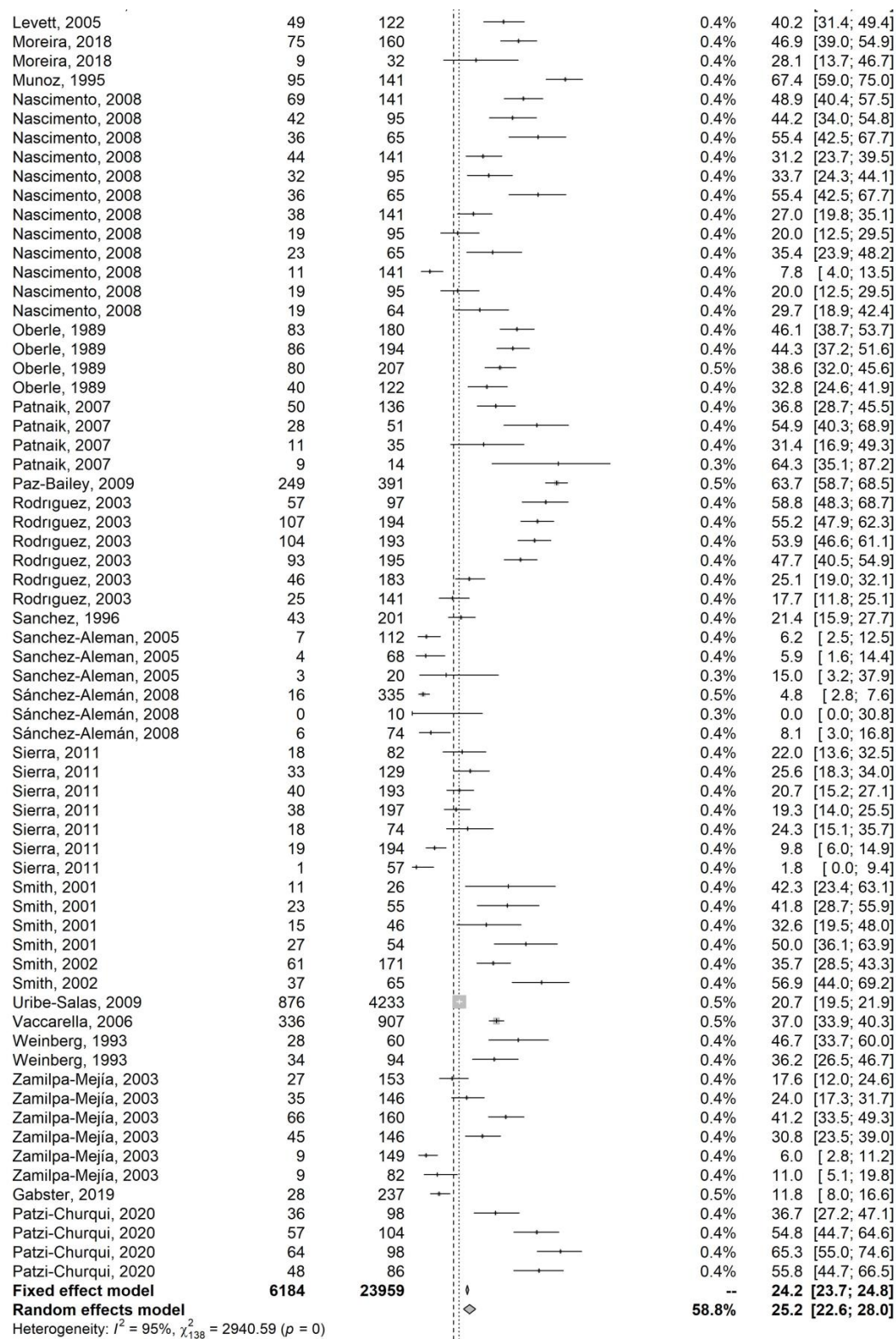
<sup>b</sup>Other populations include populations with an undetermined risk of acquiring HSV-2 infection such as patients with cervical cancer or their spouses.

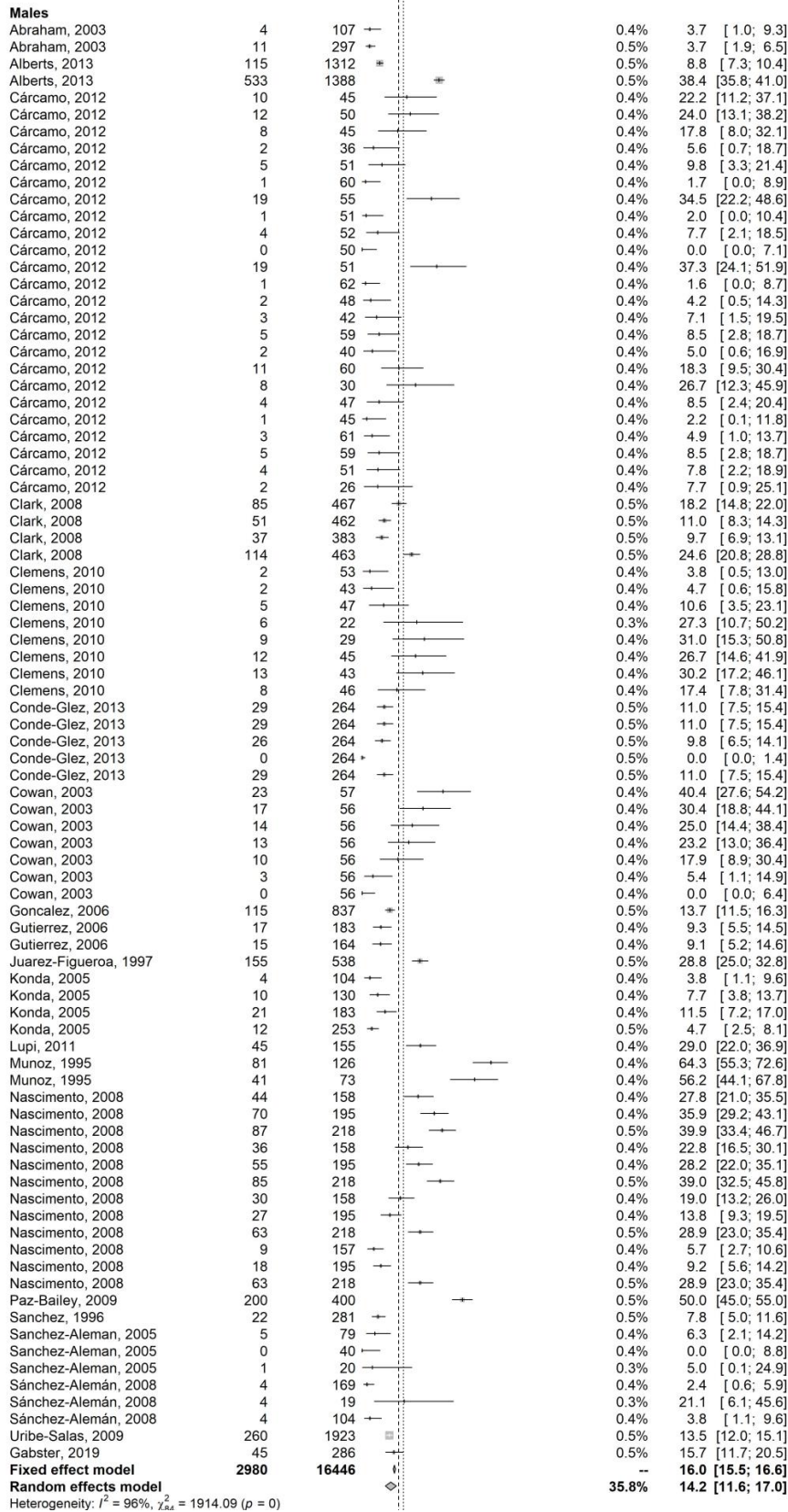
Abbreviations: CC = Case control, Conv = Convenience, CIN = Cervical intraepithelial neoplasia, CRS = Cluster random sampling, CS = Cross sectional, EIA = Enzyme immunosorbent assay, ELISA = Enzyme-linked immunosorbent assay, FSWs = Female sex workers, GUD = Genital ulcer disease, HIV = Human immunodeficiency virus, HSV-2 = Herpes simplex virus type 2, HTLV = Human T- cell leukemia virus, MSCS = Multiple stage cluster sampling, MSM = Men who have sex with men, RCT = Randomized controlled trial, RDS = Response driven sampling, RS = Random sampling, SS = Snowball sampling, STI = Sexually transmitted infection, TLS = Time-location sampling, VCT = Voluntary counselling and testing, WB = Western blot.

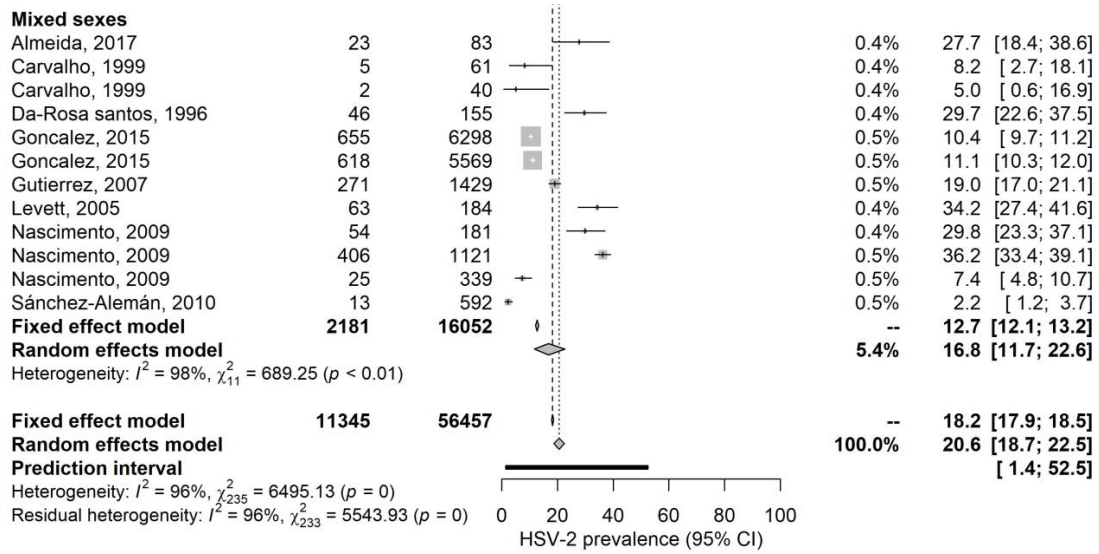
**Figure S1.** Forest plots presenting the outcomes of the pooled mean herpes simplex virus type 2 (HSV-2) seroprevalence among the different at risk populations in Latin America and the Caribbean.

