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Table S1. PRISMA checklist. Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist [1,2].

Section and topic	Item #	Checklist item	Location where item is reported
Title			
Title	1	Identify the report as a systematic review.	Title
Abstract			
Abstract	2	See the PRISMA 2020 for Abstracts checklist (table 2).	Abstract
Introduction			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Introduction
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Introduction
Methods			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Methods: Study selection process and inclusion and exclusion criteria
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Methods: Data sources and search strategy; Box S1; Figure 1
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Box S1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Methods: Study selection process and inclusion and exclusion criteria
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Methods: Data extraction; Boxes S2 and S3
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g., for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Methods: Data extraction; Boxes S2 and S3
	10b	List and define all other variables for which data were sought (e.g., participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Methods: Critical appraisal of studies; Assessment of publication bias; Table S2;
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Methods: Critical appraisal of studies; Assessment of publication bias; Table S2
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Methods: Data extraction; Meta-analyses; Meta-regressions; Box S4
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Methods: Meta-analyses; Meta-regressions; Box S4
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Methods: Meta-analyses; Meta-regressions; Box S4
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Methods: Meta-analyses; Critical appraisal of studies; Assessment of publication bias
	13d	Describe any methods used to synthesise results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Methods: Meta-analyses
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Methods: Meta-regressions; Box S4
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesised results.	Methods: Meta-regressions; Critical appraisal of studies; Assessment of publication bias; Box S4
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Methods: Meta-analyses; Meta-regressions; Box S4
Results			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram (see Figure 1).	Results: Search results and scope of evidence; Figure 1; Tables S3 and S4
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were	Figure 1; Tables S3 and S4

		excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	Results: Search results and scope of evidence; Tables S3 and S4
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Results: Risk of bias assessments and publication bias; Figures S1-S5; Table S5
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Results: Overview and pooled mean estimates of nHSV incidence rate; Overview and pooled mean estimates of nHSV-1 and nHSV-2 proportions; Table 1; Tables 3-4; Figures S6-S8
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Results: Search results and scope of evidence; Risk of bias assessments and publication bias; Figures S1-S5; Table S5
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Results: Overview and pooled mean estimates of nHSV incidence rate; Overview and pooled mean estimates of nHSV-1 and nHSV-2 proportions; Table 1; Tables 3-4; Figures S6-S8
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Results: Predictors of nHSV incidence rate and sources of between-study heterogeneity; Predictors of nHSV-1 and nHSV-2 proportions and sources of between-study heterogeneity; Table 2; Tables 5-6; Table S7
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesised results.	Results: Predictors of nHSV incidence rate and sources of between-study heterogeneity; Predictors of nHSV-1 and nHSV-2 proportions and sources of between-study heterogeneity; Table 2; Tables 5-6; Table S7
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Results: Overview and pooled mean estimates of nHSV incidence rate; Overview and pooled mean estimates of nHSV-1 and nHSV-2 proportions; Predictors of nHSV incidence rate and sources of between-study heterogeneity; Predictors of nHSV-1 and nHSV-2 proportions and sources of between-study heterogeneity; Tables 1-6; Figures S6-S8
Discussion			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Discussion: paragraphs 1-13
	23b	Discuss any limitations of the evidence included in the review.	Discussion: paragraphs 14-23
	23c	Discuss any limitations of the review processes used.	N/A
	23d	Discuss implications of the results for practice, policy, and future research.	Discussion: paragraph 24
Other information			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	N/A
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Funding; Acknowledgement
Competing interests	26	Declare any competing interests of review authors.	Competing interests
Availability of data, code, and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Data availability statement

Abbreviations: nHSV, Neonatal herpes simplex virus; N/A, Not applicable.

Box S1. Data sources and search criteria for the systematic review of neonatal herpes epidemiology.**PubMed (last searched on December 12, 2024):**

("Infant, Newborn"[MeSH] OR "Neonat*"[Text]) AND (Simplexvirus[MeSH] OR "Herpesvirus"[Text] OR "HSV-2"[Text] OR "HSV"[Text] OR "HSV-1"[Text]) OR (Neonat* herpes[Text] OR "neonatal HSV"[Text] OR "neonatal HSV-1"[Text] OR "neonatal HSV-2"[Text] OR herpes newborn[Text] OR HSV newborn[Text] OR HSV-1 newborn[Text] OR HSV-2 newborn[Text] OR Infant herpes[Text] OR Infant HSV[Text] OR Infant HSV-1[Text] OR Infant HSV-2[Text] OR Perinatal herpes[Text] OR Perinatal HSV[Text] OR Perinatal HSV-1[Text] OR Perinatal HSV-2[Text] OR intrauterine Herpes[Text] OR intrauterine HSV[Text] OR intrauterine HSV-1[Text] OR intrauterine HSV-2[Text] OR congenital HSV[Text] OR congenital HSV-1[Text] OR congenital HSV-2[Text] OR Congenital Herpes[Text] OR neonatal herpetic keratitis[Text] OR keratoconjunctivitis in neonate[Text] OR Neonatal herpes encephalitis[Text] OR disseminated neonatal HSV[Text] OR disseminated neonatal herpes[Text] OR Mother-to-Child Transmission Herpes[Text] OR vertical transmission herpes[Text])

Embase (last searched on December 12, 2024):

((exp infant/ or exp newborn/) OR (Neonat*).mp.) AND ((exp herpes/ or exp herpes simplex/ or exp Simplexvirus/) OR (Herpes or Simplexvirus or Herpesvirus or HSV or HSV-1 or HSV-2).mp.) OR ((Neonat* herpes or neonatal HSV or neonatal HSV-1 or neonatal HSV-2 or herpes newborn medor HSV newborn or HSV-1 newborn or HSV-2 newborn or Infant herpes or Infant HSV or Infant HSV-1 or Infant HSV-2 or Perinatal herpes or Perinatal HSV or Perinatal HSV-1 or Perinatal HSV-2 or intrauterine Herpes or intrauterine HSV or intrauterine HSV-1 or intrauterine HSV-2 or congenital HSV or congenital HSV-1 or congenital HSV-2 or Congenital Herpes or neonatal herpetic keratitis or keratoconjunctivitis in neonate or Neonatal herpes encephalitis or disseminated neonatal HSV or disseminated neonatal herpes or Mother-to-Child Transmission Herpes or vertical transmission herpes or (skin, eye, and mouth disease*)).mp.)

The International Network of Paediatric Surveillance Units (last searched on December 12, 2024)

Neonatal herpes, neonatal herpes simplex virus, HSV-1, HSV-2.

Abbreviations: HSV-1, Herpes simplex virus type 1; HSV-2, Herpes simplex virus type 2.

Box S2. Countries and their corresponding World Health Organization regional classifications [3].

African Region
Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.
Eastern Mediterranean Region
Afghanistan, Bahrain, Djibouti, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen.
European Region
Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands (Kingdom of the), North Macedonia, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Türkiye, Turkmenistan, Ukraine, United Kingdom of Great Britain and Northern Ireland, Uzbekistan.
Region of the Americas
Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia (Plurinational State of), Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, United States of America, Uruguay, Venezuela (Bolivarian Republic of).
South-East Asian Region
Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, Timor-Leste.
Western Pacific Region
Australia, Brunei Darussalam, Cambodia, China, Cook Islands, Fiji, Japan, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam.

Box S3. Variables extracted from the publications that met the inclusion criteria.

Study characteristics:

- Author(s)
- Year of publication
- Full citation
- Country
- City
- Study design
- Sampling methodology
- Year(s) of data collection
- Site type (national surveillance registry/report, clinical setting, healthcare database, virological laboratory, mixed/unclear)
- Estimate type (national, regional, or institutional)
- Criteria for defining the neonatal period (0 to 29 days, 0 to 90 days, unclear)
- Method of ascertainment (laboratory confirmation, clinical and/or laboratory confirmation, unclear)
- Laboratory methods used to type nHSV cases

Outcome measures:

- Number of live births
- Number of nHSV cases
- nHSV incidence rate
- Number of typed nHSV cases
- Number and proportion of typed nHSV cases attributed to HSV-1
- Number and proportion of typed nHSV cases attributed to HSV-2

Abbreviations: nHSV, Neonatal herpes simplex virus.

Table S2. Risk of bias assessment. Description of the risk of bias assessment for publications that met the inclusion criteria, conducted using the Joanna Briggs Institute critical appraisal tool [4-6].

Domain	Assessment summary
1. Sample frame	
Was the sample frame appropriate to address the target population?	Low ROB. All included studies applied an appropriate sample frame, as they estimated neonatal herpes incidence outcomes among the entire population of live births within clearly defined geographic/catchment areas and over specified time periods.
2. Participant sampling	
Were study participants sampled in an appropriate way?	Low ROB. All included studies assessed neonatal herpes incidence outcomes among the entire population of live births within clearly defined geographic/catchment areas and specified time periods.
3. Sample size	
Was the sample size adequate?	For neonatal herpes incidence rate, ROB was low. All included studies estimated incidence rate among the entire population of live births within clearly defined geographic/catchment areas and specified time periods. For the proportion of neonatal herpes cases attributed to HSV-1 versus HSV-2, studies were classified as low ROB if at least 50% of identified cases underwent laboratory typing for HSV-1 versus HSV-2. Studies with less than 50% of cases typed were considered high ROB.
4. Subjects & setting	
Were the study subjects and setting described in detail?	Low ROB. All included studies assessed neonatal herpes incidence outcomes among the entire population of live births within clearly defined geographic/catchment areas and specified time periods.
5. Data coverage	
Was the data analysis conducted with sufficient coverage of the identified sample?	Low ROB. All included studies calculated neonatal herpes incidence outcomes based on all identified cases among the entire population of live births within clearly defined geographic/catchment areas and specified time periods.
6. Case definition	
Was the case definition clearly defined?	Studies were classified as low ROB if neonatal status was clearly and adequately defined, including an explicit statement of the period used to define neonatal herpes (e.g., 0–29 days or 0–90 days). Studies were considered high ROB if neonatal status was unclear or inadequately defined, such as lacking specification of the time period during which neonatal herpes cases were identified.
7. Diagnostic methods	
Were valid methods used for identification of the condition?	This systematic review was designed with strict inclusion criteria requiring neonatal herpes cases to be diagnosed using valid, objective, and standardized approaches within well-defined populations, catchment areas, and timeframes. Neonatal herpes cases were required to be diagnosed either through laboratory testing or appropriate clinical evaluation. Accordingly, studies meeting these criteria were classified as low ROB. However, some studies were included but classified as high ROB if, despite the study context suggesting that appropriate diagnostic methods were applied, the methods for diagnosing neonatal herpes were not clearly described (e.g., unspecified or unclear clinical/laboratory procedures).
8. Statistical analysis	
Was there appropriate statistical analysis?	Low ROB. All included studies calculated neonatal herpes incidence outcomes based on all identified cases among the entire population of live births within clearly defined geographic/catchment areas and specified time periods. Definitions of both the numerator and denominator were unambiguous and consistent.
9. Confounding factors	
Were important confounders identified and appropriately handled?	Low ROB. All included studies calculated neonatal herpes incidence outcomes based on all identified cases among the entire population of live births within clearly defined geographic/catchment areas and specified time periods. Definitions of both the numerator and denominator were unambiguous and consistent. Adjustment for confounding factors was not applicable, as the outcomes were based on complete population-level data.
10. Subpopulation criteria	

Were criteria for defining and reporting subpopulations clearly specified and applied?

Low ROB. All included studies calculated neonatal herpes incidence outcomes based on all identified cases among the entire population of live births within clearly defined geographic/catchment areas and specified time periods. None of the studies assessed incidence outcomes within specific subpopulations of live births or among specific subpopulations of pregnant women.

Abbreviations: HSV-1; Herpes simplex virus type 1; HSV-2, Herpes simplex virus type 2; ROB, Risk of bias.

Box S4. Variables included in meta-regression analyses. Factors (variables) chosen a priori and integrated into both the univariable and multivariable meta-regression analyses in this study.

- 1- WHO region as defined in Box S2
- 2- Country as defined in Box S2
- 3- Site type
 - National surveillance registry/report
 - Clinical setting (e.g., hospital, neonatal intensive care unit, or paediatric clinic)
 - Healthcare databases
 - Virological laboratory
 - Mixed/Unclear
- 4- Estimate type
 - National estimate
 - Regional estimate (e.g., state, province, city, or county)
 - Institutional estimate
- 5- Criteria for defining the neonatal period
 - 0 to 29 days
 - 0 to 90 days
 - Unclear
- 6- Method of ascertainment
 - Laboratory confirmation
 - Laboratory and/or clinical confirmation
 - Unclear
- 7- Year of data collection category^a
 - <1995
 - 1995-2004
 - ≥2005
- 8- Year of data collection as a continuous term

Abbreviations: WHO, World Health Organization.

^aThe categories were determined based on the median time between the year of publication and the year of data collection, which was approximately 6 years. This interval was rounded to 5 years to have a 5-year bracket.

Table S3. Studies reporting neonatal herpes incidence rates, categorized by World Health Organization region.

