

# Prevalence of curable sexually transmitted infections in pregnant women in low- and middle-income countries: A systematic review



Hannah I. Shull, MD; Jeffrey D. Klausner, MD MPH  
David Geffen School of Medicine at UCLA, Los Angeles, CA, USA



## OBJECTIVE

- To conduct a systematic review and summarize curable sexually transmitted infection (STI) prevalence estimates among pregnant women in low- and middle-income countries

## BACKGROUND

- Globally, nearly 17,000 children under 5 years of age die each day
- Preterm delivery is the number one cause of under-5 year mortality

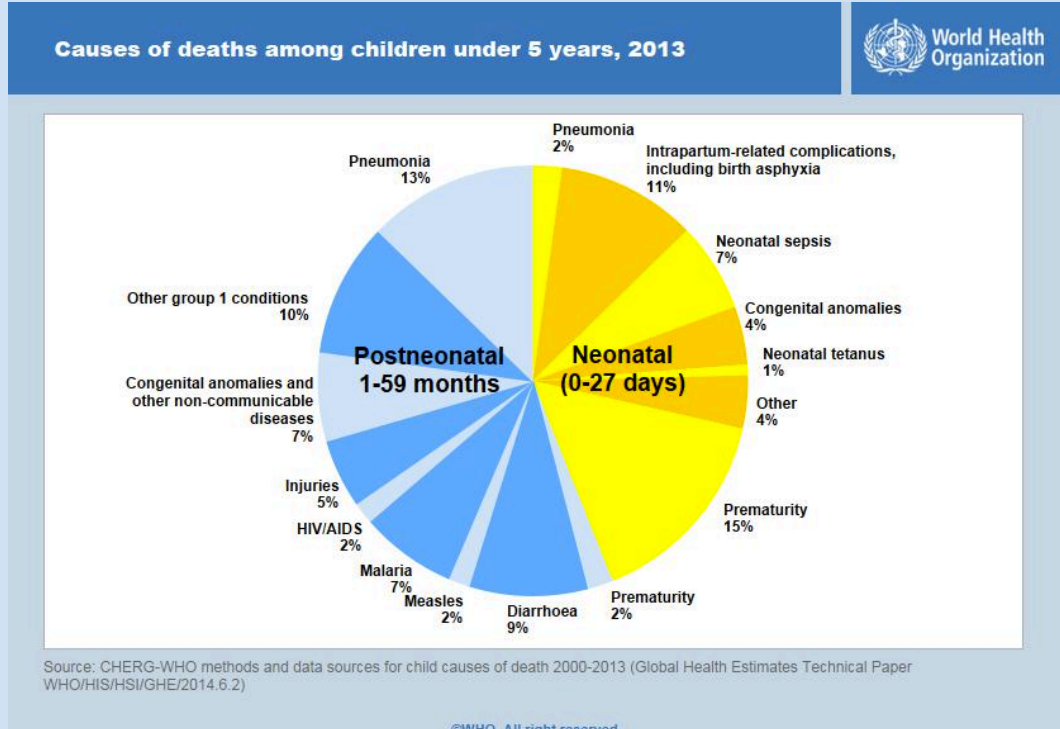


Image 1: Causes of under-5 year mortality

- Curable STIs in pregnant women, specifically syphilis, *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Trichomonas vaginalis*, have been shown to cause preterm delivery through:
  - Premature rupture of membranes
  - Preterm labor
  - Chorioamnionitis
  - Congenital infection
- There is a strong likely causal association between antenatal STIs and preterm delivery
- Treating curable STIs may decrease under-5 year mortality

## METHODS

- Searched PubMed for studies reporting prevalence statistics for syphilis, *Neisseria gonorrhoeae*, *Chlamydia trachomatis*, and *Trichomonas vaginalis* infections among pregnant women in low- and middle-income countries
- Definitions of low- and middle-income economies were obtained from the World Bank
- Included studies published between 1/1/2010 and 3/1/2015
- Inclusion criteria included: English language; cross-sectional/prevalence/cohort/case-control study; low- or middle-income country; objective prevalence statistics for pregnant women
- Exclusion criteria included: Non-English language; review article; high-income country; women previously tested for STIs during current pregnancy; data collected after postpartum women were discharged from the hospital; data obtained via surveys or self-report; cohort of women presenting with a chief complaint of vaginal discharge