A) General populations





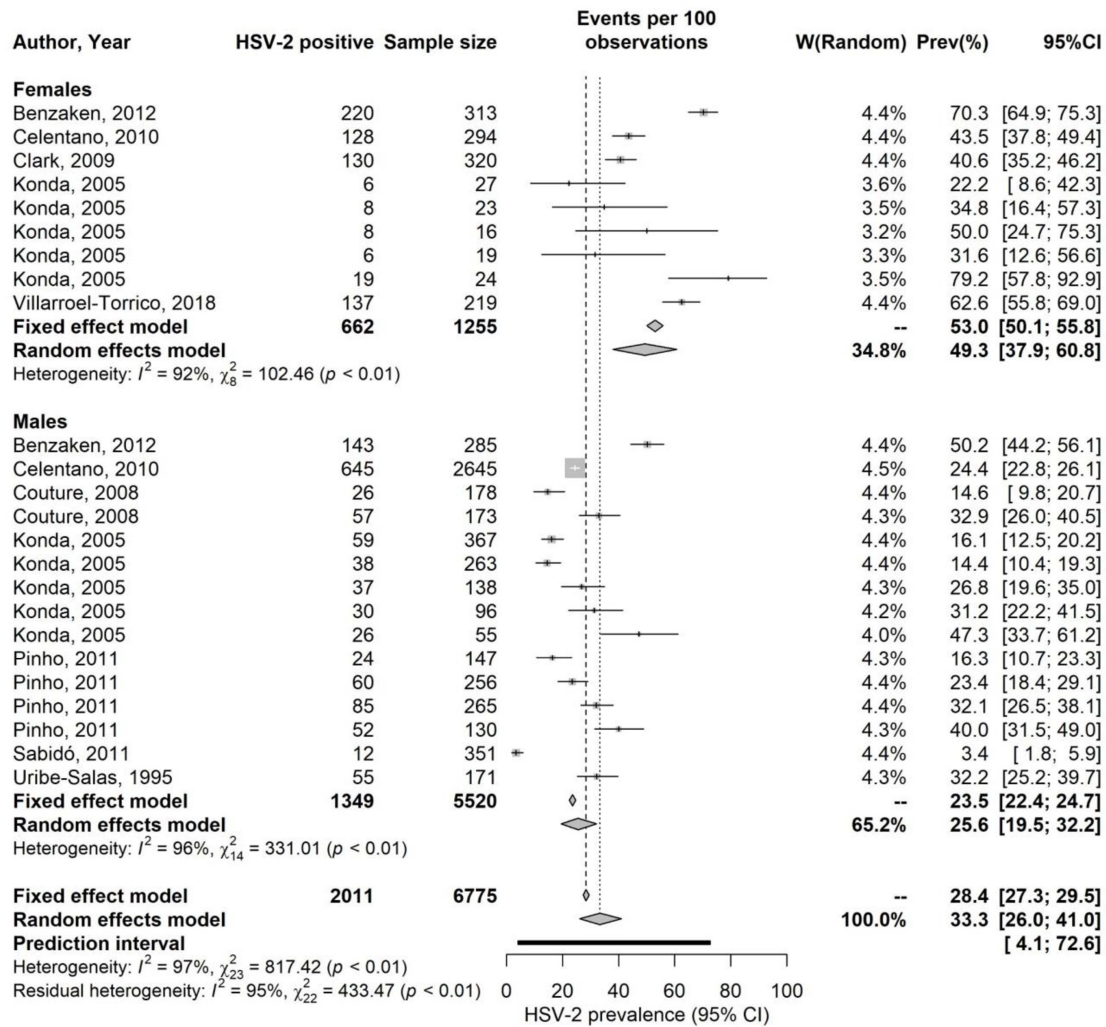




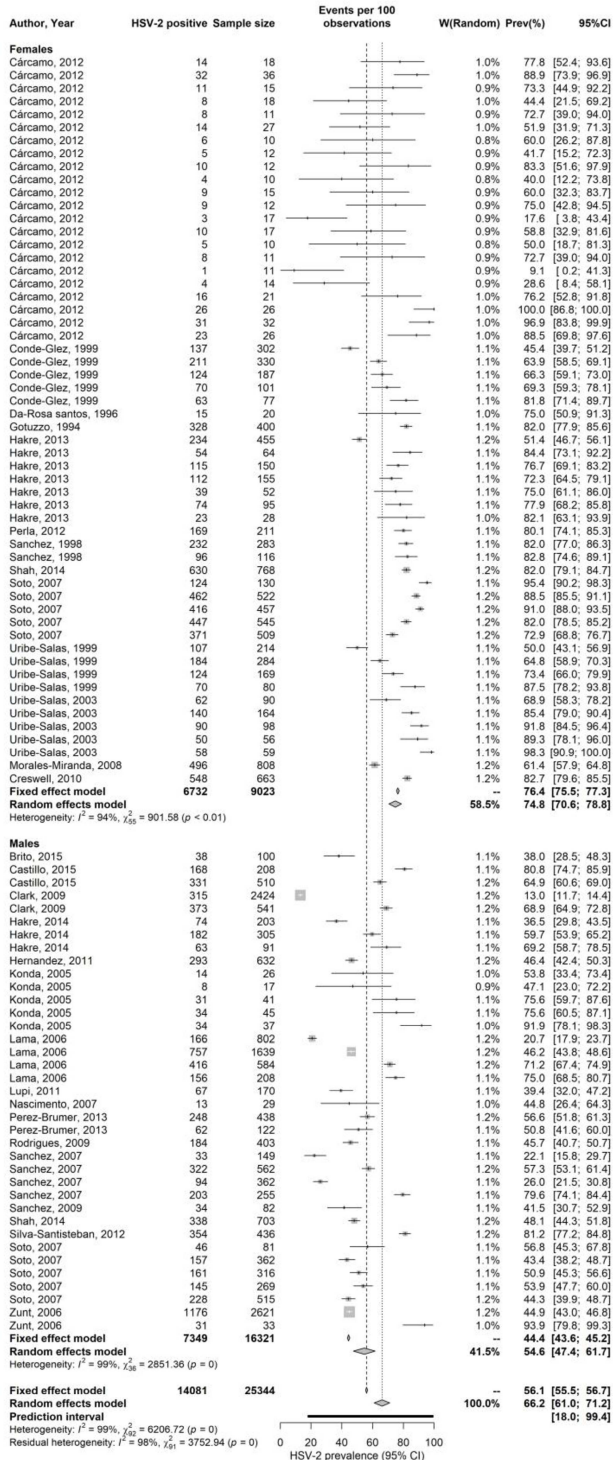
Abbreviations: CI = Confidence interval, HSV-2 = Herpes simplex virus type 2.