Country	Name	Year(s) of data collection	Estimate type	Method of ascertainment	Live births (N) ^a	nHSV cases (n) ^b	Incidence rate (per 100,000 live births) ^c	95% CI (per 100,000 live births) ^d
Region of the Americas								
Canada	Kropp, 2006 [7]	2000-2003	National	Laboratory confirmation	983,051	58	5.9	4.6-7.6
Canada	Selin, 1988 [8]	1980-1980	Regional	Laboratory confirmation	17,000	0	0.0	0.2-21.7
Canada	Selin, 1988 [8]	1981-1981	Regional	Laboratory confirmation	17,000	1	5.9	1.4-32.8
Canada	Selin, 1988 [8]	1982-1982	Regional	Laboratory confirmation	17,000	1	5.9	1.4-32.8
Canada	Selin, 1988 [8]	1983-1983	Regional	Laboratory confirmation	17,000	3	17.6	6.4-51.6
Canada	Selin, 1988 [8]	1984-1984	Regional	Laboratory confirmation	17,000	5	29.4	6.4-51.6
Canada	Selin, 1988 [8]	1985-1985	Regional	Laboratory confirmation	17,000	0	0.0	0.1-21.7
Canada	Selin, 1988 [8]	1986-1986	Regional	Laboratory confirmation	17,000	2	11.8	3.6-42.5
United States	Boehm, 1981 [9]	1976-1980	Regional	Laboratory confirmation	100,000	7	7.0	3.5-14.4
United States	Brown, 1991 [10]	1984-1989	Regional	Laboratory confirmation	18,630	10	53.7	29.5-98.7
United States	Brown, 2003 [11]	1982-1999	Regional	Unclear	58,362	18	30.8	19.6-48.7
United States	Chen, 2024 [12]	2009-2020	Regional	Laboratory confirmation	1,057,061	1,090	103.1	97.2-109.4
United States	Desai, 2011 [13]	2011-2011	Institutional	Unclear	55,670	84	151.0	122.1-186.9
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	55,556	1	1.8	0.4-10.0
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	250,000	12	4.8	2.8-8.4
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	327,869	20	6.1	4.0-9.4
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	400,000	4	1.0	0.4-2.6
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	127,660	6	4.7	2.2-10.2
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	754,717	40	5.3	3.9-7.2
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	54,348	15	27.6	16.8-45.5
United States	Dinh, 2008 [14]	2000-2004	Regional	Laboratory and/or clinical confirmation	400,000	14	3.5	2.1-5.9
United States	Donda, 2019 [15]	2003-2005	National	Laboratory and/or clinical confirmation	10,218,156	814	8.0	7.4-8.5
United States	Donda, 2019 [15]	2006-2008	National	Laboratory and/or clinical confirmation	10,710,853	762	7.1	6.6-7.6
United States	Donda, 2019 [15]	2009-2011	National	Laboratory and/or clinical confirmation	9,980,522	894	9.0	8.4-9.6
United States	Donda, 2019 [15]	2012-2014	National	Laboratory and/or clinical confirmation	11,877,289	1,160	9.8	9.2-10.3
United States	Flagg, 2011 [16]	2006-2006	National	Laboratory and/or clinical confirmation	4,106,488	682	16.6	14.4-18.8
United States	Gutierrez, 1999 [17]	1985-1985	Regional	Laboratory and/or clinical confirmation	470,816	55	11.7	9.0-15.2
United States	Gutierrez, 1999 [17]	1990-1990	Regional	Laboratory and/or clinical confirmation	611,666	69	11.3	8.9-14.3
United States	Gutierrez, 1999 [17]	1995-1995	Regional	Laboratory and/or clinical confirmation	551,226	63	11.4	8.9-14.6
United States	Handel, 2011 [18]	1997-2008	Regional	Laboratory and/or clinical confirmation	1,516,949	179	11.8	10.2-13.7
United States	Mahant, 2019 [19]	2009-2009	National	Unclear	289,903	94	32.4	28.0-42.0
United States	Mahant, 2019 [19]	2010-2010	National	Unclear	271,634	88	32.4	28.0-42.0
United States	Mahant, 2019 [19]	2011-2011	National	Unclear	224,809	71	31.6	26.0-42.0
United States	Mahant, 2019 [19]	2012-2012	National	Unclear	294,414	147	49.9	45.0-62.0
United States	Mahant, 2019 [19]	2013-2013	National	Unclear	286,604	145	50.6	45.0-62.0
United States	Mahant, 2019 [19]	2014-2014	National	Unclear	369,052	168	45.5	41.0-56.0
United States	Mahant, 2019 [19]	2015-2015	National	Unclear	369,808	187	50.6	46.0-61.0
United States	Mahnert, 2007 [20]	1999-2003	Institutional	Laboratory confirmation	78,115	4	5.1	1.4-13.1
United States	Mark, 2006 [21]	1987-2002	Regional	Unclear	1,089,595	91	8.4	6.8-10.3
United States	Matthias, 2021 [22]	2011-2017	Regional	Laboratory confirmation	1,534,140	483	31.5	25.0-41.3
United States	Morris, 2008 [23]	1995-2003	Regional	Unclear	4,782,094	580	12.1	11.2-13.2
United States	Nahmias, 1985 [24]	1975-1980	Institutional	Unclear	3,500	1	28.6	6.9-159.0
United States	Owusu-Edusei, 2015 [25]	2005-2005	National	Laboratory and/or clinical confirmation	58,423	17	29.1	18.3-46.6
United States	Owusu-Edusei, 2015 [25]	2006-2006	National	Laboratory and/or clinical confirmation	62,038	14	22.6	13.5-37.9

United States	Owusu-Edusei, 2015 [25]	2007-2007	National	Laboratory and/or clinical confirmation	109,063	38	34.8	25.4-47.8
United States	Owusu-Edusei, 2015 [25]	2008-2008	National	Laboratory and/or clinical confirmation	111,766	29	25.9	18.1-37.3
United States	Owusu-Edusei, 2015 [25]	2009-2009	National	Laboratory and/or clinical confirmation	133,603	52	38.9	29.7-51.0
United states	Pooser, 2023 [26]	2019-2019	National	Unclear	3,573,248	561	15.7	14.5-17.1
United States	Roberts, 1995 [27]	1984-1991	Institutional	Laboratory confirmation	100,000	3	3.0	1.1-8.8
United states	Saremi, 2024 [28]	2015-2019	Regional	Laboratory confirmation	100,000	2	2.1	0.6-7.3
United states	Saremi, 2024 [28]	2015-2019	Regional	Laboratory confirmation	100,000	2	2.3	0.7-7.7
United states	Saremi, 2024 [28]	2015-2019	Regional	Laboratory confirmation	100,000	31	31.5	22.3-44.6
United States	DOH of New York, 2007 [29]	2007-2007	Regional	Laboratory confirmation	127,273	7	5.5	2.7-11.3
United States	DOH of New York, 2008 [30]	2008-2008	Regional	Laboratory confirmation	253,165	40	15.8	11.6-21.5
United States	DOH of New York, 2009 [31]	2009-2009	Regional	Laboratory confirmation	250,000	25	10.0	6.8-14.8
United States	DOH of New York, 2010 [32]	2010-2010	Regional	Laboratory confirmation	246,032	31	12.6	8.9-17.9
United States	DOH of New York, 2011 [33]	2011-2011	Regional	Laboratory confirmation	243,243	27	11.1	7.6-16.1
United States	DOH of New York, 2012 [34]	2012-2012	Regional	Laboratory confirmation	240,310	31	12.9	9.1-18.3
United States	DOH of New York, 2013 [35]	2013-2013	Regional	Laboratory confirmation	240,000	24	10.0	6.4-14.9
United States	DOH of New York, 2014 [36]	2014-2014	Regional	Laboratory confirmation	235,772	29	12.3	8.6-17.7
United States	DOH of New York, 2015 [37]	2015-2015	Regional	Laboratory confirmation	239,130	22	9.2	6.1-13.9
United States	DOH of New York, 2016 [38]	2016-2016	Regional	Laboratory confirmation	242,857	34	14.0	10.0-19.6
United States	DOH of New York, 2017 [39]	2017-2017	Regional	Laboratory confirmation	250,000	20	8.0	5.1-12.4
United States	DOH of New York, 2018 [40]	2018-2018	Regional	Laboratory confirmation	440,000	22	5.0	3.3-7.6
United States	DOH of New York, 2019 [41]	2019-2019	Regional	Laboratory confirmation	16,500,000	33	0.2	0.1-0.3
United States	DOH of New York, 2020 [42]	2020-2020	Regional	Laboratory confirmation	11,000,000	11	0.1	0.1-0.2
United States	DOH of New York, 2021 [43]	2021-2021	Regional	Laboratory confirmation	18,000,000	18	0.1	0.1-0.2
United States	DOH of New York, 2022 [44]	2022-2022	Regional	Laboratory confirmation	16,500,000	33	0.2	0.1-0.3
United States	Stone, 1989 [45]	1984-1984	National	Laboratory confirmation	3,700,000	139	3.8	3.2-4.4
United States	Sullivan Bolyai, 1983 [46]	1966-1969	Regional	Laboratory and/or clinical confirmation	115,385	3	2.6	0.0-3.8
United States	Sullivan Bolyai, 1983 [46]	1970-1973	Regional	Laboratory and/or clinical confirmation	83,333	4	4.8	0.0-10.1
United States	Sullivan Bolyai, 1983 [46]	1974-1977	Regional	Laboratory and/or clinical confirmation	81,081	6	7.4	0.2-14.3
United States	Sullivan Bolyai, 1983 [46]	1978-1981	Regional	Laboratory and/or clinical confirmation	126,050	15	11.9	3.6-20.1
United States	Sullivan Bolyai, 1983 [46]	1982-1982	Regional	Laboratory and/or clinical confirmation	24,823	7	28.2	17.4-46.0
United States	Warford, 1986 [47]	1980-1980	Institutional	Laboratory confirmation	23,719	0	0.0	0.1-15.6
United States	Warford, 1986 [47]	1982-1982	Institutional	Laboratory confirmation	23,719	2	8.4	2.6-30.5
United States	Warford, 1986 [47]	1983-1983	Institutional	Laboratory confirmation	23,719	2	8.4	2.6-30.5
United States	Warford, 1986 [47]	1984-1984	Institutional	Laboratory confirmation	23,719	6	25.3	11.9-55.0
United States	Whitley, 2007 [48]	1997-2002	National	Laboratory and/or clinical confirmation	233,487	178	76.2	65.8-88.3
United States	Xu, 2008 [49]	1997-2002	Regional	Laboratory confirmation	270,703	24	8.9	5.4-12.4
European Region								
Denmark	Dungu, 2023 [50]	2010-2019	National	Laboratory confirmation	596,927	54	9.0	7.0-12.0
Denmark	Fonnest, 1997 [51]	1977-1984	National	Laboratory and/or clinical confirmation	423,729	10	2.4	1.3-4.3
Denmark	Fonnest, 1997 [51]	1984-1991	National	Laboratory and/or clinical confirmation	438,596	20	4.6	3.0-7.0
Finland	Koskiniemi, 1989 [52]	1970-1985	Regional	Laboratory confirmation	240,000	79	33.0	26.5-41.1
France	Bouthry, 2024 [53]	2013-2023	Institutional	Laboratory confirmation	666,667	8	1.2	0.0-3.3
Germany	Kidszun, 2022 [54]	2017-2018	National	Laboratory confirmation	1,574,468	37	2.4	1.7-3.0
Israel	Lagziel, 2024 [55]	201-2021	National	Laboratory confirmation	1,272,509	75	5.9	4.7-7.4
Israel	Kohelet, 2004 [56]	1999-2002	Institutional	Laboratory confirmation	6,953	11	158.2	89.2-282.9
Israel	Koren, 2013 [57]	2001-2007	National	Laboratory confirmation	261,488	22	8.4	5.6-12.7
Netherlands	Gaytant, 2000 [58]	1987-1991	National	Laboratory confirmation	950,000	19	2.0	1.3-3.1
Netherlands	Gaytant, 2000 [58]	1992-1998	National	Laboratory confirmation	1,358,000	33	2.4	1.7-3.4
Netherlands	Hemelaar, 2015 [59]	2006-2011	National	Laboratory confirmation	1,100,399	52	4.7	3.6-6.2
Netherlands	Poeran, 2008 [60]	1999-2005	National	Laboratory confirmation	1,031,250	33	3.2	2.3-4.5

Netherlands	van Everdingen, 1993 [61]	1981-1985	National	Laboratory confirmation	910,000	26	2.9	2.0-4.2
Netherlands	van Oeffelen, 2018 [62]	2012-2015	National	Laboratory and/or clinical confirmation	687,500	33	4.8	3.4-6.7
Spain	Lecumberri Garcia, 2015 [63]	2000-2015	Institutional	Laboratory confirmation	78,400	7	8.9	4.4-18.4
Sweden	Engman, 2008 [64]	1989-2000	Regional	Laboratory confirmation	267,690	19	7.1	4.6-11.1
Sweden	Forsgren, 1990 [65]	1979-1989	Regional	Laboratory confirmation	200,000	12	6.0	3.5-10.5
Switzerland	Kucera, 2012 [66]	2004-2007	Institutional	Unclear	6,507	0	0.0	0.4-56.7
Switzerland	Pascual, 2011 [67]	2002-2008	National	Laboratory confirmation	437,500	7	1.6	0.6-3.3
UK and Ireland	Dudley, 2023 [68]	2019-2022	National	Laboratory and/or clinical confirmation	1,710,145	118	6.9	5.8-8.3
UK and Ireland	Fidler, 2020 [69]	2019-2020	National	Laboratory and/or clinical confirmation	652,778	47	7.2	5.4-9.6
UK and Ireland	Fidler, 2021 [70]	2019-2021	National	Laboratory and/or clinical confirmation	855,072	59	6.9	4.2-6.5
UK and Ireland	Tookey, 1996 [71]	1986-1991	National	Laboratory and/or clinical confirmation	4,606,061	76	1.7	1.3-2.0
UK and Ireland	Tookey, 2020 [72]	2004-2006	National	Laboratory confirmation	2,374,302	85	3.6	2.9-4.4
UK	Batra, 2014 [73]	2006-2012	Regional	Laboratory confirmation	57,291	10	17.5	8.4-32.1
UK	Clarke, 2014 [74]	1986-1991	National	Unclear	4,560,000	76	1.7	1.3-2.1
UK	Clarke, 2014 [74]	2004-2006	National	Unclear	2,580,000	86	3.3	2.7-4.1
UK	Clarke, 2014 [74]	2012-2012	National	Laboratory confirmation	688,116	66	9.6	7.5-12.2
UK	Kadambari, 2020 [75]	1999-2006	National	Laboratory and/or clinical confirmation	5,428,864	233	4.3	3.7-5.0
UK	Kadambari, 2020 [75]	2007-2016	National	Laboratory and/or clinical confirmation	6,786,080	645	9.5	8.7-10.2
UK	Kadambari, 2020 [75]	1968-1998	National	Laboratory and/or clinical confirmation	1,111,111	10	0.9	0.4-1.6
UK	Sachane, 2017 [76]	2004-2015	Institutional	Unclear	67,500	8	11.9	6.1-23.4
Western Pacific Region								
Australia	Berkhout, 2021 [77]	2005-2017	Regional	Laboratory confirmation	791,667	76	9.6	7.0-11.5
Australia	Deverell, 2012 [78]	2011-2011	National	Laboratory confirmation	296,296	8	2.7	1.4-5.3
Australia	Deverell, 2013 [79]	2012-2012	National	Laboratory confirmation	302,013	9	2.98	1.6-5.7
Australia	Deverell, 2014 [80]	2013-2013	National	Laboratory and/or clinical confirmation	309,735	14	4.5	2.7-7.6
Australia	Deverell, 2016 [81]	2014-2014	National	Laboratory and/or clinical confirmation	307,692	10	3.3	1.8-6.0
Australia	Deverell, 2017a [82]	2015-2015	National	Laboratory confirmation	299,625	16	5.3	3.3-8.7
Australia	Deverell, 2017b [83]	2016-2016	National	Laboratory confirmation	306,122	6	2.0	0.9-4.3
Australia	Elder, 1995 [84]	1990-1991	Regional	Laboratory confirmation	37,440	5	13.4	4.5-42.6
Australia	Garland, 1992 [85]	1982-1988	Institutional	Laboratory confirmation	66,000	6	9.1	4.3-19.8
Australia	Jones, 2010 [86]	1997-2007	National	Laboratory and/or clinical confirmation	2,816,092	98	3.5	2.9-4.2
Australia	Mindel, 2000 [87]	1995-1998	Institutional	Laboratory confirmation	13,372	1	7.5	1.8-41.7
Australia	Teutsch, 2018 [88]	2017-2017	National	Laboratory and/or clinical confirmation	303,030	4	1.3	0.5-3.4
Australia	Teutsch, 2020 [89]	2019-2019	National	Laboratory confirmation	303,030	8	2.6	1.1-5.2
Australia	Teutsch, 2021 [90]	2020-2020	National	Laboratory confirmation	305,344	8	2.6	1.1-5.2
Australia	Teutsch, 2022 [91]	2021-2021	National	Laboratory confirmation	305,677	14	4.6	2.7-7.7
Australia	Teutsch, 2023 [92]	2022-2022	National	Laboratory confirmation	295,858	10	3.4	1.8-6.3
Australia	Zurynski, 2010 [93]	2008-2008	National	Laboratory and/or clinical confirmation	300,000	9	3.0	1.6-5.7
Australia	Zurynski, 2010 [93]	2009-2009	National	Laboratory and/or clinical confirmation	303,030	10	3.3	1.8-6.1
Australia	Zurynski, 2011 [94]	2010-2010	National	Laboratory and/or clinical confirmation	307,692	4	1.3	0.5-3.3
Japan	Morishima, 2000 [95]	1978-1982	National	Unclear	1,600,000	16	1.0	0.6-1.6
Japan	Morishima, 2000 [95]	1983-1983	National	Unclear	1,500,000	24	1.6	1.1-2.4
Japan	Morishima, 2000 [95]	1984-1984	National	Unclear	1,619,048	34	2.1	1.5-2.9
Japan	Morishima, 2000 [95]	1985-1985	National	Unclear	1,444,444	39	2.7	2.0-3.7
Japan	Morishima, 2000 [95]	1986-1986	National	Unclear	1,303,030	43	3.3	2.5-4.4
Japan	Morishima, 2000 [95]	1987-1987	National	Unclear	1,216,216	45	3.7	2.8-5.0
Japan	Torii, 2013 [96]	2006-2008	National	Laboratory confirmation	1,461,538	38	2.6	1.9-3.6
Japan	Yamada, 2015 [97]	2011-2011	National	Laboratory confirmation	788,673	7	0.9	0.4-1.8

Abbreviations: CI, Confidence interval; DOH, Department of Health; nHSV, Neonatal herpes simplex virus; UK, United Kingdom.

^aIf the number of live births was not explicitly reported in a study, it was estimated by dividing the number of nHSV cases by the reported incidence rate. When both live births and cases were not reported, the number of live births was estimated using the median live births from other studies within the same geographic area

^bThe number of nHSV cases was extracted directly from the study when explicitly reported. If not provided, it was calculated by multiplying the incidence rate by the number of live births. In some studies, the number of cases was estimated using statistical methods, such as capture-recapture, applied to reported cases from various sources. As a result, the estimated number of cases may not always be an exact integer.

^cIf a study employed multiple methods to estimate the incidence rate within the same geographic area and time period, the estimate from the method deemed most representative was extracted.

^dIf a study did not provide a 95% CI for the incidence rate, it was calculated using a Bayesian approach employing a Beta-binomial model.

Table S4. Studies reporting neonatal herpes proportions attributed to HSV-1 versus HSV-2, categorized by World Health Organization region.

Country	Name	Year of data collection	Laboratory method ^a	Typed nHSV cases	Proportion of HSV-1 (%) ^b	Proportion of HSV-2 (%) ^b
Region of the Americas						
Canada	Kropp, 2006 [7]	2000-2003	PCR, culture, and IgM serology	48	62.5	37.5
Canada	Selin, 1988 [8]	1980-1986	Mixed	11	45.5	54.5
United States	Boehm, 1981 [9]	1976-1980	Culture	7	28.6	71.4
United States	Brown, 1991 [10]	1984-1989	Culture	10	30.0	70.0
United States	Brown, 2003 [11]	1982-1999	PCR or culture	18	44.4	55.6
United States	Brown, 2007 [98]	2007-2007	PCR or culture	25	40.0	60.0
United States	Burchett, 1992 [99]	1983-1988	Culture	22	31.8	68.2
United States	Cantey, 2012 [100]	2005-2010	PCR	21	47.6	52.4
United States	Caviness, 2008a [101]	1991-2005	PCR, culture, and/or DFA	40	27.5	72.5
United States	Caviness, 2008b [102]	2001-2005	PCR, culture, and/or DFA	10	40.0	60.0
United States	CDC, 2012 [103]	2006-2011	PCR	70	52.9	47.1
United States	Ch'ien, 1975 [104]	2007-2007	Culture	11	36.4	63.6
United States	Corey, 1988 [105]	1981-1986	Culture	33	42.4	57.6
United States	Dendi, 2020 [106]	2001-2019	PCR	88	44.2	55.8
United States	Dominguez, 2018 [107]	2017-2017	PCR or culture	7	57.1	42.9
United States	Ericson, 2022 [108]	2002-2014	PCR or culture	44	36.4	63.6
United States	Graf, 2024 [109]	2001-2023	PCR	15	86.7	13.3
United States	Handel, 2011 [18]	2006-2010	Mixed	55	50.9	49.1
United States	Kimberlin, 2001 [110]	1989-1997	PCR or culture	74	27.0	73.0
United States	Kimberlin, 2011 [111]	1997-2008	PCR or culture	53	32.1	67.9
United states	Kotzbauer, 2014 [112]	2006-2013	PCR or culture	13	46.2	53.8
United States	Lao, 2019 [113]	2006-2015	Mixed	93	46.2	53.8
United States	Long, 2011 [114]	1988-2009	PCR or culture	17	11.8	88.2
United States	Mahnert, 2007 [20]	1999-2003	PCR or culture	3	33.3	66.7
United States	Matthias, 2021 [22]	2011-2017	PCR or culture	164	44.5	55.5
United States	Mejias, 2023 [115]	2007-2022	PCR or culture	12	58.3	41.7
United States	Melvin, 2022 [116]	1980-1989	Culture	43	34.9	65.1
United States	Melvin, 2022 [116]	1990-1999	PCR or culture	29	44.8	55.2
United States	Melvin, 2022 [116]	2000-2009	PCR or culture	38	44.7	55.3
United States	Melvin, 2022 [116]	2010-2016	PCR or culture	21	57.1	42.9
United States	Nahmias, 1969 [117]	2007-2007	Culture	25	12.0	88.0
United states	O'Riordan, 2006 [118]	1989-2003	PCR or culture	12	0.0	100
United States	Pass, 1981 [119]	2007-2007	Mixed	11	18.2	81.8
United States	Schillinger, 2013 [120]	2006-2012	PCR	76	52.6	47.4
United States	Stone, 1989 [45]	1983-1985	Culture	105	32.4	67.6
United States	Sullender, 1987 [121]	1976-1985	Mixed	55	29.1	70.9
United States	Sullivan Bolyai, 1983 [46]	1965-1982	Neutralization	27	22.2	77.8
United States	Whitley, 1988 [122]	1973-1981	Mixed	80	26.3	73.8
United States	Whitley, 1991 [123]	1981-1988	Mixed	184	35.3	64.7
United States	Xu, 2008 [49]	1997-2002	PCR, culture, and/or DFA	17	41.2	58.8
United States	Samies, 2019 [124]	2014-2018	PCR or culture	18	66.7	33.3
United States	Yeager, 1980 [125]	1976-1979	Culture	11	27.3	72.7
United States	Yeager, 1984 [126]	-	Mixed	19	52.6	47.4
United States and Canada	Cruz, 2018 [127]	2005-2013	PCR or culture	96	55.2	46.9
European Region						
Denmark	Dungu, 2023 [50]	2010-2019	PCR	53	98.1	1.9
Denmark	Fonnest, 1997 [51]	1977-1984	Culture	7	42.9	57.1
Denmark	Fonnest, 1997 [51]	1984-1991	Culture	2	50.0	50.0
Finland	Koskiniemi, 1989 [52]	1970-1985	Mixed	13	7.7	92.3

France	Bouthry, 2024 [53]	2013-2023	PCR	8	50.0	50.0
Germany	Kidszun, 2022 [54]	2017-2018	PCR or culture	24	83.3	25.0
Israel	Kohelet, 2004 [56]	1999-2002	PCR or culture	5	0.0	100
Israel	Koren, 2013 [57]	2001-2007	PCR or culture	3	33.3	66.7
Israel	Lagziel, 2024 [55]	2015-2022	PCR or culture	85	90.6	9.4
Israel	Leventon-Kriss, 1983 [128]	1973-1981	Neutralization	17	76.5	23.5
Netherlands	Gaytant, 2000 [58]	1992-1998	Culture	27	88.9	11.1
Netherlands	Hemelaar, 2015 [59]	2006-2011	PCR or culture	35	94.3	5.7
Netherlands	Keunig, 2019	2006-2017	PCR	6	33.3	66.7
Netherlands	Poeran, 2008 [60]	1999-2005	PCR or culture	28	53.6	46.4
Netherlands	van Everdingen, 1993 [61]	1981-1985	Culture	22	68.2	31.8
Netherlands	van Everdingen, 1993 [61]	1987-1991	Culture	16	75.0	25.0
Netherlands	van Oeffelen, 2018 [62]	2012-2015	PCR	23	78.3	21.7
Sweden	Brown, 2007 [98]	1973-2001	PCR or culture	35	28.6	71.4
Sweden	Engman, 2008 [64]	1989-2000	Mixed	9	22.2	77.8
Sweden	Forsgren, 1990 [65]	1979-1989	PCR	48	25.0	75.0
Sweden	Lewensohn-Fuchs, 2003 [129]	1979-1998	Mixed	28	10.7	89.3
Sweden	Malm, 1991 [130]	1971-1986	Mixed	45	22.2	77.8
Sweden	Malm, 1999 [131]	1973-1996	PCR	36	19.4	80.6
Switzerland	Pascual, 2011 [67]	2002-2008	PCR, culture, and IgM serology	6	66.7	33.3
UK and Ireland	Dudley, 2023 [68]	2019-2022	PCR	78	37.0	63.0
UK and Ireland	Fidler, 2021 [70]	2019-2021	Mixed	54	53.7	46.3
UK and Ireland	Tookey, 1996 [71]	1986-1991	Mixed	49	51.0	49.0
UK and Ireland	Tookey, 2007 [132]	2004-2004	Mixed	24	45.8	54.2
UK and Ireland	Tookey, 2007 [132]	2005-2005	Mixed	31	48.4	51.6
UK and Ireland	Tookey, 2007 [132]	2006-2006	Mixed	24	37.5	62.5
UK	Batra, 2014 [73]	2006-2013	PCR	17	52.9	47.1
UK	Kashyap, 2014 [133]	2010-2013	Mixed	11	54.5	45.5
UK	Khandwalla, 2021 [134]	2010-2019	PCR	10	10.0	90.0
UK	Vaughan, 2024 [135]	-	Mixed	4	75.0	25.0
UK	Waheed, 2022 [136]	2013-2020	Mixed	20	30.0	70.0
Western Pacific Region						
Australia	Tiffany, 2005 [137]	1990-2003	PCR or culture	14	21.4	78.6
Australia	Berkhout, 2021 [77]	2005-2017	PCR	144	72.2	27.8
Australia	Deverell, 2012 [78]	2011-2011	PCR or culture	10	70.0	30.0
Australia	Deverell, 2017a [82]	2015-2015	PCR or culture	16	68.8	31.3
Australia	Deverell, 2017b [83]	2016-2016	PCR or culture	6	83.3	16.7
Australia	Elder, 1995 [84]	1977-1992	Mixed	13	7.7	92.3
Australia	Garland, 1992 [85]	1982-1988	Mixed	6	50.0	50.0
Australia	Jones, 2005 [138]	2004-2004	Mixed	8	62.5	37.5
Australia	Jones, 2014 [139]	1997-2011	Mixed	118	62.7	37.3
Australia	Malouf, 1995 [140]	1979-1992	Mixed	9	11.1	88.9
Australia	Nunez, 2019 [141]	2018-2018	PCR	4	75.0	25.0
Australia	Teutsch, 2020 [89]	2019-2019	PCR	8	50.0	50.0
Australia	Teutsch, 2021 [90]	2020-2020	PCR	8	75.0	25.0
Australia	Teutsch, 2022 [91]	2021-2021	PCR	14	78.6	21.4
Australia	Teutsch, 2023 [92]	2022-2022	PCR or immunofluorescence	10	50.0	50.0
Japan	Kawada, 2004 [142]	-	PCR	19	47.4	52.6
Japan	Kimura, 2002 [143]	2000-2000	PCR	34	64.7	35.3
Japan	Morishima, 2000 [95]	1978-1987	Culture	65	67.7	32.3
Japan	Morishima, 2000 [95]	1988-1991	Culture	12	58.3	41.7
Japan	Morishima, 2000 [95]	1992-1993	Culture	18	77.8	22.2
Japan	Morishima, 2000 [95]	1994-1999	Culture	39	64.1	35.9
Japan	Okanishi, 2015 [144]	2001-2011	PCR	6	16.7	83.3
Japan	Torii, 2013 [96]	2006-2008	Mixed	13	53.8	46.2

Republic of Korea	Kim, 2018 [145]	2008-2017	Mixed	16	62.5	37.5
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Abbreviations: CDC, Centers for Disease Control and Prevention; CI, Confidence interval; DFA, Direct fluorescence assay; HSV-1, Herpes simplex virus type 1; HSV-2, Herpes simplex virus type 2; IgM, Immunoglobulin M; nHSV, Neonatal herpes simplex virus; PCR, Polymerase chain reaction; UK, United Kingdom.

^aMixed refers to the use of a combination of different laboratory methods, including PCR, culture, and other diagnostic techniques.

^bCases with an unknown nHSV type were excluded from the total to ensure accurate measurement of the proportions of cases attributed to HSV-1 and HSV-2. If a case tested positive for both HSV-1 and HSV-2, it was included in both categories. As a result, the proportions attributed to HSV-1 and HSV-2 may not always sum to 100%.

Figure S1. Risk of bias assessment of individual incidence rate studies. Traffic light plot of the risk of bias assessment for individual studies reporting incidence rates of neonatal herpes, based on the Joanna Briggs Institute's critical appraisal tool [4-6].