## B) Intermediate-risk populations

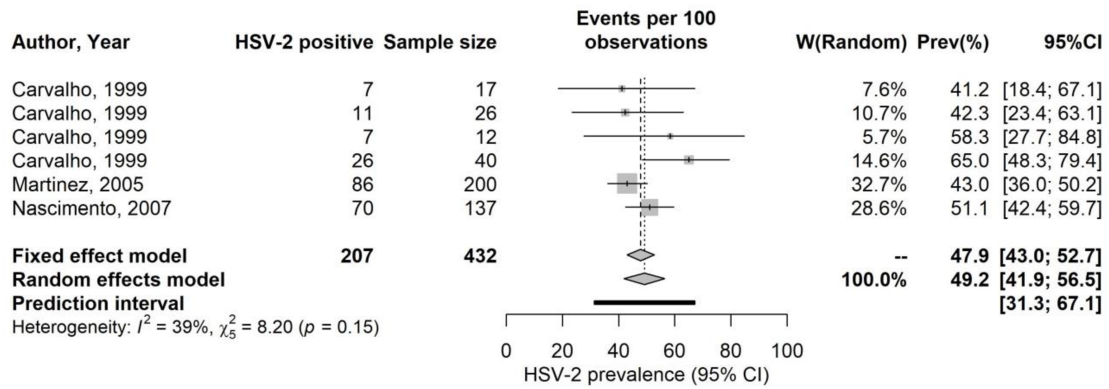


C) High-risk populations



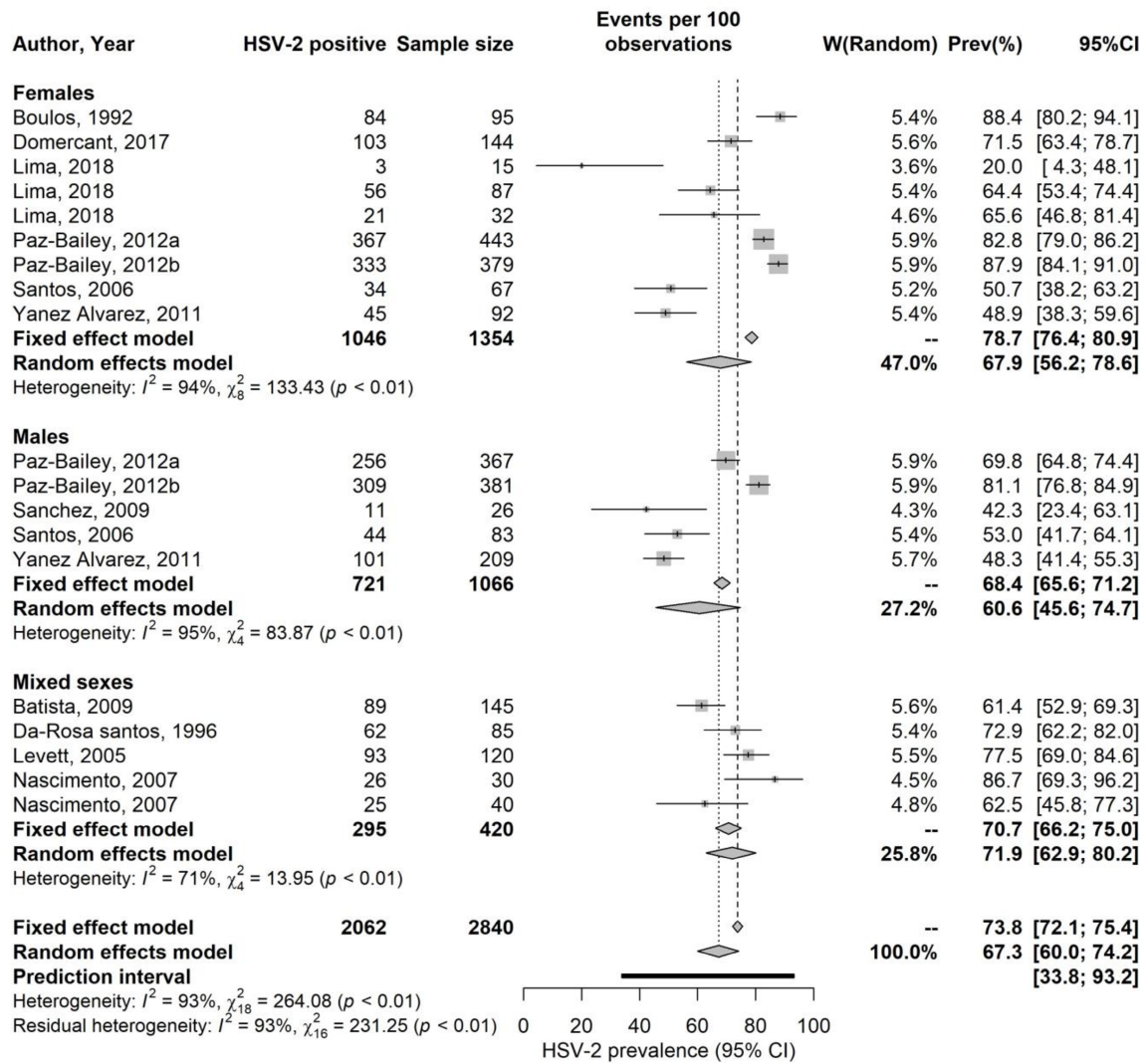
Abbreviations: CI = Confidence interval, HSV-2 = Herpes simplex virus type 2.

## D) STI clinic attendees and symptomatic populations (mixed women and men)



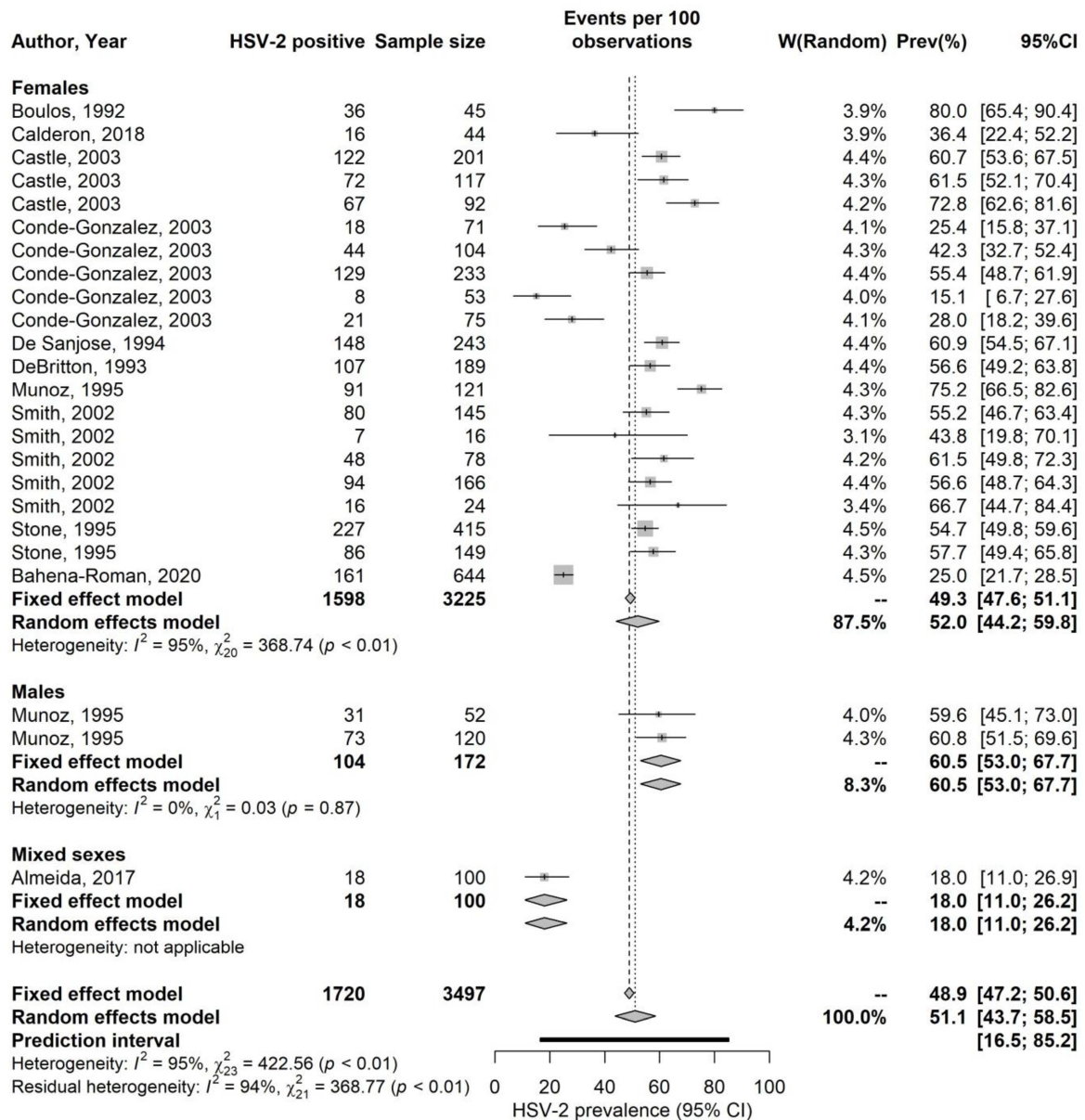
Abbreviations: CI = Confidence interval, HSV-2 = Herpes simplex virus type 2, STI = Sexually transmitted infection.

## F) HIV positive individuals and individuals in HIV discordant couples



Abbreviations: CI = Confidence interval, HSV-2 = Herpes simplex virus type 2, HIV = Human immunodeficiency virus.

## G) Other populations



Abbreviations: CI = Confidence interval, HSV-2 = Herpes simplex virus type 2.

**Table S5.** Univariable and multivariable meta-regression analyses for HSV-2 seroprevalence among the different at risk populations in Latin America and the Caribbean using each of country's income and country *instead* of subregion in the multivariable meta-regression.