	Risk of bias										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Overall
1- Batra, 2014	+	+	+	+	+	+	+	+	+	+	+
2- Berkhout, 2021	+	+	+	+	+	+	+	+	+	+	+
3- Boehm, 1981	+	+	+	+	+	X	+	+	+	+	+
4- Bouthry, 2024	+	+	+	+	+	+	+	+	+	+	+
5- Brown, 1991	+	+	+	+	+	+	+	+	+	+	+
6- Brown, 2003	+	+	+	+	+	X	+	+	+	+	+
7- Chen, 2024	+	+	+	+	+	+	+	+	+	+	+
8- Clarke, 2014	+	+	+	+	+	X	X	+	+	+	+
9- Clarke, 2014	+	+	+	+	+	X	X	+	+	+	+
10- Clarke, 2014	+	+	+	+	+	X	+	+	+	+	+
11- Desai, 2011	+	+	+	+	+	X	X	+	+	+	+
12- Deverell, 2012	+	+	+	+	+	X	+	+	+	+	+
13- Deverell, 2013	+	+	+	+	+	X	+	+	+	+	+
14- Deverell, 2014	+	+	+	+	+	+	+	+	+	+	+
15- Deverell, 2016	+	+	+	+	+	+	+	+	+	+	+
16- Deverell, 2017a	+	+	+	+	+	+	+	+	+	+	+
17- Deverell, 2017b	+	+	+	+	+	+	+	+	+	+	+
18- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
19- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
20- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
21- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
22- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
23- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
24- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
25- Dinh, 2008	+	+	+	+	+	+	+	+	+	+	+
26- Donda, 2019	+	+	+	+	+	+	+	+	+	+	+
27- Donda, 2019	+	+	+	+	+	+	+	+	+	+	+
28- Donda, 2019	+	+	+	+	+	+	+	+	+	+	+
29- Donda, 2019	+	+	+	+	+	+	+	+	+	+	+
30- Dudley, 2023	+	+	+	+	+	+	+	+	+	+	+
31- Dungu, 2023	+	+	+	+	+	+	+	+	+	+	+
32- Elder, 1995	+	+	+	+	+	+	+	+	+	+	+
33- Engman, 2008	+	+	+	+	+	X	+	+	+	+	+
34- Fidler, 2020	+	+	+	+	+	+	+	+	+	+	+
35- Fidler, 2021	+	+	+	+	+	+	+	+	+	+	+
36- Flagg, 2011	+	+	+	+	+	+	+	+	+	+	+
37- Fonnest, 1997	+	+	+	+	+	+	+	+	+	+	+
38- Fonnest, 1997	+	+	+	+	+	+	+	+	+	+	+
39- Forsgren, 1990	+	+	+	+	+	X	+	+	+	+	+
40- Garland, 1992	+	+	+	+	+	X	+	+	+	+	+

	Risk of bias										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Overall
41- Gaytant, 2000	+	+	+	+	+	+	+	+	+	+	+
42- Gaytant, 2000	+	+	+	+	+	+	+	+	+	+	+
43- Gutierrez, 1999	+	+	+	+	+	+	+	+	+	+	+
44- Gutierrez, 1999	+	+	+	+	+	+	+	+	+	+	+
45- Gutierrez, 1999	+	+	+	+	+	+	+	+	+	+	+
46- Handel, 2011	+	+	+	+	+	+	+	+	+	+	+
47- Hemelaar, 2015	+	+	+	+	+	+	+	+	+	+	+
48- Jones, 2010	+	+	+	+	+	+	+	+	+	+	+
49- Kadambari, 2020	+	+	+	+	+	+	+	+	+	+	+
50- Kadambari, 2020	+	+	+	+	+	+	+	+	+	+	+
51- Kadambari, 2020	+	+	+	+	+	+	+	+	+	+	+
52- Kidszun, 2022	+	+	+	+	+	+	+	+	+	+	+
53- Kohelet, 2004	+	+	+	+	+	X	+	+	+	+	+
54- Koren, 2013	+	+	+	+	+	+	+	+	+	+	+
55- Koskiniemi, 1989	+	+	+	+	+	+	+	+	+	+	+
56- Kropp, 2006	+	+	+	+	+	+	+	+	+	+	+
57- Kucera, 2012	+	+	+	+	+	X	X	+	+	+	+
58- Lagziel, 2024	+	+	+	+	+	+	+	+	+	+	+
59- Lecumberri Garcia, 2015	+	+	+	+	+	X	+	+	+	+	+
60- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
61- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
62- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
63- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
64- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
65- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
66- Mahant, 2019	+	+	+	+	+	+	X	+	+	+	+
67- Mahnert, 2007	+	+	+	+	+	+	+	+	+	+	+
68- Mark, 2006	+	+	+	+	+	+	+	+	+	+	+
69- Matthias, 2021	+	+	+	+	+	+	+	+	+	+	+
70- Mindel, 2000	+	+	+	+	+	X	+	+	+	+	+
71- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
72- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
73- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
74- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
75- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
76- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
77- Morris, 2008	+	+	+	+	+	+	X	+	+	+	+
78- Nahmias, 1985	+	+	+	+	+	X	X	+	+	+	+
79- Owusu-Edusei, 2015	+	+	+	+	+	X	+	+	+	+	+
80- Owusu-Edusei, 2015	+	+	+	+	+	X	+	+	+	+	+

	Risk of bias										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Overall
81- Owusu-Edusei, 2015	+	+	+	+	+	X	+	+	+	+	+
82- Owusu-Edusei, 2015	+	+	+	+	+	X	+	+	+	+	+
83- Owusu-Edusei, 2015	+	+	+	+	+	X	+	+	+	+	+
84- Pascual, 2011	+	+	+	+	+	+	+	+	+	+	+
85- Poeran, 2008	+	+	+	+	+	+	+	+	+	+	+
86- Pooser, 2023	+	+	+	+	+	X	+	+	+	+	+
87- Roberts, 1995	+	+	+	+	+	X	+	+	+	+	+
88- Sachane, 2017	+	+	+	+	+	+	X	+	+	+	+
89- Saremi, 2024	+	+	+	+	+	+	+	+	+	+	+
90- Saremi, 2024	+	+	+	+	+	+	+	+	+	+	+
91- Saremi, 2024	+	+	+	+	+	+	+	+	+	+	+
92- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
93- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
94- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
95- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
96- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
97- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
98- Selin, 1988	+	+	+	+	+	X	+	+	+	+	+
99- State of New York DOH, 2007	+	+	+	+	+	+	+	+	+	+	+
100- State of New York DOH, 2008	+	+	+	+	+	+	+	+	+	+	+
101- State of New York DOH, 2009	+	+	+	+	+	+	+	+	+	+	+
102- State of New York DOH, 2010	+	+	+	+	+	+	+	+	+	+	+
103- State of New York DOH, 2011	+	+	+	+	+	+	+	+	+	+	+
104- State of New York DOH, 2012	+	+	+	+	+	+	+	+	+	+	+
105- State of New York DOH, 2013	+	+	+	+	+	+	+	+	+	+	+
106- State of New York DOH, 2014	+	+	+	+	+	+	+	+	+	+	+
107- State of New York DOH, 2015	+	+	+	+	+	+	+	+	+	+	+
108- State of New York DOH, 2016	+	+	+	+	+	+	+	+	+	+	+
109- State of New York DOH, 2017	+	+	+	+	+	+	+	+	+	+	+
110- State of New York DOH, 2018	+	+	+	+	+	+	+	+	+	+	+
111- State of New York DOH, 2019	+	+	+	+	+	+	+	+	+	+	+
112- State of New York DOH, 2020	+	+	+	+	+	+	+	+	+	+	+
113- State of New York DOH, 2021	+	+	+	+	+	+	+	+	+	+	+
114- State of New York DOH, 2022	+	+	+	+	+	+	+	+	+	+	+
115- Stone, 1989	+	+	+	+	+	+	+	+	+	+	+
116- Sullivan Bolyai, 1983	+	+	+	+	+	+	+	+	+	+	+
117- Sullivan Bolyai, 1983	+	+	+	+	+	+	+	+	+	+	+
118- Sullivan Bolyai, 1983	+	+	+	+	+	+	+	+	+	+	+
119- Sullivan Bolyai, 1983	+	+	+	+	+	+	+	+	+	+	+
120- Sullivan Bolyai, 1983	+	+	+	+	+	+	+	+	+	+	+

	Risk of bias										Overall
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	
121- Teutsch, 2018	+	+	+	+	+	+	+	+	+	+	+
122- Teutsch, 2020	+	+	+	+	+	+	+	+	+	+	+
123- Teutsch, 2021	+	+	+	+	+	+	+	+	+	+	+
124- Teutsch, 2022	+	+	+	+	+	+	+	+	+	+	+
125- Teutsch, 2023	+	+	+	+	+	+	+	+	+	+	+
126- Tookey, 1996	+	+	+	+	+	✗	+	+	+	+	+
127- Tookey, 2020	+	+	+	+	+	+	+	+	+	+	+
128- Torii, 2013	+	+	+	+	+	✗	+	+	+	+	+
129- van Everdingen, 1993	+	+	+	+	+	+	+	+	+	+	+
130- van Oeffelen, 2018	+	+	+	+	+	✗	+	+	+	+	+
131- Warford, 1986	+	+	+	+	+	+	+	+	+	+	+
132- Warford, 1986	+	+	+	+	+	+	+	+	+	+	+
133- Warford, 1986	+	+	+	+	+	+	+	+	+	+	+
134- Warford, 1986	+	+	+	+	+	+	+	+	+	+	+
135- Whitley, 2007	+	+	+	+	+	+	+	+	+	+	+
136- Xu, 2008	+	+	+	+	+	+	+	+	+	+	+
137- Yamada, 2015	+	+	+	+	+	✗	+	+	+	+	+
138- Zurynski, 2010	+	+	+	+	+	✗	+	+	+	+	+
139- Zurynski, 2010	+	+	+	+	+	✗	+	+	+	+	+
140- Zurynski, 2011	+	+	+	+	+	✗	+	+	+	+	+

D1: Sample Representativeness
D2: Participant Recruitment
D3: Sample Size
D4: Description Of Study Subjects And Settings
D5: Data Analysis Coverage
D6: Case Definition Criteria
D7: Diagnostic Reliability
D8: Statistical Analysis Methods
D9: Confounding Factors
D10: Criteria For Subpopulations

Judgement
✗ High
+ Low

Figure S2. Risk of bias assessment of individual HSV-1 versus HSV-2 studies. Traffic light plot of the risk of bias assessment for individual studies reporting neonatal herpes proportions attributed to HSV-1 versus HSV-2, based on the Joanna Briggs Institute's critical appraisal tool [4-6].

	Risk of bias										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Overall
1- Batra, 2014	+	+	+	+	+	+	+	+	+	+	+
2- Berkhout, 2021	+	+	+	+	+	+	+	+	+	+	+
3- Boehm, 1981	+	+	+	+	+	✗	+	+	+	+	+
4- Bouthry, 2024	+	+	+	+	+	+	+	+	+	+	+
5- Brown, 1991	+	+	+	+	+	+	+	+	+	+	+
6- Brown, 2003	+	+	+	+	+	✗	+	+	+	+	+
7- Brown, 2007	+	+	✗	+	+	+	+	+	+	+	+
8- Brown, 2007	+	+	+	+	+	+	+	+	+	+	+
9- Burchett, 1992	+	+	+	+	+	✗	+	+	+	+	+
10- Cantey, 2012	+	+	+	+	+	+	+	+	+	+	+
11- Caviness, 2008a	+	+	+	+	+	+	+	+	+	+	+
12- Caviness, 2008b	+	+	+	+	+	+	+	+	+	+	+
13- CDC, 2012	+	+	+	+	+	+	+	+	+	+	+
14- Ch'ien, 1975	+	+	+	+	+	✗	+	+	+	+	+
15- Corey, 1988	+	+	+	+	+	✗	+	+	+	+	+
16- Cruz, 2018	+	+	+	+	+	+	+	+	+	+	+
17- Dendi, 2020	+	+	+	+	+	+	+	+	+	+	+
18- Deverell, 2012	+	+	+	+	+	✗	+	+	+	+	+
19- Deverell, 2017a	+	+	+	+	+	+	+	+	+	+	+
20- Deverell, 2017b	+	+	+	+	+	+	+	+	+	+	+
21- Dominguez, 2018	+	+	+	+	+	+	+	+	+	+	+
22- Dudley, 2023	+	+	+	+	+	+	+	+	+	+	+
23- Dungu, 2023	+	+	+	+	+	+	+	+	+	+	+
24- Elder, 1995	+	+	+	+	+	+	+	+	+	+	+
25- Engman, 2008	+	+	✗	+	+	✗	+	+	+	+	+
26- Ericson, 2022	+	+	+	+	+	+	+	+	+	+	+
27- Fidler, 2021	+	+	+	+	+	+	+	+	+	+	+
28- Fonnest, 1997	+	+	+	+	+	+	+	+	+	+	+
29- Fonnest, 1997	+	+	✗	+	+	+	+	+	+	+	+
30- Forsgren, 1990	+	+	+	+	+	✗	+	+	+	+	+
31- Garland, 1992	+	+	+	+	+	✗	+	+	+	+	+
32- Gaytant, 2000	+	+	+	+	+	+	+	+	+	+	+
33- Graf, 20204	+	+	+	+	+	+	+	+	+	+	+
34- Handel, 2011	+	+	+	+	+	+	+	+	+	+	+
35- Hemelaar, 2015	+	+	+	+	+	+	+	+	+	+	+
36- Jones, 2005	+	+	+	+	+	+	+	+	+	+	+
37- Jones, 2014	+	+	+	+	+	+	+	+	+	+	+
38- Kashyap, 2014	+	+	+	+	+	✗	+	+	+	+	+
39- Kawada, 2004	+	+	+	+	+	+	+	+	+	+	+
40- Keunig, 2019	+	+	+	+	+	+	+	+	+	+	+

	Risk of bias										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	overall
41- Khandwalla, 2021	+	+	+	+	+	X	+	+	+	+	+
42- Kiszun, 2022	+	+	+	+	+	+	+	+	+	+	+
43- Kim, 2018	+	+	+	+	+	+	+	+	+	+	+
44- Kimberlin, 2001	+	+	+	+	+	+	+	+	+	+	+
45- Kimberlin, 2011	+	+	+	+	+	+	+	+	+	+	+
46- Kimura, 2002	+	+	+	+	+	+	+	+	+	+	+
47- Kohlet, 2004	+	+	X	+	+	X	+	+	+	+	+
48- Koren, 2013	+	+	+	+	+	+	+	+	+	+	+
49- Koskine, 1989	+	+	X	+	+	+	+	+	+	+	+
50- Kotzbauer, 2014	+	+	+	+	+	+	+	+	+	+	+
51- Kropp, 2006	+	+	+	+	+	+	+	+	+	+	+
52- Lagziel, 2024	+	+	+	+	+	+	+	+	+	+	+
53- Lao, 2019	+	+	+	+	+	+	+	+	+	+	+
54- Leventon-Kriss, 1983	+	+	+	+	+	+	+	+	+	+	+
55- Lewensohn-Fuchs, 2003	+	+	+	+	+	+	+	+	+	+	+
56- Long, 2011	+	+	+	+	+	+	+	+	+	+	+
57- Mahner, 2007	+	+	+	+	+	+	+	+	+	+	+
58- Malm, 1991	+	+	+	+	+	+	+	+	+	+	+
59- Malm, 1999	+	+	+	+	+	+	+	+	+	+	+
60- Malouf, 1995	+	+	+	+	+	+	+	+	+	+	+
61- Matthias, 2021	+	+	+	+	+	+	+	+	+	+	+
62- Mejias, 2023	+	+	X	+	+	+	+	+	+	+	+
63- Melvin, 2022	+	+	+	+	+	+	+	+	+	+	+
64- Melvin, 2022	+	+	+	+	+	+	+	+	+	+	+
65- Melvin, 2022	+	+	+	+	+	+	+	+	+	+	+
66- Melvin, 2022	+	+	+	+	+	+	+	+	+	+	+
67- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
68- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
69- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
70- Morishima, 2000	+	+	+	+	+	X	+	+	+	+	+
71- Nahmias, 1969	+	+	+	+	+	X	+	+	+	+	+
72- Nunez, 2019	+	+	+	+	+	+	+	+	+	+	+
73- Okanishi, 2015	+	+	X	+	+	+	+	+	+	+	+
74- O'Riordan, 2006	+	+	+	+	+	+	+	+	+	+	+
75- Pascual, 2011	+	+	+	+	+	+	+	+	+	+	+
76- Pass, 1981	+	+	+	+	+	X	+	+	+	+	+
77- Poeran, 2008	+	+	+	+	+	+	+	+	+	+	+
78- Samies, 2019	+	+	+	+	+	+	+	+	+	+	+
79- Schillinger, 2013	+	+	+	+	+	+	+	+	+	+	+
80- Selin, 1988	+	+	+	+	+	+	+	+	+	+	+

	Risk of bias										Overall
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	
81- Stone, 1989	+	+	+	+	+	+	+	+	+	+	+
82- Sullender, 1987	+	+	+	+	+	+	+	+	+	+	+
83- Sullivan Bolyai, 1983	+	+	+	+	+	+	+	+	+	+	+
84- Teutsch, 2020	+	+	+	+	+	+	+	+	+	+	+
85- Teutsch, 2021	+	+	+	+	+	+	+	+	+	+	+
86- Teutsch, 2022	+	+	+	+	+	+	+	+	+	+	+
87- Teutsch, 2023	+	+	+	+	+	+	+	+	+	+	+
88- Tiffany, 2005	+	+	+	+	+	+	+	+	+	+	+
89- Tookey, 1996	+	+	+	+	+	X	+	+	+	+	+
90- Tookey, 2007	+	+	+	+	+	+	+	+	+	+	+
91- Tookey, 2007	+	+	+	+	+	+	+	+	+	+	+
92- Tookey, 2007	+	+	+	+	+	+	+	+	+	+	+
93- Torii, 2013	+	+	+	+	+	X	+	+	+	+	+
94- van Everdingen, 1993	+	+	+	+	+	+	+	+	+	+	+
95- van Everdingen, 1993	+	+	+	+	+	+	+	+	+	+	+
96- van Oeffelen, 2018	+	+	+	+	+	X	+	+	+	+	+
97- Vaughan, 2024	+	+	+	+	+	X	+	+	+	+	+
98- Waheed, 2022	+	+	+	+	+	+	+	+	+	+	+
99- Whitley, 1988	+	+	+	+	+	+	+	+	+	+	+
100- Whitley, 1991	+	+	+	+	+	+	+	+	+	+	+
101- Xu, 2008	+	+	+	+	+	+	+	+	+	+	+
102- Yeager, 1980	+	+	+	+	+	X	+	+	+	+	+
103- Yeager, 1984	+	+	+	+	+	X	+	+	+	+	+

D1: Sample Representativeness
D2: Participant Recruitment
D3: Sample Size
D4: Description Of Study Subjects And Settings
D5: Data Analysis Coverage
D6: Case Definition Criteria
D7: Diagnostic Reliability
D8: Statistical Analysis Methods
D9: Confounding Factors
D10: Criteria For Subpopulations

Judgement
X High
+ Low

Figure S3. Summary of risk of bias assessment of incidence rate studies. Summary plot of the risk of bias assessment of individual studies reporting incidence rate of neonatal herpes, based on the Joanna Briggs Institute's critical appraisal tool [4-6].

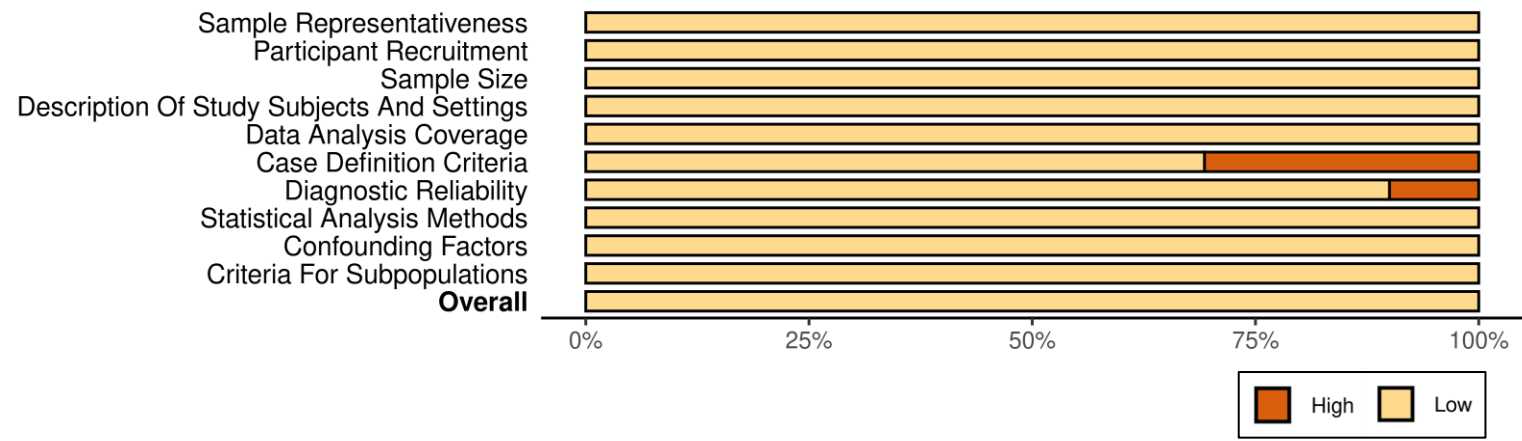


Figure S4. Summary of risk of bias assessment of HSV-1 versus HSV-2 studies. Summary plot of the risk of bias assessment of individual studies reporting neonatal herpes proportions attributed to HSV-1 versus HSV-2, based on the Joanna Briggs Institute's critical appraisal tool [4-6].

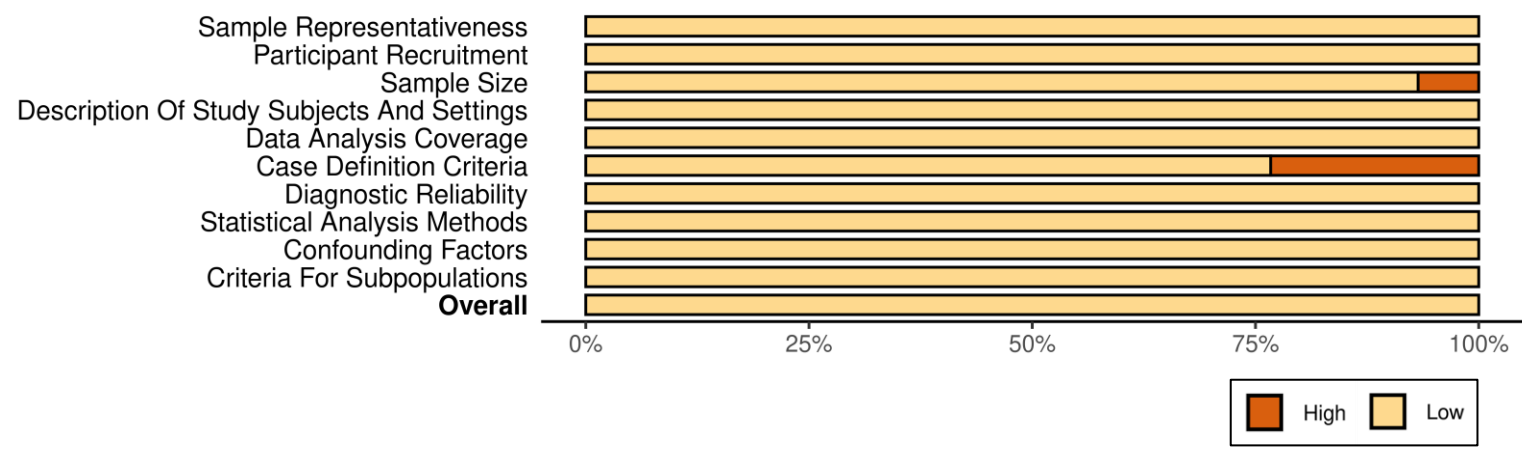


Table S5. Assessment of publication bias using Doi plots and the LFK index.

Outcome type	Outcome measures	LFK index	Doi plot inspection	Interpretation
nHSV incidence rate	140	5.31	Asymmetrical Doi plot	Indicative of potential publication bias
Region of the Americas	80	3.73	Asymmetrical Doi plot	Indicative of potential publication bias
European Region	33	1.96	Asymmetrical Doi plot	Indicative of potential publication bias
Western Pacific Region	27	2.15	Asymmetrical Doi plot	Indicative of potential publication bias
nHSV cases attributable to HSV-1	103	-0.08	Symmetrical Doi plot	No publication bias
nHSV cases attributable to HSV-2	103	0.09	Symmetrical Doi plot	No publication bias

Abbreviations: nHSV, Neonatal herpes simplex virus.

Figure S5. Doi plots for assessing publication bias. Doi plot of studies reporting neonatal herpes A) incidence rate, B) cases attributed to HSV-1, and C) cases attributed to HSV-2.

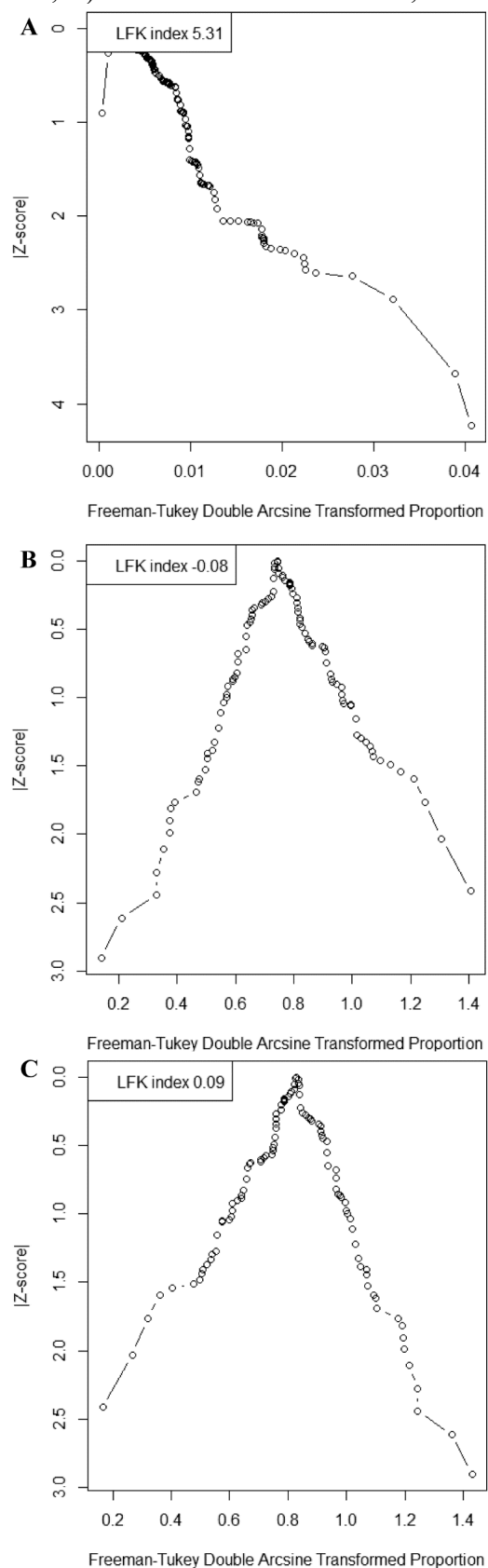
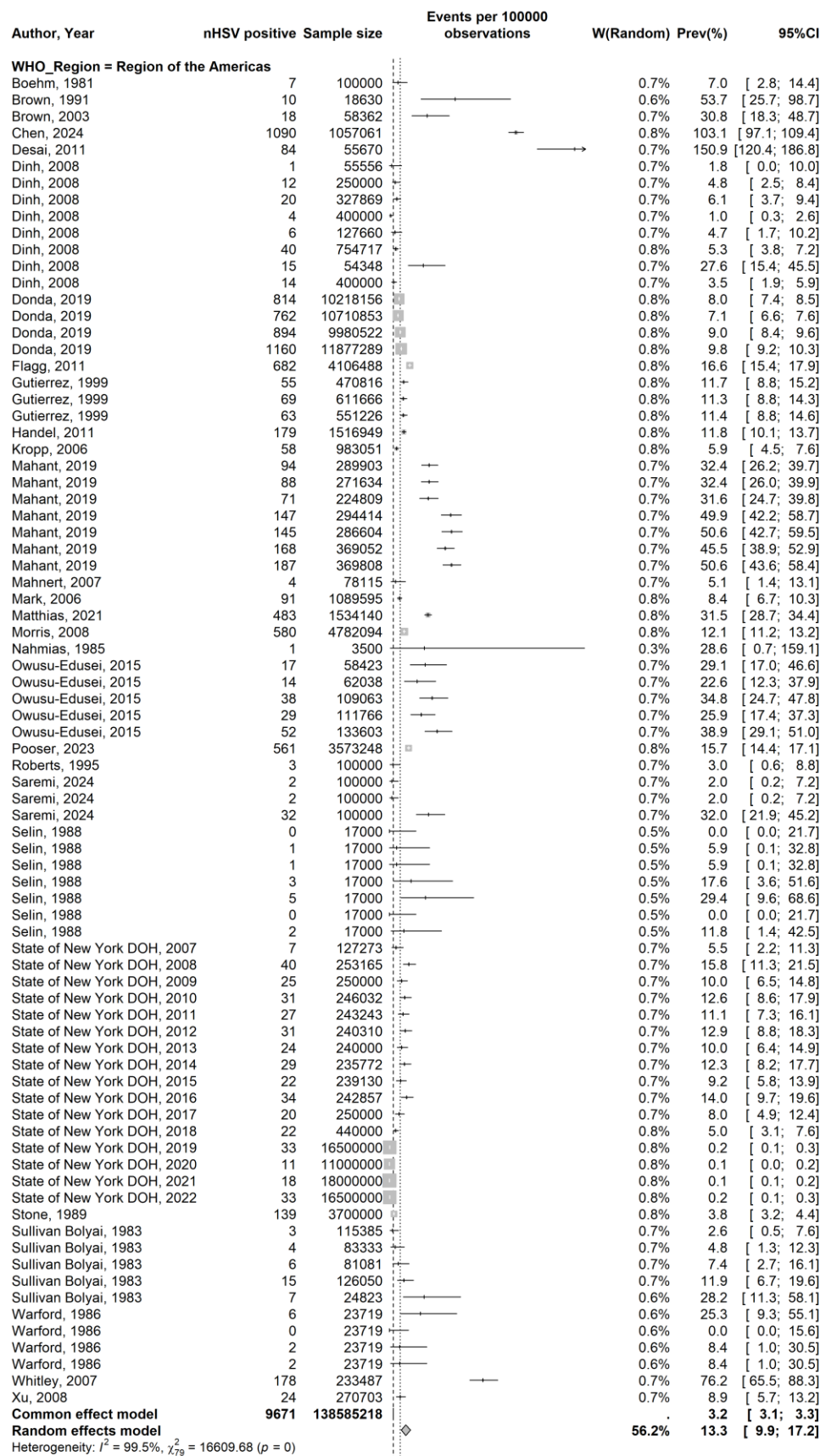
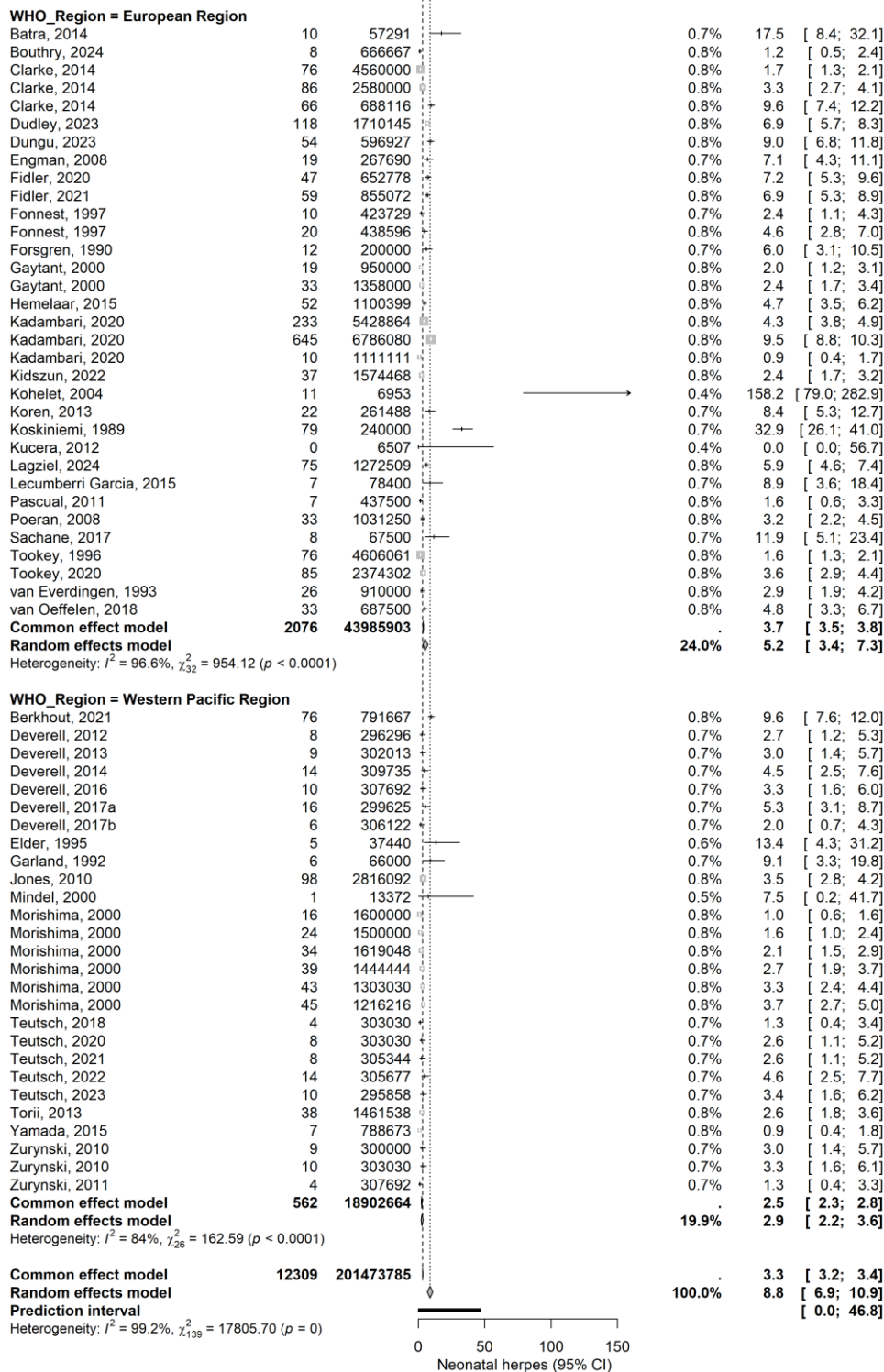