			Outcome measures		Sample size		Univariable analysis				Multivariable analysis									
			Total n		Total N		RR (95% CI)		p-value		LR test p-value		Adjusted R <sup>2</sup> (%)		Model 1 <sup>a</sup>		Model 2 <sup>b</sup>		Model 3 <sup>c</sup>	
															ARR (95% CI)		p-value		ARR (95% CI)	
Population characteristics	Population type	General populations	236	56,457	1.00	-	<0.001	45.98	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-	1.00	-
		Intermediate-risk populations	24	6,775	1.52 (1.16-2.00)	0.002			1.55 (1.22-1.96)	<0.001	1.49 (1.18-1.87)	0.001	1.58 (1.26-1.97)	<0.001						
		High-risk populations	93	25,344	3.09 (2.64-3.61)	<0.001			3.09 (2.67-3.57)	<0.001	2.81 (2.44-3.23)	<0.001	3.08 (2.66-3.55)	<0.001						
		STI clinic attendees and symptomatic populations	6	432	2.49 (1.47-4.22)	0.001			2.40 (1.48-3.90)	<0.001	2.15 (1.34-3.45)	0.002	2.18 (1.38-3.42)	0.001						
		HIV positive individuals and individuals in HIV discordant couples	19	2,840	3.21 (2.38-4.32)	<0.001			3.06 (2.37-3.95)	<0.001	2.59 (2.02-3.33)	<0.001	2.77 (2.18-3.51)	<0.001						
		Other populations <sup>d</sup>	24	3,497	2.42 (1.85-3.16)	<0.001			1.56 (1.24-1.97)	<0.001	1.55 (1.24-1.94)	<0.001	1.51 (1.22-1.88)	<0.001						
	Age group	<20 years	35	6,538	1.00	-	<0.001	10.26	1.00	-	1.00	-	1.00	-						
		20-30 years	47	7,751	2.05 (1.40-3.00)	<0.001			1.63 (1.27-2.09)	<0.001	1.70 (1.34-2.17)	<0.001	1.63 (1.29-2.05)	<0.001						
		30-40 years	22	2,933	2.58 (1.64-4.04)	<0.001			2.24 (1.68-2.99)	<0.001	2.29 (1.72-3.03)	<0.001	2.11 (1.61-2.77)	<0.001						
		>40 years	39	5,940	2.84 (1.92-4.18)	<0.001			3.22 (2.50-4.14)	<0.001	3.20 (2.50-4.09)	<0.001	2.92 (2.30-3.71)	<0.001						
		Mixed ages	259	72,183	2.49 (1.82-3.41)	<0.001			1.79 (1.44-2.21)	<0.001	1.72 (1.40-2.12)	<0.001	1.68 (1.37-2.07)	<0.001						
	Sex	Women	234	38,816	1.00	-	0.001	4.82	1.00	-	1.00	-	1.00	-						
		Men	144	39,525	0.67 (0.56-0.80)	<0.001			0.68 (0.60-0.76)	<0.001	0.70 (0.62-0.78)	<0.001	0.68 (0.61-0.76)	<0.001						
		Mixed sexes	24	17,004	0.81 (0.57-1.16)	0.267			0.59 (0.46-0.77)	<0.001	0.65 (0.50-0.83)	0.001	0.62 (0.48-0.80)	<0.001						
	Countries	Brazil	106	25,766	1.00	-	<0.001	12.58	-	-	-	-	1.00	-						
		Colombia	19	2,247	1.36 (0.91-2.01)	0.125			-	-	-	-	1.20 (0.93-1.55)	0.156						
		Costa Rica	13	2,364	1.46 (0.92-2.30)	0.102			-	-	-	-	1.23 (0.92-1.64)	0.157						
		Mexico	76	23,437	0.71 (0.56-0.91)	0.008			-	-	-	-	0.66 (0.56-0.78)	<0.001						
		Panama	15	3,334	1.81 (1.18-2.78)	0.006			-	-	-	-	1.10 (0.82-1.47)	0.506						
		Peru	131	24,976	0.92 (0.74-1.14)	0.476			-	-	-	-	0.87 (0.73-1.02)	0.096						
		Other <sup>e</sup>	42	13,221	1.84 (1.39-2.45)	<0.001			-	-	-	-	1.20 (0.99-1.46)	0.050						
	Subregions	Central America	124	38,103	1.00	-	0.065	0.82	1.00	-	-	-	-	-						
		South America	264	54,798	0.95 (0.79-1.14)	0.606			1.13 (1.00-1.27)	0.047	-	-	-	-						
		Caribbean	14	2,444	1.62 (1.02-2.58)	0.040			1.17 (0.87-1.57)	0.281	-	-	-	-						
Country's income	LIC and LMIC	29	9,846	1.00	-	<0.001	9.07	-	-	1.00	-	-	-							
	UMIC	354	81,539	0.45 (0.33-0.62)	<0.001			-	-	0.65 (0.54-0.78)	<0.001	-	-							
	HIC	19	3,960	0.86 (0.54-1.36)	0.528			-	-	0.83 (0.63-1.11)	0.220	-	-							
Study methodology characteristics	Assay type	Western Blot	94	11,898	1.00	-	0.432	0.00	-	-	-	-	-							
		ELISA	304	82,744	0.89 (0.73-1.09)	0.280			-	-	-	-	-							
		Monoclonal antibody	4	703	1.24 (0.53-2.87)	0.614			-	-	-	-	-							
	Sample size <sup>f</sup>	<200	81	7,542	1.00	-	<0.001	7.27	1.00	-	1.00	-	1.00	-						
		>200	321	87,803	0.58 (0.47-0.71)	<0.001			0.75 (0.64-0.87)	<0.001	0.75 (0.64-0.86)	<0.001	0.82 (0.71-0.95)	0.010						
	Sampling method	Probability based	151	47,471	1.00	-	<0.001	18.05	1.00	-	1.00	-	1.00	-						
		Non-probability based	251	47,874	2.08 (1.76-2.44)	<0.001			1.16 (1.00-1.35)	0.037	1.24 (1.08-1.42)	0.002	1.18 (1.03-1.35)	0.013						
	Response rate	≥80%	194	48,220	1.00	-	0.002	5.52	1.00	-	1.00	-	1.00	-						
<80%		32	6,062	0.59 (0.42-0.82)	0.002			0.79 (0.63-0.99)	0.044	0.76 (0.62-0.95)	0.016	0.89 (0.72-1.10)	0.300							
Unclear		176	41,063	1.25 (1.05-1.49)	0.010			1.07 (0.94-1.22)	0.262	1.07 (0.94-1.22)	0.260	1.13 (1.00-1.29)	0.046							
Temporal category	<2000	49	7,244	1.00	-	<0.001	4.39	1.00	-	1.00	-	1.00	-							
	2000-2010	206	51,983	0.61 (0.47-0.79)	<0.001			0.88 (0.75-1.05)	0.166	0.88 (0.75-1.04)	0.141	0.90 (0.76-1.06)	0.212							
	>2010	147	31,118	0.56 (0.42-0.73)	<0.001			0.74 (0.61-0.89)	0.002	0.74 (0.62-0.89)	0.001	0.76 (0.63-0.91)	0.004							

<sup>a</sup> Variance explained by the multivariable model (adjusted R<sup>2</sup>) = 68.85%.<sup>b</sup> Variance explained by the multivariable model (adjusted R<sup>2</sup>) = 70.63%.<sup>c</sup> Variance explained by the multivariable model (adjusted R<sup>2</sup>) = 73.85%.<sup>d</sup> Other populations include populations with an undetermined risk of acquiring HSV-2 infection such as patients with cervical cancer or their spouses.<sup>e</sup> Other countries include Argentina, Barbados, Bolivia, Chile, Dominican republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, and Nicaragua.

<sup>†</sup>Sample size denotes the sample size of each study population found in the original publication.

Abbreviations: *ARR* = Adjusted risk ratio, *CI* = Confidence interval, *ELISA* = Enzyme-linked immunosorbent assay, *HIC* = High-income country, *HIV* = Human immunodeficiency virus, *HSV-2* = Herpes simplex virus type 2, *LIC* = Low-income country, *LMIC* = Lower-middle-income country, *LR* = Likelihood ratio, *RR* = Risk ratio, *STI* = Sexually transmitted infection, *UMIC* = Upper-middle-income country.

**Table S6.** Univariable and multivariable meta-regression analyses for HSV-2 seroprevalence among the different at-risk populations in Latin America and the Caribbean using the year of data collection as the temporal variable. The analysis using year of publication as the temporal variable is found in Table 3 of main text.

			Outcome measures	Sample size	Univariable analysis				Multivariable analysis					
					Total n	Total N	RR (95% CI)	p-value	LR test p-value	Adjusted R <sup>2</sup> (%)	Model 1 <sup>a</sup>		Model 2 <sup>b</sup>	
											ARR (95% CI)	p-value	ARR (95% CI)	p-value
Population characteristics	Population type	General populations	236	56,457	1.00	-	<0.001	45.98	1.00	-	1.00	-		
		Intermediate-risk populations	24	6,775	1.52 (1.16-2.00)	0.002			1.65 (1.30-2.10)	0.001	1.58 (1.24-2.01)	<0.001		
		High-risk populations	93	25,344	3.09 (2.64-3.61)	<0.001			3.13 (2.71-3.62)	<0.001	3.10 (2.67-3.59)	<0.001		
		STI clinic attendees and symptomatic populations	6	432	2.49 (1.47-4.22)	0.001			2.47 (1.52-4.00)	<0.001	2.40 (1.47-3.90)	<0.001		
		HIV positive individuals and individuals in HIV discordant couples	19	2,840	3.21 (2.38-4.32)	<0.001			3.07 (2.38-3.95)	<0.001	2.95 (2.28-3.81)	<0.001		
		Other populations <sup>c</sup>	24	3,497	2.42 (1.85-3.16)	<0.001			1.60 (1.24-2.02)	<0.001	1.56 (1.23-1.97)	<0.001		
	Age group	<20 years	35	6,538	1.00	-	<0.001	10.26	1.00	-	1.00	-		
		20-30 years	47	7,751	2.05 (1.40-3.00)	<0.001			1.64 (1.29-2.10)	<0.001	1.64 (1.27-2.11)	<0.001		
		30-40 years	22	2,933	2.58 (1.64-4.04)	<0.001			2.14 (1.60-2.86)	<0.001	2.23 (1.66-2.98)	<0.001		
		>40 years	39	5,940	2.84 (1.92-4.18)	<0.001			3.01 (2.34-3.87)	<0.001	3.08 (2.39-3.97)	<0.001		
		Mixed ages	259	72,183	2.49 (1.82-3.41)	<0.001			1.70 (1.38-2.10)	<0.001	1.70 (1.37-2.09)	<0.001		
	Sex	Women	234	38,816	1.00	-	0.001	4.82	1.00	-	1.00	-		
		Men	144	39,525	0.67 (0.56-0.80)	<0.001			0.71 (0.63-0.79)	<0.001	0.69 (0.61-0.77)	<0.001		
		Mixed sexes	24	17,004	0.81 (0.57-1.16)	0.267			0.61 (0.47-0.79)	<0.001	0.63 (0.48-0.82)	0.001		
	Countries	Brazil	106	25,766	1.00	-	<0.001	12.58	-	-	-	-		
		Colombia	19	2,247	1.36 (0.91-2.01)	0.125			-	-	-	-		
		Costa Rica	13	2,364	1.46 (0.92-2.30)	0.102			-	-	-	-		
		Mexico	76	23,437	0.71 (0.56-0.91)	0.008			-	-	-	-		
		Panama	15	3,334	1.81 (1.18-2.78)	0.006			-	-	-	-		
		Peru	131	24,976	0.92 (0.74-1.14)	0.476			-	-	-	-		
		Other <sup>d</sup>	42	13,221	1.84 (1.39-2.45)	<0.001			-	-	-	-		
									-	-	-	-		
	Subregions	Central America	124	38,103	1.00	-	0.065	0.82	1.00	-	1.00	-		
		South America	264	54,798	0.95 (0.79-1.14)	0.606			1.11 (0.98-1.25)	0.082	1.09 (0.96-1.23)	0.147		
		Caribbean	14	2,444	1.62 (1.02-2.58)	0.040			1.10 (0.82-1.47)	0.506	1.16 (0.86-1.56)	0.308		
	Country's income	LIC and LMIC	29	9,846	1.00	-	<0.001	9.07	-	-	-	-		
		UMIC	354	81,539	0.45 (0.33-0.62)	<0.001			-	-	-	-		
		HIC	19	3,960	0.86 (0.54-1.36)	0.528			-	-	-	-		
Study methodology characteristics	Assay type	Western Blot	94	11,898	1.00	-	0.432	0.00	-	-	-	-		
		ELISA	304	82,744	0.89 (0.73-1.09)	0.280			-	-	-	-		
		Monoclonal antibody	4	703	1.24 (0.53-2.87)	0.614			-	-	-	-		
	Sample size <sup>e</sup>	<200	81	7,542	1.00	-	<0.001	7.27	1.00	-	1.00	-		
		>200	321	87,803	0.58 (0.47-0.71)	<0.001			0.79 (0.67-0.93)	0.004	0.73 (0.63-0.85)	<0.001		
	Sampling method	Probability based	151	47,471	1.00	-	<0.001	18.05	1.00	-	1.00	-		
		Non-probability based	251	47,874	2.08 (1.76-2.44)	<0.001			1.17 (1.01-1.35)	0.030	1.18 (1.02-1.36)	0.026		
	Response rate	≥80%	194	48,220	1.00	-	0.002	5.52	1.00	-	1.00	-		
		<80%	32	6,062	0.59 (0.42-0.82)	0.002			0.80 (0.64-1.00)	0.053	0.78 (0.62-0.97)	0.030		
		Unclear	176	41,063	1.25 (1.05-1.49)	0.010			1.09 (0.96-1.24)	0.189	1.11 (0.97-1.27)	0.104		
Temporal variables	Year of data collection category	<2000	151	27,266	1.00	-	0.007	1.94	1.00	-	-	-		
		2000-2010	231	53,038	0.65 (0.54-0.78)	<0.001			0.77 (0.68-0.88)	<0.001	-	-		
		>2010	20	14,041	0.85 (0.58-1.25)	0.429			0.95 (0.75-1.20)	0.683	-	-		
	Year of data collection	402	95,345	0.98 (0.97-0.99)	0.024	<0.001	2.98	-	-	0.99 (0.98-0.99)	0.031			



<sup>a</sup> Variance explained by the multivariable model (adjusted  $R^2$ ) = 69.12%.

<sup>b</sup> Variance explained by the multivariable model (adjusted  $R^2$ ) = 68.45%.

<sup>c</sup> Other populations include populations with an undetermined risk of acquiring HSV-2 infection such as patients with cervical cancer or their spouses.

<sup>d</sup> Other countries include Argentina, Barbados, Bolivia, Chile, Dominican republic, El Salvador, Guatemala, Haiti, Honduras, Jamaica, and Nicaragua.

<sup>e</sup> Sample size denotes the sample size of each study population found in the original publication.

Abbreviations: *ARR* = Adjusted risk ratio, *CI* = Confidence interval, *ELISA* = Enzyme-linked immunosorbent assay, *HIC* = High-income country *HIV* = Human immunodeficiency virus, *HSV-2* = Herpes simplex virus type 2, *LIC* = Low-income country, *LMIC* = Lower-middle-income country, *LR* = Likelihood ratio, *RR* = Risk ratio, *STI* = Sexually transmitted infection, *UMIC* = Upper-middle-income country.

**Table S7.** Studies reporting proportions of HSV-2 virus isolation in clinically-diagnosed genital ulcer disease and in clinically-diagnosed genital herpes in Latin America and the Caribbean.

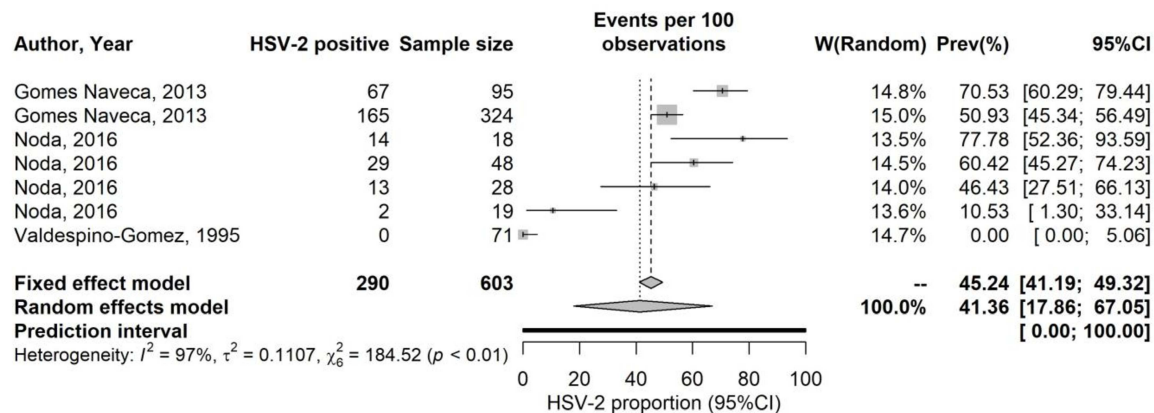
Author, year	Year(s) of data collection	Country	Study site	Original study design*	Sampling method	Population	HSV-2 biological assay	Sample size	Proportion of HSV-2 detection (%)
<b>Patients with clinically-diagnosed GUD</b>									
Gomes Naveca, 2013 <sup>97</sup>	2008-09	Brazil	Outpatient clinic	CS	Conv	Patients with primary GUD	PCR	324	50.9
Gomes Naveca, 2013 <sup>97</sup>	2008-09	Brazil	Outpatient clinic	CS	Conv	Patients with recurring GUD	PCR	95	70.5
Noda, 2016 <sup>98</sup>	2012-15	Cuba	Outpatient clinic	CS	Conv	Male patients with GUD aged 15-20 years	PCR	18	77.8
Noda, 2016 <sup>98</sup>	2012-15	Cuba	Outpatient clinic	CS	Conv	Male patients with GUD aged 21-30 years	PCR	48	60.4
Noda, 2016 <sup>98</sup>	2012-15	Cuba	Outpatient clinic	CS	Conv	Male patients with GUD aged 31-40 years	PCR	28	46.4
Noda, 2016 <sup>98</sup>	2012-15	Cuba	Outpatient clinic	CS	Conv	Male patients with GUD aged >41 years	PCR	19	10.5
Valdespino-Gomez, 1995 <sup>99</sup>	1990	Mexico	Community	CS	Conv	FSWs with GUD	IF	71	0.0
<b>Patients with clinically-diagnosed genital herpes</b>									
Balachandran, 1982 <sup>100</sup>	-	Puerto Rico	Outpatient clinic	CS	Conv	Patients with genital herpes	IF	12	91.6
Belli, 1990 <sup>101</sup>	1982-83	Argentina	Outpatient clinic	CS	Conv	Patients with genital herpes	IF	25	79.0
do Nascimento, 1998 <sup>102</sup>	1995	Brazil	Outpatient clinic	CS	Conv	HIV positive patients with genital herpes	PCR	36	94.4
Hun, 1987 <sup>103</sup>	-	Costa Rica	Outpatient clinic	CS	Conv	STI clinic attendees with genital herpes	Virus isolation	12	75.0
Orozco-Topete, 1997 <sup>104</sup>	-	Mexico	Outpatient clinic	RCT <sup>a</sup>	RS	HIV positive patients with recurrent genital herpes	Culture	45	100
Prabhakar, 1987 <sup>105</sup>	1982-84	Jamaica	Outpatient clinic	CS	Conv	Women with genital herpes	IF	40	100
Schultz, 1994 <sup>106</sup>	1988-90	Chile	Outpatient clinic	CS	Conv	Pregnant women with genital lesions	IF	20	90.0
Suárez, 1988 <sup>107</sup>	1985-86	Chile	Outpatient clinic	CS	Conv	Patients with primary genital herpes	IF	14	71.5
Suárez, 1988 <sup>107</sup>	1985-86	Chile	Outpatient clinic	CS	Conv	Patients with recurrent genital herpes	IF	64	90.2
Suárez, 1989 <sup>108</sup>	1984-86	Chile	Outpatient clinic	CS	Conv	Women with genital herpes	IF	13	76.9

\*The reported study design is the original study design (case control, cross sectional, longitudinal cohort, or randomized controlled trial). The included seroprevalence measures are those for the baseline measures at the beginning of the study.

Abbreviations: Conv = Convenience, CS = Cross sectional, GUD = Genital ulcer disease, FSWS = Female sex workers HSV-2 = Herpes simplex virus type 2, IF = Immunofluorescence, PCR = Polymerase chain reaction, RCT = Randomized controlled trial, RS = Random sampling, STI = Sexually transmitted infections.

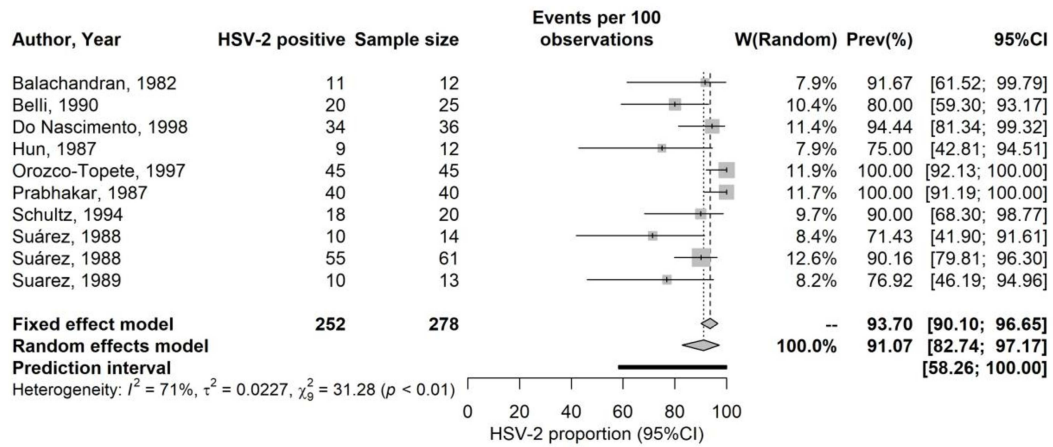
**Figure S2.** Forest plots presenting the outcomes of the pooled mean proportions of HSV-2 virus isolation in clinically-diagnosed genital ulcer disease and in clinically-diagnosed genital herpes in Latin America and the Caribbean.