Figure S6. Forest plot for neonatal herpes incidence rate. Forest plot illustrating the global and regional pooled mean incidence rates of neonatal herpes.





Abbreviations: CI, Confidence interval; nHSV, Neonatal herpes simplex virus.

Table S6. Leave-one-out sensitivity analysis. Leave-one-out analysis of pooled mean estimates for the incidence rate of neonatal herpes.

Study	Pooled mean neonatal herpes incidence rate (per 100,000 live births) (95% CI)	Absolute difference
Omitting Desai, 2011	8.4 (6.7-10.3)	0.431
Omitting Chen, 2024	8.4 (6.7-10.4)	0.370
Omitting Whitley, 2007	8.5 (6.7-10.6)	0.282
Omitting Mahant, 2019.6	8.6 (6.7-10.7)	0.199
Omitting Mahant, 2019.4	8.6 (6.7-10.7)	0.198
Omitting Kohelet, 2004	8.6 (6.8-10.7)	0.198
Omitting Mahant, 2019.3	8.6 (6.7-10.7)	0.196
Omitting Mahant, 2019.5	8.6 (6.8-10.7)	0.181
Omitting Owusu-Edusei, 2015.4	8.7 (6.8-10.8)	0.149
Omitting Brown, 1991	8.7 (6.8-10.8)	0.144
Omitting Owusu-Edusei, 2015.2	8.7 (6.8-10.8)	0.131
Omitting Koskiniemi, 1989	8.7 (6.8-10.8)	0.128
Omitting Mahant, 2019	8.7 (6.8-10.8)	0.127
Omitting Mahant, 2019.1	8.7 (6.8-10.8)	0.126
Omitting Matthias, 2021	8.7 (6.8-10.8)	0.125
Omitting State of New York DOH, 2021	8.9 (7.0-11.1)	0.123
Omitting State of New York DOH, 2020	8.9 (7.0-11.1)	0.123
Omitting Mahant, 2019.2	8.7 (6.8-10.8)	0.122
Omitting Saremi, 2024.2	8.7 (6.8-10.8)	0.119
Omitting State of New York DOH, 2019	8.9 (7.0-11.1)	0.118
Omitting State of New York DOH, 2022	8.9 (7.0-11.1)	0.118
Omitting Brown, 2003	8.7 (6.8-10.8)	0.108
Omitting Owusu-Edusei, 2015	8.7 (6.8-10.8)	0.101
Omitting Kadambari, 2020.2	8.9 (7.0-11.1)	0.094
Omitting Yamada, 2015	8.9 (7.0-11.1)	0.094
Omitting Dinh, 2008.6	8.7 (6.8-10.8)	0.094
Omitting Owusu-Edusei, 2015.3	8.7 (6.8-10.8)	0.093
Omitting Morishima, 2000	8.9 (7.0-11.1)	0.092
Omitting Dinh, 2008.3	8.9 (7.0-11.1)	0.090
Omitting Bouthry, 2024	8.9 (7.0-11.0)	0.087
Omitting Warford, 1986.1	8.9 (7.0-11.0)	0.086
Omitting Zurynski, 2011	8.9 (7.0-11.0)	0.083
Omitting Teutsch, 2018	8.9 (7.0-11.0)	0.083
Omitting Morishima, 2000.1	8.9 (7.0-11.0)	0.081
Omitting Sullivan Bolyai, 1983.4	8.7 (6.8-10.9)	0.081
Omitting Tookey, 1996	8.9 (7.0-11.0)	0.080
Omitting Clarke, 2014	8.9 (7.0-11.0)	0.080
Omitting Selin, 1988	8.9 (7.0-11.0)	0.079
Omitting Selin, 1988.5	8.9 (7.0-11.0)	0.079
Omitting Pascual, 2011	8.9 (7.0-11.0)	0.079
Omitting Kucera, 2012	8.9 (7.0-11.0)	0.076
Omitting Gaytant, 2000	8.9 (7.0-11.0)	0.074
Omitting Owusu-Edusei, 2015.1	8.7 (6.8-10.9)	0.073
Omitting Morishima, 2000.2	8.9 (7.0-11.0)	0.073
Omitting Selin, 1988.4	8.7 (6.8-10.9)	0.072
Omitting Deverell, 2017b	8.9 (7.0-11.0)	0.072
Omitting Warford, 1986	8.7 (6.8-10.9)	0.069
Omitting Kidszun, 2022	8.9 (7.0-11.0)	0.069
Omitting Gaytant, 2000.1	8.9 (7.0-11.0)	0.068
Omitting Fonnest, 1997	8.9 (7.0-11.0)	0.067
Omitting Saremi, 2024	8.9 (7.0-11.0)	0.066
Omitting Saremi, 2024.1	8.9 (7.0-11.0)	0.066
Omitting Torii, 2013	8.9 (7.0-11.0)	0.065
Omitting Dinh, 2008	8.9 (7.0-11.0)	0.064
Omitting Morishima, 2000.3	8.9 (7.0-11.0)	0.064
Omitting Teutsch, 2021	8.9 (7.0-11.0)	0.063
Omitting Teutsch, 2020	8.9 (7.0-11.0)	0.063
Omitting Deverell, 2012	8.9 (7.0-11.0)	0.062
Omitting van Everdingen, 1993	8.9 (6.9-11.0)	0.061
Omitting Sullivan Bolyai, 1983	8.9 (6.9-11.0)	0.060
Omitting Deverell, 2013	8.9 (6.9-11.0)	0.058

Omitting Zurynski, 2010	8.9 (6.9-11.0)	0.058
Omitting Poeran, 2008	8.9 (6.9-11.0)	0.057
Omitting Morishima, 2000.4	8.9 (6.9-11.0)	0.056
Omitting Clarke, 2014.1	8.9 (6.9-11.0)	0.056
Omitting Deverell, 2016	8.9 (6.9-11.0)	0.055
Omitting Zurynski, 2010.1	8.9 (6.9-11.0)	0.054
Omitting Roberts, 1995	8.9 (6.9-11.0)	0.054
Omitting Jones, 2010	8.9 (6.9-11.0)	0.054
Omitting Teutsch, 2023	8.9 (6.9-11.0)	0.053
Omitting Tookey, 2020	8.9 (6.9-11.0)	0.053
Omitting Dinh, 2008.7	8.9 (6.9-11.0)	0.052
Omitting Morishima, 2000.5	8.9 (6.9-11.0)	0.051
Omitting Stone, 1989	8.9 (6.9-11.0)	0.051
Omitting Flagg, 2011	8.8 (6.8-10.9)	0.050
Omitting Batra, 2014	8.8 (6.9-10.9)	0.048
Omitting Kadambari, 2020	8.9 (6.9-11.0)	0.045
Omitting Pooser, 2023	8.8 (6.9-10.9)	0.044
Omitting State of New York DOH, 2008	8.8 (6.9-10.9)	0.044
Omitting Nahmias, 1985	8.9 (6.9-11.0)	0.041
Omitting Fonnest, 1997.1	8.9 (6.9-11.0)	0.041
Omitting Deverell, 2014	8.9 (6.9-11.0)	0.041
Omitting Teutsch, 2022	8.9 (6.9-11.0)	0.040
Omitting Hemelaar, 2015	8.9 (6.9-11.0)	0.040
Omitting van Oeffelen, 2018	8.9 (6.9-11.0)	0.039
Omitting Dinh, 2008.1	8.9 (6.9-11.0)	0.038
Omitting Dinh, 2008.4	8.9 (6.9-11.0)	0.037
Omitting State of New York DOH, 2018	8.9 (6.9-11.0)	0.036
Omitting Sullivan Bolyai, 1983.1	8.9 (6.9-11.0)	0.035
Omitting Dinh, 2008.5	8.8 (6.9-11.0)	0.034
Omitting State of New York DOH, 2016	8.8 (6.9-10.9)	0.033
Omitting Deverell, 2017a	8.8 (6.9-11.0)	0.033
Omitting Selin, 1988.3	8.8 (6.9-10.9)	0.032
Omitting Mahnert, 2007	8.8 (6.9-11.0)	0.032
Omitting State of New York DOH, 2007	8.8 (6.9-11.0)	0.030
Omitting Lagziel, 2024	8.8 (6.9-11.0)	0.028
Omitting Kropp, 2006	8.8 (6.9-11.0)	0.028
Omitting State of New York DOH, 2012	8.8 (6.9-10.9)	0.026
Omitting Forsgren, 1990	8.8 (6.9-11.0)	0.026
Omitting Dinh, 2008.2	8.8 (6.9-11.0)	0.025
Omitting State of New York DOH, 2010	8.8 (6.9-10.9)	0.024
Omitting Elder, 1995	8.8 (6.9-10.9)	0.023
Omitting Selin, 1988.1	8.8 (6.9-11.0)	0.023
Omitting Selin, 1988.2	8.8 (6.9-11.0)	0.023
Omitting State of New York DOH, 2014	8.8 (6.9-10.9)	0.022
Omitting Morris, 2008	8.8 (6.9-10.9)	0.021
Omitting Handel, 2011	8.8 (6.9-10.9)	0.019
Omitting Dudley, 2023	8.8 (6.9-11.0)	0.019
Omitting Fidler, 2021	8.8 (6.9-11.0)	0.019
Omitting Sullivan Bolyai, 1983.3	8.8 (6.9-10.9)	0.019
Omitting Gutierrez, 1999	8.8 (6.9-10.9)	0.018
Omitting Sachane, 2017	8.8 (6.9-10.9)	0.017
Omitting Donda, 2019.1	8.8 (6.9-11.0)	0.017
Omitting Engman, 2008	8.8 (6.9-11.0)	0.017
Omitting Boehm, 1981	8.8 (6.9-11.0)	0.016
Omitting Gutierrez, 1999.2	8.8 (6.9-10.9)	0.016
Omitting Mindel, 2000	8.8 (6.9-11.0)	0.016
Omitting Fidler, 2020	8.8 (6.9-11.0)	0.016
Omitting Gutierrez, 1999.1	8.8 (6.9-10.9)	0.015
Omitting State of New York DOH, 2011	8.8 (6.9-10.9)	0.014
Omitting Sullivan Bolyai, 1983.2	8.8 (6.9-11.0)	0.013
Omitting Donda, 2019	8.8 (6.9-11.0)	0.010
Omitting State of New York DOH, 2017	8.8 (6.9-11.0)	0.009
Omitting Selin, 1988.6	8.8 (6.9-10.9)	0.007
Omitting Mark, 2006	8.8 (6.9-11.0)	0.007
Omitting Warford, 1986.2	8.8 (6.9-11.0)	0.007
Omitting Warford, 1986.3	8.8 (6.9-11.0)	0.007
Omitting State of New York DOH, 2009	8.8 (6.9-11.0)	0.006

Omitting State of New York DOH, 2013	8.8 (6.9-11.0)	0.006
Omitting Koren, 2013	8.8 (6.9-11.0)	0.006
Omitting Donda, 2019.3	8.8 (6.9-11.0)	0.004
Omitting Berkhout, 2021	8.8 (6.9-11.0)	0.003
Omitting Clarke, 2014.2	8.8 (6.9-11.0)	0.003
Omitting Xu, 2008	8.8 (6.9-11.0)	0.002
Omitting Kadambari, 2020.1	8.8 (6.9-11.0)	0.002
Omitting Donda, 2019.2	8.8 (6.9-11.0)	0.002
Omitting Lecumberri Garcia, 2015	8.8 (6.9-11.0)	0.002
Omitting Dungu, 2023	8.8 (6.9-11.0)	0.001
Omitting Garland, 1992	8.8 (6.9-11.0)	0.001
Omitting State of New York DOH, 2015	8.8 (6.9-11.0)	0.000

Abbreviations: CI, Confidence interval; DOH, Department of Health.