A) Patients with GUD



Abbreviations: CI = Confidence interval, GUD = Genital ulcer disease, HSV-2 = Herpes simplex virus type 2.

## B) Patients with genital herpes



Abbreviations: CI = Confidence interval, HSV-2 = Herpes simplex virus type 2.

**Table S8.** Summary of the precision assessment and risk of bias assessment for the studies reporting HSV-2 seroprevalence in Latin America and the Caribbean.

Quality assessment	HSV-2 seroprevalence measures	
	Number of studies	%
<b>Precision of seroprevalence measures<sup>a</sup></b>		
Low precision	29	17.8
High precision	134	82.2
<b>Risk of bias quality domain<sup>b</sup></b>		
<b>Sampling method</b>		
Low risk of bias	47	28.8
High risk of bias	116	71.2
<b>Response rate</b>		
Low risk of bias	58	35.6
High risk of bias	9	5.5
Unclear risk of bias	96	58.9
<b>Summary of the risk of bias assessment</b>		
<b>Low risk of bias</b>		
In at least one quality domain	63	38.6
In both quality domains	30	18.4
<b>High risk of bias</b>		
In at least one quality domain	37	22.7
In both quality domains	4	2.4
<b>Seroprevalence studies where risk of bias assessment was possible</b>	<b>163</b>	<b>100</b>

<sup>a</sup>Precision was assessed based on the overall sample size (not each stratum subsample size) of the study as reported in the record/publication.

<sup>b</sup>Risk of bias was assessed based on the overall sample size (not each stratum subsample size) of the study as reported in the record/publication.

Abbreviations: HSV-2 = Herpes simplex virus type 2.

## References

1. Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS medicine* 2009;6(7):e1000097. doi: 10.1371/journal.pmed.1000097
2. Smolak A, Chemaitelly H, Hermez JG, et al. Epidemiology of Chlamydia trachomatis in the Middle East and north Africa: a systematic review, meta-analysis, and meta-regression. *Lancet Glob Health* 2019;7(9):e1197-e225. doi: 10.1016/S2214-109X(19)30279-7 [published Online First: 2019/08/14]
3. Abu-Raddad LJ, Akala FA, Semini I, et al. Characterizing the HIV/AIDS Epidemic in the Middle East and North Africa : Time for Strategic Action. World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/2457> License: CC BY 3.0 IGO. 2010
4. Brunham RC, Plummer FA. A general model of sexually transmitted disease epidemiology and its implications for control. *Med Clin North Am* 1990;74(6):1339-52.
5. Low N, Broutet N, Adu-Sarkodie Y, et al. Global control of sexually transmitted infections. *Lancet* 2006;368(9551):2001-16.
6. World Health Organization. Global strategy for the prevention and control of sexually transmitted infections: 2006 - 2015. Breaking the chain of transmission. WHO Press, Geneva, Switzerland. Found at: <http://www.who.int/reproductivehealth/publications/rtis/9789241563475/en/>. Last accessed April 2012. 2007
7. Lupi O. Prevalence and risk factors for herpes simplex infection among patients at high risk for HIV infection in Brazil. *Int J Dermatol* 2011;50(6):709-13.
8. Sánchez-Alemán MA, Uribe-Salas FJ, Lazcano-Ponce EC, et al. HSV-2 seroincidence among Mexican college students: the delay of sexual debut is not enough to avoid risky sexual behaviours and virus transmission. *Sex Transm Infect* 2010;86(7):565-9.
9. Konda KA, Lescano AG, Celentano DD, et al. In Peru, reporting male sex partners imparts significant risk of incident HIV/sexually transmitted infection: all men Engaging in same-sex behavior need prevention services. *Sex Transm Dis* 2013;40(7):569-74.
10. Castillo R, Konda KA, Leon SR, et al. HIV and Sexually Transmitted Infection Incidence and Associated Risk Factors Among High-Risk MSM and Male-to-Female Transgender Women in Lima, Peru. *J Acquir Immune Defic Syndr* 2015;69(5):567-75.
11. Sanchez J, Lama JR, Peinado J, et al. High HIV and ulcerative sexually transmitted infection incidence estimates among men who have sex with men in Peru: awaiting for an effective preventive intervention. *J Acquir Immune Defic Syndr* 2009;51 Suppl 1:S47-51.
12. Yanez Alvarez I, Martinez Salazar MF, Conde Gonzalez CJ, et al. Herpes simplex virus type 2 seroprevalence and seroincidence among HIV infected persons. *Enfermedades Infecciosas y Microbiologia* 2011;31(3):93-97.
13. Abraham CD, Conde-Glez CJ, Cruz-Valdez A, et al. Sexual and demographic risk factors for herpes simplex virus type 2 according to schooling level among Mexican youths. *Sex Transm Dis* 2003;30(7):549-55.
14. Alberts CJ, Schim van der Loeff MF, Papenfuss MR, et al. Association of Chlamydia trachomatis infection and herpes simplex virus type 2 serostatus with genital human papillomavirus infection in men: the HPV in men study. *Sex Transm Dis* 2013;40(6):508-15.
15. Almeida JFM, Campos AH, Marcello MA, et al. Investigation on the association between thyroid tumorigenesis and herpesviruses. *Journal of endocrinological investigation* 2017;40(8):823-29. doi: 10.1007/s40618-017-0609-y [published Online First: 2017/03/10]
16. Ashley-Morrow R, Nollkamper J, Robinson NJ, et al. Performance of Focus ELISA tests for herpes simplex virus type 1 (HSV-1) and HSV-2 antibodies among women in ten diverse geographical locations. *Clinical Microbiology and Infection* 2004;10(6):530-36. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1111/j.1469-0691.2004.00836.x>

17. Boulos R, Ruff AJ, Nahmias A, et al. Herpes simplex virus type 2 infection, syphilis, and hepatitis B virus infection in Haitian women with human immunodeficiency virus type 1 and human T lymphotropic virus type I infections. The Johns Hopkins University (JHU)/Centre pour le Developpement et la Santé (CDS) HIV Study Group. *J Infect Dis* 1992;166(2):418-20.
18. Cárcamo CP, Campos PE, García PJ, et al. Prevalences of sexually transmitted infections in young adults and female sex workers in Peru: a national population-based survey. *Lancet Infect Dis* 2012;12(10):765-73.
19. Carvalho M, De Carvalho S, Pannuti CS, et al. Prevalence of herpes simplex type 2 antibodies and a clinical history of herpes in three different populations in Campinas City, Brazil. *International Journal of Infectious Diseases* 1999;3(2):94-98. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1016/S1201-9712%2899%2990016-4>
20. Clark JL, Konda KA, Munayco CV, et al. Prevalence of HIV, herpes simplex virus-2, and syphilis in male sex partners of pregnant women in Peru. *BMC Public Health* 2008;8:65-65.
21. Clemens SAC, Farhat CK. Seroprevalence of herpes simplex 1-2 antibodies in Brazil. *Rev Saude Publica* 2010;44(4):726-34.
22. Conde-Glez C, Lazcano-Ponce E, Rojas R, et al. Seroprevalences of varicella-zoster virus, herpes simplex virus and cytomegalovirus in a cross-sectional study in Mexico. *Vaccine* 2013;31(44):5067-74.
23. Conde-Gonzalez CJ, Lazcano-Ponce E, Hernandez-Giron C, et al. [Seroprevalence of type 2 herpes simplex virus infection in 3 population groups of Mexico City]. *Salud publica de Mexico* 2003;45 Supp 5:S608-16. [published Online First: 2004/02/21]
24. Cowan FM, French RS, Mayaud P, et al. Seroepidemiological study of herpes simplex virus types 1 and 2 in Brazil, Estonia, India, Morocco, and Sri Lanka. *Sex Transm Infect* 2003;79(4):286-90.
25. Da Rosa-Santos OL, Gonçalves Da Silva A, Pereira AC. Herpes simplex virus type 2 in Brazil: seroepidemiologic survey. *Int J Dermatol* 1996;35(11):794-6.
26. De Sanjose S, Munoz N, Bosch F, et al. Sexually transmitted agents and cervical neoplasia in Colombia and Spain. *International Journal of Cancer* 1994;56(3):358-63.
27. Domercant JW, Jean Louis F, Hulland E, et al. Seroprevalence of Herpes Simplex Virus type-2 (HSV-2) among pregnant women who participated in a national HIV surveillance activity in Haiti. *BMC Infect Dis* 2017;17(1):577-77.
28. Gabster A, Pascale JM, Cislighi B, et al. High Prevalence of Sexually Transmitted Infections, and High-Risk Sexual Behaviors Among Indigenous Adolescents of the Comarca Ngäbe-Buglé, Panama. *Sex Transm Dis* 2019;46(12):780-87.
29. Gonzalez TT, Sabino EC, Murphy EL, et al. Human immunodeficiency virus test-seeking motivation in blood donors, São Paulo, Brazil. *Vox Sang* 2006;90(3):170-6.
30. Gonzalez TT, Blatyta PF, Santos FM, et al. Does offering human immunodeficiency virus testing at the time of blood donation reduce transfusion transmission risk and increase disclosure counseling? Results of a randomized controlled trial, São Paulo, Brazil. *Transfusion* 2015;55(6):1214-22.
31. Gutierrez J-P, Bertozzi SM, Conde-Glez CJ, et al. Risk behaviors of 15-21 year olds in Mexico lead to a high prevalence of sexually transmitted infections: results of a survey in disadvantaged urban areas. *BMC Public Health* 2006;6:49-49.
32. Gutierrez JP, Conde-González CJ, Walker DM, et al. Herpes simplex virus type 2 among Mexican high school adolescents: prevalence and association with community characteristics. *Arch Med Res* 2007;38(7):774-82.
33. Herrera-Ortiz A, Conde-Glez CJ, Vergara-Ortega DN, et al. Avidity of antibodies against HSV-2 and risk to neonatal transmission among Mexican pregnant women. *Infect Dis Obstet Gynecol* 2013;2013:140142-42.
34. Juarez-Figueroa LA, Uribe-Salas FJ, Conde-Glez CJ, et al. Hepatitis B markers in men seeking human immunodeficiency virus antibody testing in Mexico City. *Sex Transm Dis* 1997;24(4):211-7. [published Online First: 1997/04/01]

35. Konda KA, Klausner JD, Lescano AG, et al. The epidemiology of herpes simplex virus type 2 infection in low-income urban populations in coastal Peru. *Sex Transm Dis* 2005;32(9):534-41.
36. Lazcano-Ponce E, Smith JS, Muñoz N, et al. High prevalence of antibodies to herpes simplex virus type 2 among middle-aged women in Mexico City, Mexico: a population-based study. *Sex Transm Dis* 2001;28(5):270-6.
37. Levett PN. Seroprevalence of HSV-1 and HSV-2 in Barbados. *Med Microbiol Immunol* 2005;194(1-2):105-7.
38. Moreira-Soto A, Cabral R, Pedroso C, et al. Exhaustive TORCH Pathogen Diagnostics Corroborate Zika Virus Etiology of Congenital Malformations in Northeastern Brazil. *mSphere* 2018;3(4) doi: 10.1128/mSphere.00278-18 [published Online First: 2018/08/10]
39. Muñoz N, Kato I, Bosch FX, et al. Cervical cancer and herpes simplex virus type 2: case-control studies in Spain and Colombia, with special reference to immunoglobulin-G sub-classes. *Int J Cancer* 1995;60(4):438-42.
40. Nascimento MC, Ferreira S, Sabino E, et al. Performance of the HerpeSelect (Focus) and Kalon enzyme-linked immunosorbent assays for detection of antibodies against herpes simplex virus type 2 by use of monoclonal antibody-blocking enzyme immunoassay and clinicovirological reference standards in Brazil. *Journal of clinical microbiology* 2007;45(7):2309-11. doi: 10.1128/jcm.00144-07 [published Online First: 2007/05/18]
41. Nascimento MC, De Souza VA, Sumita LM, et al. Prevalence of, and risk factors for Kaposi's sarcoma-associated herpesvirus infection among blood donors in Brazil: A multi-center serosurvey. *Journal of Medical Virology* 2008;80(7):1202-10. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1002/jmv.21188>
42. Nascimento MC, Sumita LM, Souza VU, et al. Seroprevalence of Kaposi sarcoma-associated herpesvirus and other serologic markers in the Brazilian Amazon. *Emerging infectious diseases* 2009;15(4):663-7. doi: 10.3201/eid1504.081488 [published Online First: 2009/04/01]
43. Oberle MW, Rosero-Bixby L, Lee FK, et al. Herpes simplex virus type 2 antibodies: high prevalence in monogamous women in Costa Rica. *Am J Trop Med Hyg* 1989;41(2):224-9.
44. Patnaik P, Herrero R, Morrow RA, et al. Type-specific seroprevalence of herpes simplex virus type 2 and associated risk factors in middle-aged women from 6 countries: the IARC multicentric study. *Sex Transm Dis* 2007;34(12):1019-24.
45. Patzi-Churqui M, Terrazas-Aranda K, Liljeqvist JA, et al. Prevalence of viral sexually transmitted infections and HPV high-risk genotypes in women in rural communities in the Department of La Paz, Bolivia. *BMC Infect Dis* 2020;20(1):204. doi: 10.1186/s12879-020-4931-1 [published Online First: 2020/03/08]
46. Paz-Bailey G, Morales-Miranda S, Jacobson JO, et al. High rates of STD and sexual risk behaviors among Garífunas in Honduras. *J Acquir Immune Defic Syndr* 2009;51 Suppl 1:S26-34.
47. Rodríguez AC, Castle PE, Smith JS, et al. A population based study of herpes simplex virus 2 seroprevalence in rural Costa Rica. *Sex Transm Infect* 2003;79(6):460-5.
48. Sánchez J, Gotuzzo E, Escamilla J, et al. Gender differences in sexual practices and sexually transmitted infections among adults in Lima, Peru. *Am J Public Health* 1996;86(8):1098-107.
49. Sánchez-Alemán MA, Conde-Glez CJ, Gayet C, et al. Sexual behavior and herpes simplex virus 2 infection in college students. *Arch Med Res* 2005;36(5):574-80.
50. Sánchez-Alemán MA, Conde-Glez CJ, Uribe-Salas F. Core group approach to identify college students at risk for sexually transmitted infections. *Rev Saude Publica* 2008;42(3):428-36.
51. Sierra CA, Bedoya AM, Paris S, et al. Prevalence of specific herpes simplex virus-2 antibodies and associated factors in women of a rural town of Colombia. *Trans R Soc Trop Med Hyg* 2011;105(4):232-8.
52. Smith JS, Herrero R, Muñoz N, et al. Prevalence and risk factors for herpes simplex virus type 2 infection among middle-age women in Brazil and the Philippines. *Sex Transm Dis* 2001;28(4):187-94.



53. Smith JS, Herrero R, Bosetti C, et al. Herpes simplex virus-2 as a human papillomavirus cofactor in the etiology of invasive cervical cancer. *Journal of the National Cancer Institute* 2002;94(21):1604-13. [published Online First: 2002/11/07]
54. Uribe-Salas F, Palma-Coca O, Sánchez-Alemán MA, et al. Population-based prevalence of antibodies against herpes simplex virus type 2 and socio-demographic characteristics in Mexico. *Trans R Soc Trop Med Hyg* 2009;103(2):151-8.
55. Vaccarella S, Franceschi S, Herrero R, et al. Sexual behavior, condom use, and human papillomavirus: pooled analysis of the IARC human papillomavirus prevalence surveys. *Cancer Epidemiology and Prevention Biomarkers* 2006;15(2):326-33.
56. Weinberg A, Canto CL, Pannuti CS, et al. Herpes simplex virus type 2 infection in pregnancy: asymptomatic viral excretion at delivery and seroepidemiologic survey of two socioeconomically distinct populations in Sao Paulo, Brazil. *Revista do Instituto de Medicina Tropical de Sao Paulo* 1993;35(3):285-90. [published Online First: 1993/05/01]
57. Zamilpa-Mejía LG, Uribe-Salas F, Juárez-Figueroa L, et al. Prevalencia y factores asociados con sífilis y herpes genital en dos grupos de población femenina. *Salud publica de Mexico* 2003;45 Supp 5:S617-23.
58. Benzaken A, Sabidó M, Galban E, et al. HIV and sexually transmitted infections at the borderlands: situational analysis of sexual health in the Brazilian Amazon. *Sex Transm Infect* 2012;88(4):294-300.
59. Celentano DD, Mayer KH, Pequegnat W, et al. Prevalence of Sexually Transmitted Diseases and Risk Behaviors from the NIMH Collaborative HIV/STD Prevention Trial. *International journal of sexual health : official journal of the World Association for Sexual Health* 2010;22(4):272-84. doi: 10.1080/19317611.2010.494092 [published Online First: 2010/01/01]
60. Clark JL, Lescano AG, Konda KA, et al. Syndromic management and STI control in urban Peru. *PLoS One* 2009;4(9):e7201-e01.
61. Couture M-C, Soto JC, Akom E, et al. Clients of female sex workers in Gonaives and St-Marc, Haiti characteristics, sexually transmitted infection prevalence and risk factors. *Sex Transm Dis* 2008;35(10):849-55.
62. Pinho AA, Chinaglia M, Lippman SA, et al. Prevalence and factors associated with HSV-2 and hepatitis B infections among truck drivers crossing the southern Brazilian border. *Sex Transm Infect* 2011;87(7):553-9.
63. Sabidó M, Lahuerta M, Montoliu A, et al. Human immunodeficiency virus, sexually transmitted infections, and risk behaviors among clients of sex workers in Guatemala: are they a bridge in human immunodeficiency virus transmission? *Sex Transm Dis* 2011;38(8):735-42.
64. Uribe-Salas F, Hernandez-Giron C, Conde-Gonzalez C, et al. Characteristics related to STD/HIV in men working in Mexico City bars where female prostitution takes place. *Salud publica de Mexico* 1995;37(5):385-93.
65. Villarroel-Torrico M, Montano K, Flores-Arispe P, et al. Syphilis, human immunodeficiency virus, herpes genital and hepatitis B in a women's prison in Cochabamba, Bolivia: prevalence and risk factors. *Revista espanola de sanidad penitenciaria* 2018;20(2):47-54. [published Online First: 2018/09/20]
66. Brito MO, Hodge D, Donastorg Y, et al. Risk behaviours and prevalence of sexually transmitted infections and HIV in a group of Dominican gay men, other men who have sex with men and transgender women. *BMJ Open* 2015;5(4):e007747-e47.
67. Conde-Glez CJ, Juárez-Figueroa L, Uribe-Salas F, et al. Analysis of herpes simplex virus 1 and 2 infection in women with high risk sexual behaviour in Mexico. *Int J Epidemiol* 1999;28(3):571-6.
68. HIV, STD and risk behaviors among female sex worker in El Salvador. Poster CDC0622. International AIDS Conference; 2010; Vienna, Austria.
69. Gotuzzo E, Sanchez J, Escamilla J, et al. Human T cell lymphotropic virus type I infection among female sex workers in Peru. *J Infect Dis* 1994;169(4):754-9. [published Online First: 1994/04/01]
70. Hakre S, Arteaga G, Núñez AE, et al. Prevalence of HIV and other sexually transmitted infections and factors associated with syphilis among female sex workers in Panama. *Sex Transm Infect* 2013;89(2):156-64.