Table S7. Sensitivity analyses on the meta-regressions. Sensitivity analyses on the main meta-regression analyses for the incidence rate of neonatal herpes.

			Outcome measures	Number of live births	Univariable analyses				Multivariable analyses			
			Total n	Total N	Crude IRR (95% CI)	p-value	LR test p-value	Adjusted R ²	Model 1		Model 2	
									Adjusted IRR (95% CI)	p-value	Adjusted IRR (95% CI)	p-value
Population characteristics	WHO Region	Region of the Americas	80	138,585,218	1.00	-	<0.001	14.2	1.00	-	1.00	-
		European Region	33	43,985,903	0.50 (0.30-0.82)	0.006			0.54 (0.30-0.99)	0.046	0.51 (0.28-0.91)	0.024
		Western Pacific Region	27	18,902,664	0.30 (0.18-0.52)	<0.001			0.49 (0.25-0.99)	0.046	0.45 (0.23-0.90)	0.023
	Country ^a	United States	72	137,483,167	1.00	-	0.005	14.4	-	-	-	-
		Australia	19	7,969,715	0.36 (0.20-0.68)	0.002			-	-	-	-
		Canada	8	1,102,051	1.04 (0.34-3.17)	0.943			-	-	-	-
		Denmark	3	1,459,252	0.46 (0.11-1.83)	0.268			-	-	-	-
		Israel	3	1,540,950	1.89 (0.47-7.56)	0.363			-	-	-	-
		Japan	8	10,932,949	0.20 (0.08-0.48)	<0.001			-	-	-	-
		Netherlands	6	6,037,149	0.31 (0.12-0.84)	0.022			-	-	-	-
		United Kingdom	13	31,477,320	0.48 (0.23-0.96)	0.039			-	-	-	-
		Other countries ^b	8	3,471,232	0.48 (0.19-1.22)	0.120			-	-	-	-
Methodological characteristics	Site type	National surveillance registry/report	65	116,238,593	1.00	-	<0.001	26.4	1.00	-	1.00	-
		Clinical setting	35	9,049,159	3.17 (1.96-5.13)	<0.001			3.59 (1.94-6.63)	<0.001	4.09 (2.23-7.53)	<0.001
		Healthcare database	24	70,439,796	5.23 (3.12-8.78)	<0.001			3.24 (1.69-6.22)	0.001	3.26 (1.72-6.17)	<0.001
		Virological laboratory	4	2,069,357	1.41 (0.45-4.43)	0.556			2.11 (0.64-6.89)	0.215	2.17 (0.69-6.79)	0.184
		Mixed/Unclear	12	3,676,880	2.14 (0.97-4.74)	0.061			2.60 (1.09-6.20)	0.031	2.86 (1.23-6.65)	0.015
	Estimate type	National estimate	68	118,353,291	1.00	-	0.132	1.7	1.00	-	1.00	-
		Regional estimate	57	81,882,934	1.27 (0.80-2.01)	0.311			1.05 (0.57-1.96)	0.866	1.09 (0.59-1.99)	0.789
		Institutional estimate	15	1,237,560	2.21 (0.99-4.95)	0.053			0.95 (0.38-2.37)	0.918	0.91 (0.37-2.21)	0.829
	Risk of bias: case definition criteria domain ^c	Low risk of bias	97	170,786,533	1.00	-	0.864	0.0	1.00	-	1.00	-
		High risk of bias	43	30,687,252	1.04 (0.64-1.70)	0.864			1.48 (0.93-2.36)	0.098	1.59 (1.01-2.51)	0.044
	Risk of bias: diagnostic reliability domain ^c	Low risk of bias	126	187,312,290	1.00	-	<0.001	9.6	1.00	-	1.00	-
		High risk of bias	14	14,161,495	3.93 (1.93-7.96)	<0.001			1.95 (0.98-3.87)	0.057	1.90 (0.97-3.70)	0.060
Temporal trends ^d	Year of data collection category	<1995	43	29,290,482	1.00	-	0.850	0.0	1.00	-	-	-
		1995-2004	23	31,919,950	1.19 (0.60-2.36)	0.607			1.48 (0.80-2.75)	0.209	-	-
		≥2005	74	140,263,353	1.13 (0.68-1.88)	0.642			1.75 (1.04-2.96)	0.036	-	-
	Year of data collection		140	201,473,785	1.00 (0.98-1.02)	0.710	0.710	0.0	-	-	1.03 (1.01-1.05)	0.003

Abbreviations: CI, Confidence interval; IRR, Incidence rate ratio; LR test, Likelihood ratio test; WHO, World Health Organization.

Adjusted R² in the final multivariable model 1 is 33.8%.

Adjusted R² in the final multivariable model 2 is 36.7%.

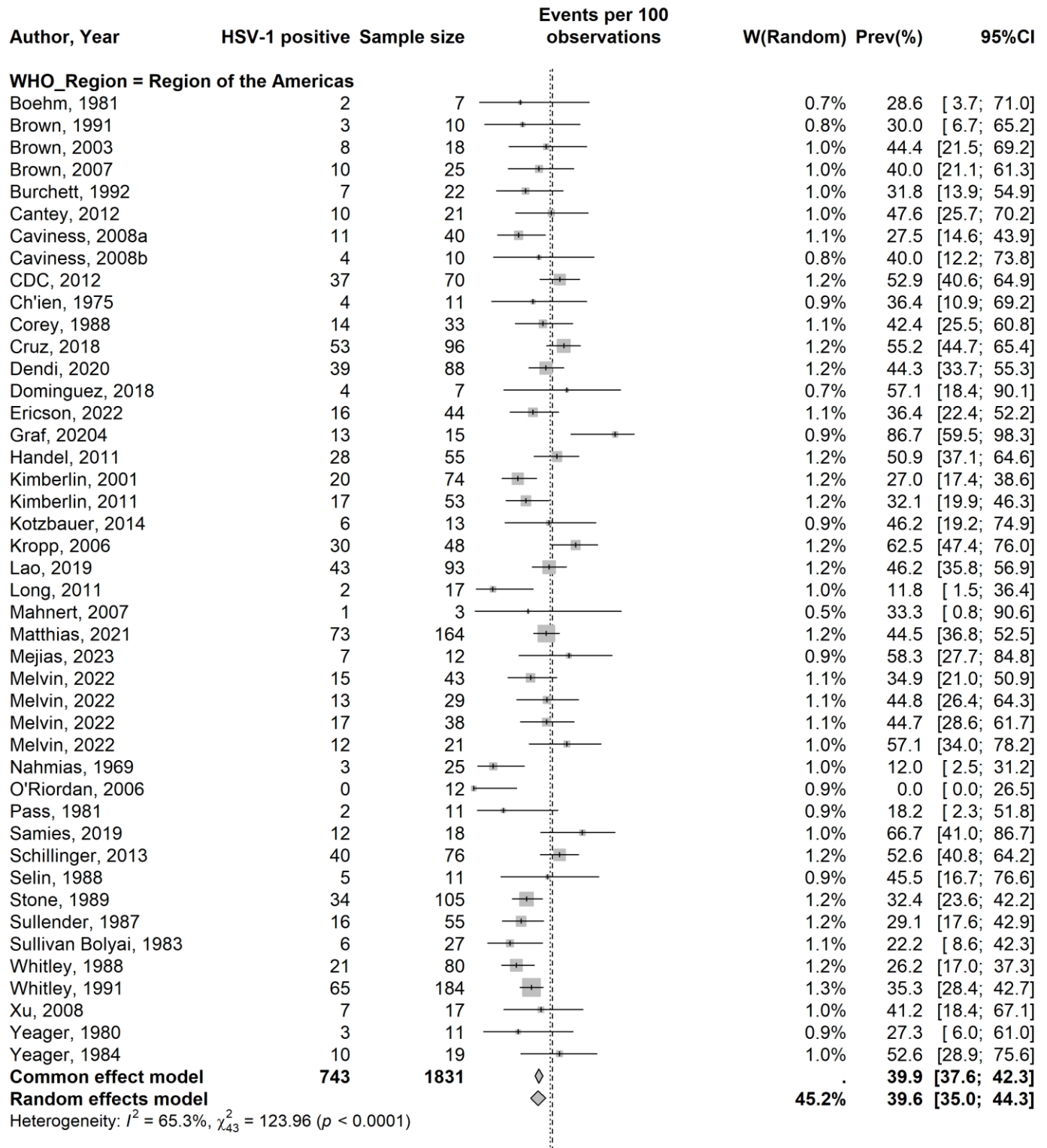
^aThe country variable was excluded from the multivariable model due to collinearity with the region variable.

^bThis category includes countries with two or fewer studies including Finland, France, Germany, Spain, Sweden, and Switzerland.

^cOf the 10 risk of bias domains assessed in this systematic review, 8 were rated as low risk of bias across all studies and were therefore excluded from the meta-regression analyses. The only domains with variability were the "case definition criteria" domain and the "diagnostic reliability" domain.

^dTo assess temporal trends, the year of data collection was included in the multivariable models irrespective of the p-value criteria for model inclusion.

Figure S7. Forest plot of HSV-1 contribution to neonatal herpes. Forest plot illustrating the global and regional pooled mean proportion of neonatal herpes cases attributed to HSV-1.