71. Hakre S, Arteaga GB, Núñez AE, et al. Prevalence of HIV, syphilis, and other sexually transmitted infections among MSM from three cities in Panama. *J Urban Health* 2014;91(4):793-808.
72. Hernandez F, Arambu N, Alvarez B, et al. High incidence of HIV and low HIV prevention coverage among men who have sex with men in Managua, Nicaragua. *Sexually Transmitted Infections* 2011;87(SUPPL. 1):A146. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1136/sextrans-2011-050108.112>
73. Lama JR, Lucchetti A, Suarez L, et al. Association of herpes simplex virus type 2 infection and syphilis with human immunodeficiency virus infection among men who have sex with men in Peru. *J Infect Dis* 2006;194(10):1459-66.
74. Morales-Miranda S, Paredes M, Arambu N, et al. HIV, STD and risk behaviors among men who have sex with men, female sex workers, and indigenous Garífuna population in Honduras. . WEAX0305 In: International AIDS Conference Mexico, Mexico, 2008.
75. Perez-Brumer AG, Konda KA, Salvatierra HJ, et al. Prevalence of HIV, STIs, and risk behaviors in a cross-sectional community- and clinic-based sample of men who have sex with men (MSM) in Lima, Peru. *PLoS One* 2013;8(4):e59072-e72.
76. Perla ME, Ghee AE, Sánchez S, et al. Genital tract infections, bacterial vaginosis, HIV, and reproductive health issues among Lima-based clandestine female sex workers. *Infect Dis Obstet Gynecol* 2012;2012:739624-24.
77. Rodrigues J, Grinsztejn B, Bastos FI, et al. Seroprevalence and factors associated with herpes simplex virus type 2 among HIV-negative high-risk men who have sex with men from Rio de Janeiro, Brazil: a cross-sectional study. *BMC Infect Dis* 2009;9:39-39.
78. Sanchez J, Gotuzzo E, Escamilla J, et al. Sexually transmitted infections in female sex workers: reduced by condom use but not by a limited periodic examination program. *Sex Transm Dis* 1998;25(2):82-9. [published Online First: 1998/03/28]
79. Sanchez J, Lama JR, Kusunoki L, et al. HIV-1, sexually transmitted infections, and sexual behavior trends among men who have sex with men in Lima, Peru. *J Acquir Immune Defic Syndr* 2007;44(5):578-85.
80. Shah NS, Kim E, de Maria Hernández Ayala F, et al. Performance and comparison of self-reported STI symptoms among high-risk populations - MSM, sex workers, persons living with HIV/AIDS - in El Salvador. *Int J STD AIDS* 2014;25(14):984-91.
81. Silva-Santisteban A, Raymond HF, Salazar X, et al. Understanding the HIV/AIDS epidemic in transgender women of Lima, Peru: results from a sero-epidemiologic study using respondent driven sampling. *AIDS Behav* 2012;16(4):872-81.
82. Soto RJ, Ghee AE, Nunez CA, et al. Sentinel surveillance of sexually transmitted infections/HIV and risk behaviors in vulnerable populations in 5 Central American countries. *J Acquir Immune Defic Syndr* 2007;46(1):101-11.
83. Uribe-Salas F, Hernández-Avila M, Juárez-Figueroa L, et al. Risk factors for herpes simplex virus type 2 infection among female commercial sex workers in Mexico City. *Int J STD AIDS* 1999;10(2):105-11.
84. Uribe-Salas F, Conde-Glez CJ, Juárez-Figueroa L, et al. Socio-demographic characteristics and sex practices related to herpes simplex virus type 2 infection in Mexican and Central American female sex workers. *Epidemiol Infect* 2003;131(2):859-65.
85. Zunt JR, La Rosa AM, Peinado J, et al. Risk factors for HTLV-II infection in Peruvian men who have sex with men. *Am J Trop Med Hyg* 2006;74(5):922-5.
86. Martinez MJ, Navarrete N, Santander E, et al. Seroprevalence of herpes simplex virus type 2 (HSV-2) infection in two clinics for sexually transmitted diseases in Santiago, Chile. *Revista medica de Chile* 2005;133(3):302-06.
87. Batista MD, Ferreira S, Sauer MM, et al. High human herpesvirus 8 (HHV-8) prevalence, clinical correlates and high incidence among recently HIV-1-infected subjects in Sao Paulo, Brazil. *PLoS ONE* 2009;4(5):e5613. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1371/journal.pone.0005613>
88. Lima LRP, Fernandes LEBC, Villela DAM, et al. Co-infection of human herpesvirus type 2 (HHV-2) and human immunodeficiency virus (HIV) among pregnant women in Rio de Janeiro, Brazil. *AIDS Care* -

*Psychological and Socio-Medical Aspects of AIDS/HIV* 2018;30(3):378-82. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1080/09540121.2017.1378798>

89. Paz-Bailey G, Isern Fernandez V, Morales Miranda S, et al. Unsafe sexual behaviors among HIV-positive men and women in Honduras: the role of discrimination, condom access, and gender. *Sex Transm Dis* 2012a;39(1):35-41.
90. Paz-Bailey G, Shah N, Creswell J, et al. Risk behaviors and STI prevalence among people with HIV in El Salvador. *Open AIDS J* 2012b;6:205-12.
91. Santos FC, De Oliveira SA, Setubal S, et al. Seroepidemiological study of herpes simplex virus type 2 in patients with the acquired immunodeficiency syndrome in the City of Niteroi, Rio de Janeiro, Brazil. *Memorias do Instituto Oswaldo Cruz* 2006;101(3):315-19.
92. Bahena-Roman M, Sanchez-Aleman MA, Contreras-Ochoa CO, et al. Prevalence of active infection by herpes simplex virus type 2 in patients with high-risk human papillomavirus infection: A cross-sectional study. *J Med Virol* 2020 doi: 10.1002/jmy.25668 [published Online First: 2020/01/12]
93. Calderon G, Pinto M, Pizarro R, et al. Viral infections associated in breast cancer patients in a Latin American cancer institute. *Annals of Surgical Oncology* 2018;25(2 Supplement 1):148-49. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1245/s10434-018-6534-2>
94. Castle PE, Escoffery C, Schachter J, et al. Chlamydia trachomatis, herpes simplex virus 2, and human T-cell lymphotropic virus type 1 are not associated with grade of cervical neoplasia in Jamaican colposcopy patients. *Sex Transm Dis* 2003;30(7):575-80.
95. DeBritton RC, Hildesheim A, De Lao SL, et al. Human papillomaviruses and other influences on survival from cervical cancer in Panama. *Obstet Gynecol* 1993;81(1):19-24.
96. Stone KM, Zaidi A, Rosero-Bixby L, et al. Sexual behavior, sexually transmitted diseases, and risk of cervical cancer. *Epidemiology* 1995;6(4):409-14.
97. Gomes Naveca F, Sabidó M, Amaral Pires de Almeida T, et al. Etiology of genital ulcer disease in a sexually transmitted infection reference center in Manaus, Brazilian Amazon. *PLoS One* 2013;8(5):e63953-e53.
98. Noda AA, Blanco O, Correa C, et al. Etiology of Genital Ulcer Disease in Male Patients Attending a Sexually Transmitted Diseases Clinic: First Assessment in Cuba. *Sex Transm Dis* 2016;43(8):494-7.
99. Valdespino-Gomez JL, Garcia-Garcia ML, del Rio-Chiriboga C, et al. Sexually transmitted diseases and the HIV/AIDS epidemic. *Salud publica de Mexico* 1995;37(6):549-55.
100. Balachandran N, Frame B, Chernesky M, et al. Identification and typing of herpes simplex viruses with monoclonal antibodies. *Journal of clinical microbiology* 1982;16(1):205-08.
101. Belli L, Irigoyen MH, Casco RH, et al. Pautas para el manejo de la infección herpética genital en la experiencia de un centro de atención de ETS en Buenos Aires (Argentina). *Med Cutan Ibero Lat Am* 1990;18(1):44-8.
102. do Nascimento MC, Sumita LM, de Souza VA, et al. Detection and direct typing of herpes simplex virus in perianal ulcers of patients with AIDS by PCR. *Journal of clinical microbiology* 1998;36(3):848-49.
103. Hun L, Fuentes LG. Diagnóstico del laboratorio de virus herpes simplex en Costa Rica. *Rev Costarric Cienc Med* 1987;8(3):143-8.
104. Orozco-Topete R, Sierra-Madero J, Cano-Dominguez C, et al. Safety and efficacy of Virend for topical treatment of genital and anal herpes simplex lesions in patients with AIDS. *Antiviral Research* 1997;35(2):91-103. doi: <http://0-dx.doi.org.elibrary.qatar-weill.cornell.edu/10.1016/S0166-3542%2897%2900015-6>
105. Prabhakar P, Allam MG, Prabhu PS, et al. Genital herpes in Jamaica. A clinical and pathological study (1982-1984). *West Indian Med J* 1987;36(3):154-8.
106. Schultz R, Suarez M, Saavedra T. Follow-up of pregnant women at high risk of transmitting herpes simplex virus. *Bulletin of the Pan American Health Organization* 1994;28(2):163-8. [published Online First: 1994/06/01]
107. Suárez M, Labbé V, Saavedra T, et al. Tipos víricos del herpes simple asociados a infecciones genitales primarias y recurrentes en Chile. *Bol Oficina Sanit Panam* 1988;105(1):13-9.

108. Suarez M, Briones H, Dubinovsky S, et al. Genital herpes infection in Chilean female university students. *Boletin de la Oficina Sanitaria Panamericana Pan American Sanitary Bureau* 1989;106(5):389-95.