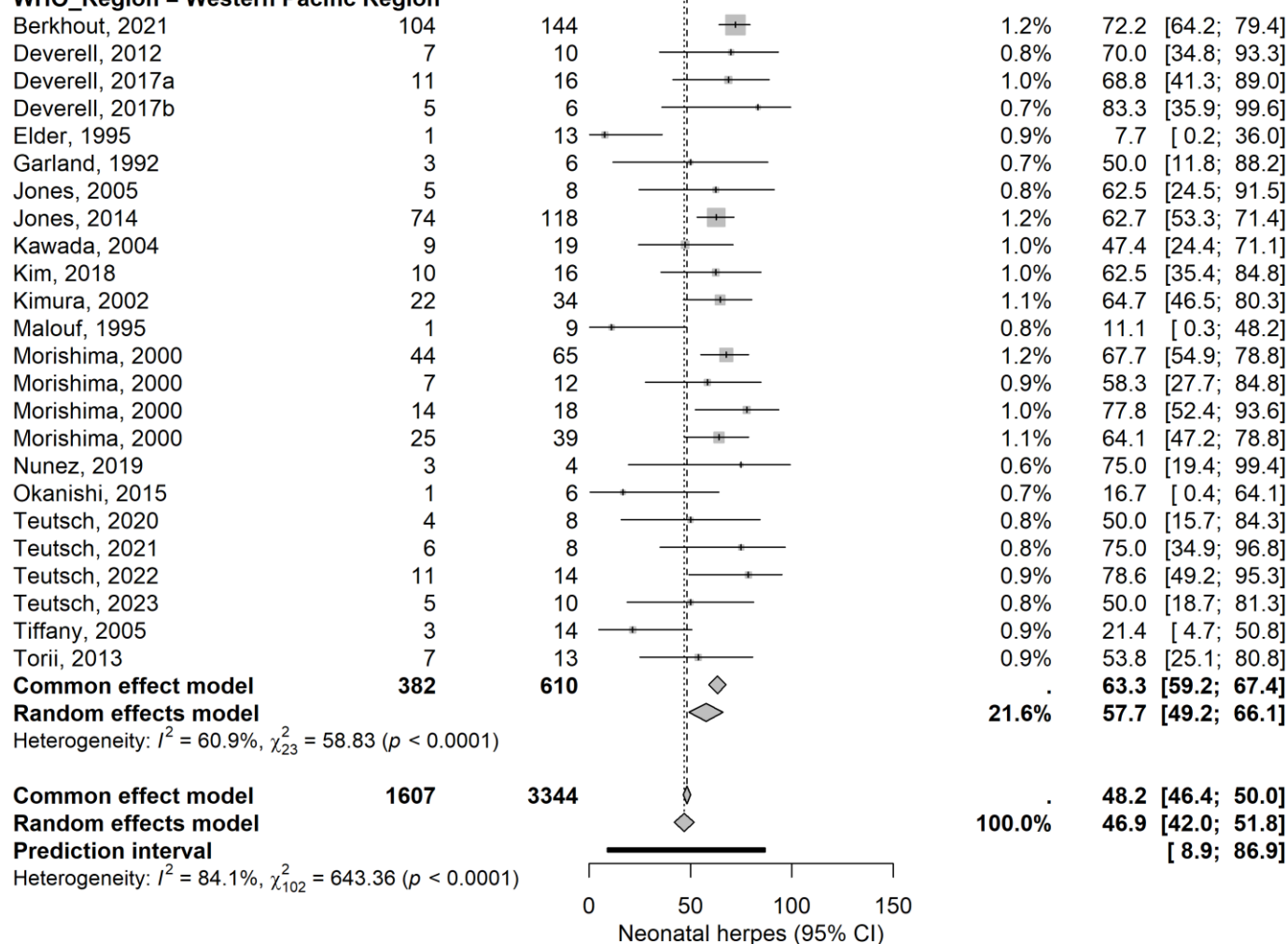


WHO_Region = European Region

Batra, 2014	9	17	1.0%	52.9	[27.8; 77.0]
Bouthry, 2024	4	8	0.8%	50.0	[15.7; 84.3]
Brown, 2007	10	35	1.1%	28.6	[14.6; 46.3]
Dudley, 2023	29	78	1.2%	37.2	[26.5; 48.9]
Dungu, 2023	52	53	1.2%	98.1	[89.9; 100.0]
Engman, 2008	2	9	0.8%	22.2	[2.8; 60.0]
Fidler, 2021	29	54	1.2%	53.7	[39.6; 67.4]
Fonnest, 1997	3	7	0.7%	42.9	[9.9; 81.6]
Fonnest, 1997	1	2	0.4%	50.0	[1.3; 98.7]
Forsgren, 1990	12	48	1.2%	25.0	[13.6; 39.6]
Gaytant, 2000	24	27	1.1%	88.9	[70.8; 97.6]
Hemelaar, 2015	33	35	1.1%	94.3	[80.8; 99.3]
Kashyap, 2014	6	11	0.9%	54.5	[23.4; 83.3]
Keunig, 2019	2	6	0.7%	33.3	[4.3; 77.7]
Khandwalla, 2021	1	10	0.8%	10.0	[0.3; 44.5]
Kidszun, 2022	20	24	1.0%	83.3	[62.6; 95.3]
Kohelet, 2004	0	5	0.6%	0.0	[0.0; 52.2]
Koren, 2013	13	17	1.0%	76.5	[50.1; 93.2]
Koskiniemi, 1989	1	13	0.9%	7.7	[0.2; 36.0]
Lagziel, 2024	77	85	1.2%	90.6	[82.3; 95.8]
Leventon-Kriss, 1983	1	3	0.5%	33.3	[0.8; 90.6]
Lewensohn-Fuchs, 2003	3	28	1.1%	10.7	[2.3; 28.2]
Malm, 1991	10	45	1.1%	22.2	[11.2; 37.1]
Malm, 1999	7	36	1.1%	19.4	[8.2; 36.0]
Pascual, 2011	4	6	0.7%	66.7	[22.3; 95.7]
Poeran, 2008	15	28	1.1%	53.6	[33.9; 72.5]
Tookey, 1996	25	49	1.2%	51.0	[36.3; 65.6]
Tookey, 2007	11	24	1.0%	45.8	[25.6; 67.2]
Tookey, 2007	15	31	1.1%	48.4	[30.2; 66.9]
Tookey, 2007	9	24	1.0%	37.5	[18.8; 59.4]
van Everdingen, 1993	15	22	1.0%	68.2	[45.1; 86.1]
van Everdingen, 1993	12	16	1.0%	75.0	[47.6; 92.7]
van Oeffelen, 2018	18	23	1.0%	78.3	[56.3; 92.5]
Vaughan, 2024	3	4	0.6%	75.0	[19.4; 99.4]
Waheed, 2022	6	20	1.0%	30.0	[11.9; 54.3]
Common effect model	482	903	.	55.1	[51.7; 58.6]
Random effects model			33.2%	50.4	[39.6; 61.2]

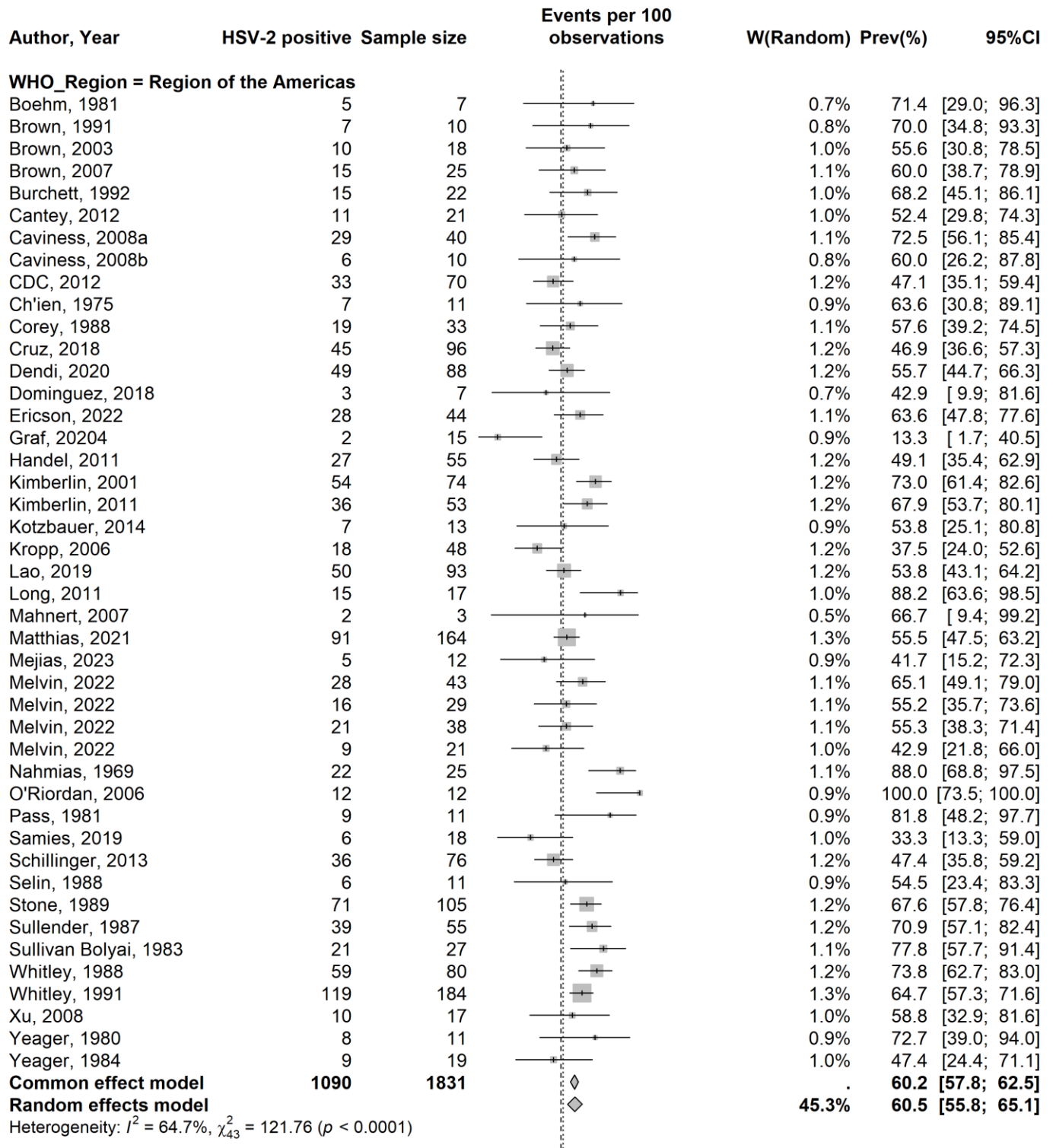
Heterogeneity: $I^2 = 90.3\%$, $\chi^2_{34} = 349.08$ ($p < 0.0001$)

WHO_Region = Western Pacific Region

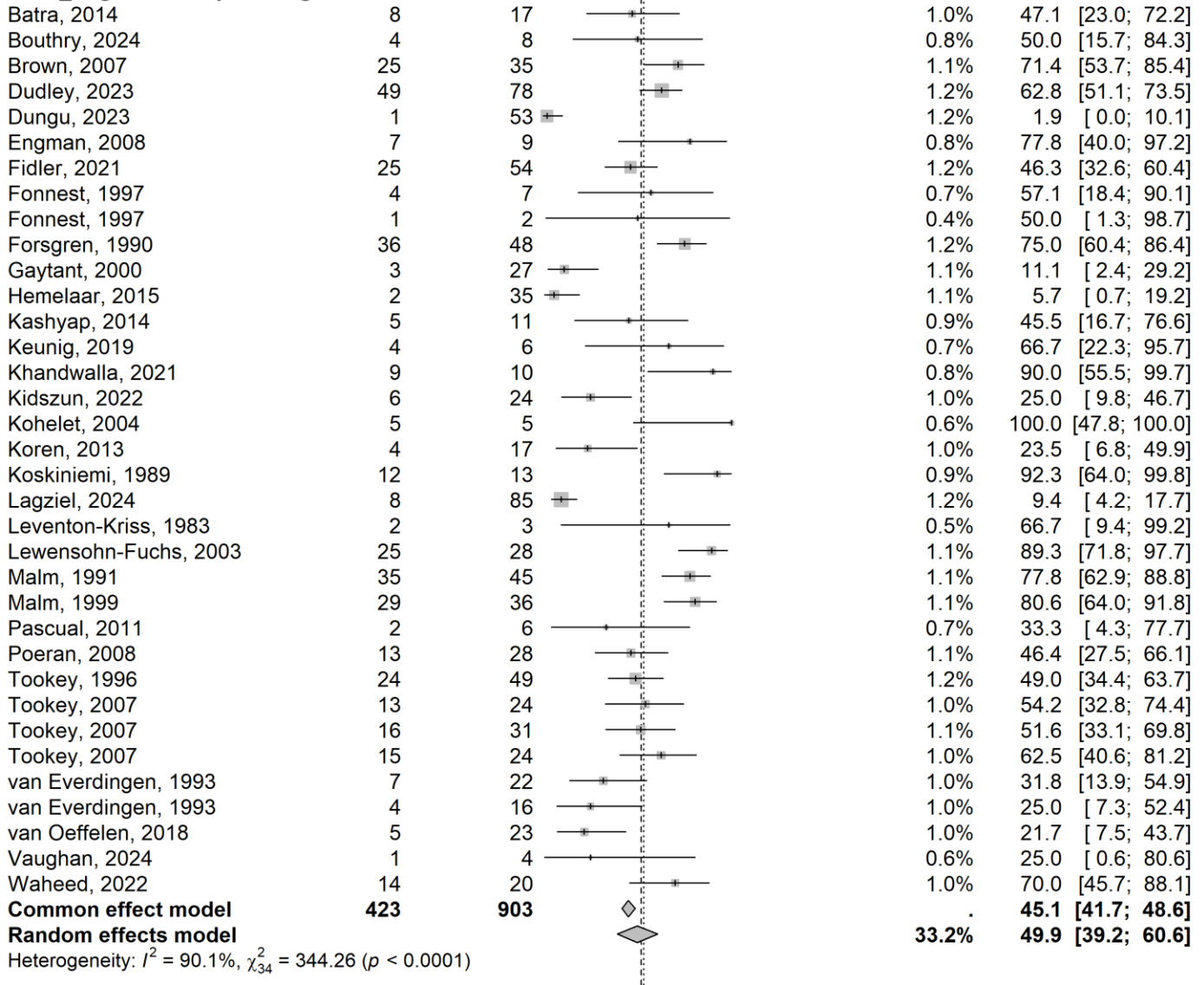


Abbreviations: CI, Confidence interval; HSV-1, Herpes simplex virus type 1.

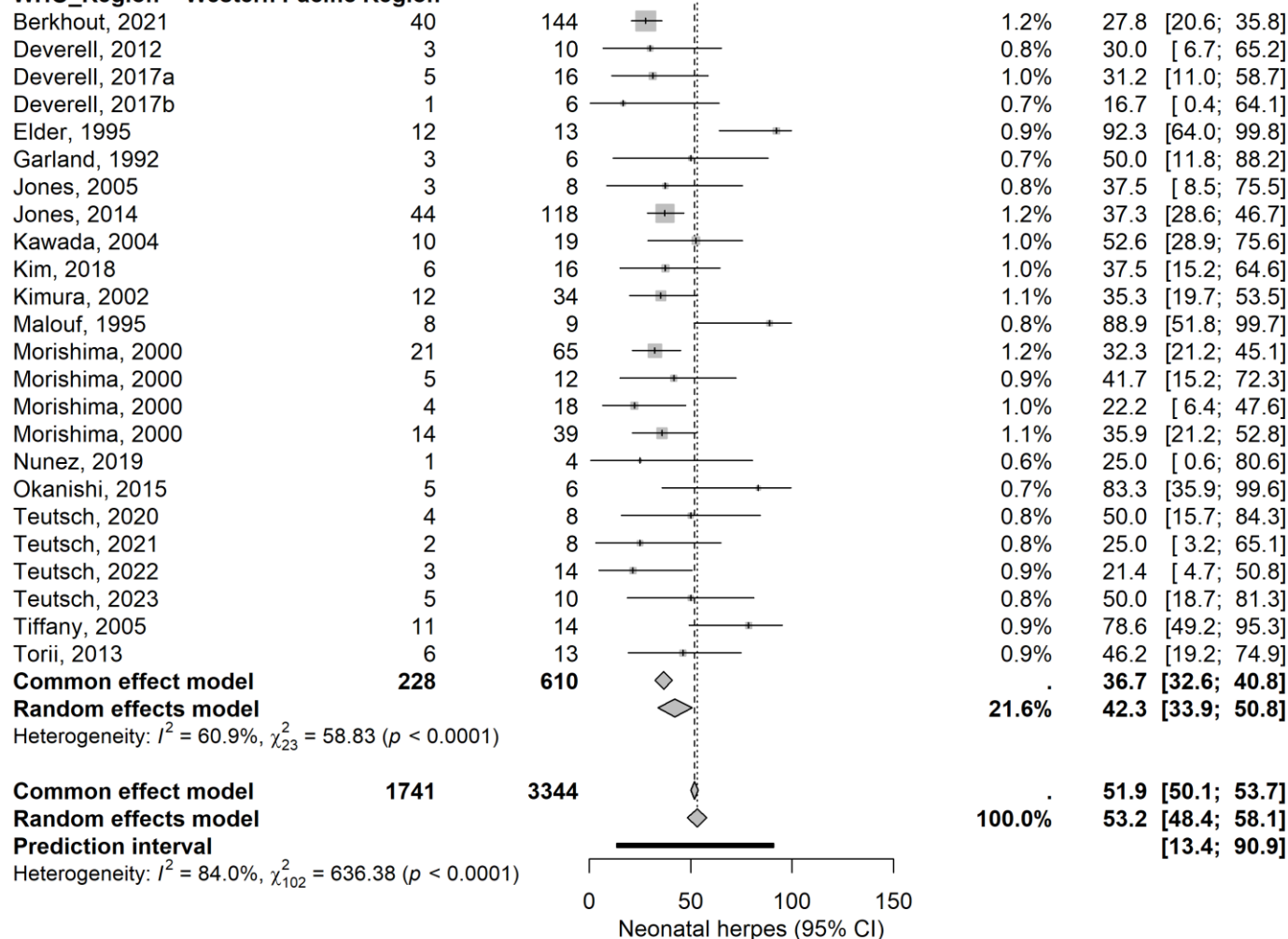
Figure S8. Forest plot of HSV-2 contribution to neonatal herpes. Forest plot illustrating the global and regional pooled mean proportion of neonatal herpes cases attributed to HSV-2.



WHO_Region = European Region



WHO_Region = Western Pacific Region



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

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