## RESULTS

Table 1: Syphilis				
Year	Location	Prevalence	Positive	Tested
Africa				
2015	Tanzania	1.8%	6	332
2015	Uganda	5.1%	29	570
2014	Benin	2.5%	7	283
2014	Malawi	7.0%	150	2149
Democratic Republic of				
2014	Congo	4.2%	739	17669
2013	South Africa	4.9%	99	2008
2013	Uganda	11.1%	54	488
2013	Madagascar	3.0%	37	1232
2012	Zambia	9.2%	1050	11460
2012	Uganda	5.3%	690	13131
2012	Tanzania	1.6%	93	5802
2012	Tanzania	2.7%	5	185
2012	South Africa	3.2%	33684	
2012	South Africa	2.3%	34927	
2012	South Africa	2.2%	33861	
2012	Zambia	3.2%	239	7477
2011	Nigeria	0.2%	3	1393
2011	Ethiopia	0.0%	0	165
2011	Zambia	2.6%	2449	95663
2010	Malawi	5.0%	66	1320
2010	Zimbabwe	1.2%	8	662
2010	Tanzania	0.9%	23	2654
2010	Kenya	2.5%	11	441
2010	Tanzania	16.0%		3780
2010	Tanzania	7.0%		
2010	Tanzania	13.0%		
2010	South Africa	17.1%	298	1740
2010	Somalia	1.3%	21	1559
2010	Mozambique	10.0%	15	149
2011	Burkina Faso	1.8%	38	2136
2010	Southern Sudan	34.2%	79	231
Asia				
2015	India	0.2%		
2014	India	0.6%	35	6221
2014	China	0.4%	7668	2077362
2014	China	0.3%	838	279334
2013	India	0.5%	5	1038
2013	China	0.4%	106	27150
2012	India	0.2%	2	1002
2012	China	0.9%	7	800
2011	Bangladesh	3.0%	37	1250
2011	Myanmar	13.3%	15	113
2011	Myanmar	3.5%	8	226
2011	Cambodia	0.1%	11	16529
2010	China	0.3%	1471	535527
2010	China	0.5%	827	159107
Middle East				
2011	Pakistan	0.9%	7	800
Pacific Islands				
2015	Papua New Guinea	1.5%	35	2288
South & Central America				
2014	Brazil	0.4%	666	162669
2014	Ecuador	0.7%	21	5874
2013	Brazil	1.9%	46	2422
2013	Brazil	41.7%	5	12
2013	Brazil	0.5%	17	3300
2013	Argentina	1.2%	29	2403
2012	Brazil	9.5%	6	63
2012	Mexico	0.3%	6	2331
2012	Peru	1.6%	20	1251
2012	Brazil	8.1%	3	37
2012	Brazil	3.1%	4	130
2011	Guatemala	0.6%	12	1897
2011	Brazil	2.2%	16	712
2010	Brazil	0.9%	5	561
2010	Guatemala	0.6%	78	13027

Table 2: <i>Neisseria gonorrhoeae</i>				
Year	Location	Prevalence	Positive	Tested
Africa				
2015	South Africa	6.4%	92	1459
2014	Kenya	0.0%	0	30
2014	South Africa	0.0%	0	30
2012	Sudan	4.0%	8	200
2010	Tanzania	1.6%	3	185
2010	Kenya	1.6%	7	441
2010	Mozambique	19.0%	27	145
2010	South Africa	4.5%	9	200
Asia				
2011	Myanmar	3.5%	4	113
2011	Myanmar	0.9%	2	226
2014	Papua New Guinea	9.7%	35	362
South & Central America				
2012	Brazil	0.0%	0	63
2011	Brazil	1.0%	20	2017
2010	Peru	0.1%	1	1286



Image 2: Female hospital ward in Malawi

Table 3: <i>Chlamydia trachomatis</i>				
Year	Location	Prevalence	Positive	Tested
Africa				
2015	South Africa	17.8%	260	1459
2014	Kenya	7.0%	2	30
2014	South Africa	13.0%	4	30
2014	Sudan	68.0%	136	200
2014	Nigeria	16.3%	16	98
2012	Tanzania	1.6%	3	185
2010	Kenya	4.3%	19	441
2010	Mozambique	10.0%	15	151
2010	South Africa	14.0%	28	200
Asia				
2014	Bangladesh	41.3%	71	172
2012	India	0.1%	1	784
2011	Myanmar	8.0%	9	113
2011	Myanmar	2.2%	5	226
Middle East				
2014	Iran	4.7%	4	85
2013	Turkey	6.4%	8	125
2010	Turkey	7.3%	7	96
Pacific Islands				
2014	Papua New Guinea	11.0%	40	362
South & Central America				
2015	Peru	10.0%	60	600
2013	Brazil	11.0%	11	100
2012	Brazil	11.1%	7	63
2011	Brazil	9.8%	202	2071
2011	Brazil	25.7%	26	101
2010	Peru	7.6%	98	1286
2010	Brazil	8.9%	33	371



Image 3: Rapid syphilis test

Table 4: <i>Trichomonas vaginalis</i>				
Year	Location	Prevalence	Positive	Tested
Africa				
2015	South Africa	15.3%	223	1459
2014	Kenya	3.0%	1	30
2014	South Africa	10.0%	3	30
2014	Sudan	1.0%	2	200
2012	Tanzania	11.4%	21	185
2010	Zimbabwe	11.8%	80	680
2010	Tanzania	5.0%	127	2555
2010	Kenya	16.6%	73	441
2010	South Africa	12.5%	25	200
2010	Sub-Saharan Africa	18.0%	428	2428
2010	Zimbabwe	11.2%	38	340
2010	Zambia	32.2%	99	307
Middle East				
2014	Iran	7.1%	6	85
Pacific Islands				
2014	Papua New Guinea	21.3%	77	362
South & Central America				
2010	Brazil	1.4%	4	289
2010	Argentina	4.0%	24	597
2010	Peru	2.5%	33	1315

## RESULTS

- 376 potentially relevant reports were identified, with 331 English results
- 77 studies met inclusion criteria
- 116 point prevalence estimates, including a total of 3,594,777 women
- Median value (range) of the estimates for each STI were as follows:
  - Syphilis, 1.9% (0-41.7%)
  - N. gonorrhoeae*, 1.6% (0-19.0%)
  - C. trachomatis*, 9.8% (0.1-41.3%)
  - T. vaginalis*, 11.2% (1.0-32.3%)
- Median prevalence value of any STI was 23.9% (10.3-33.7)

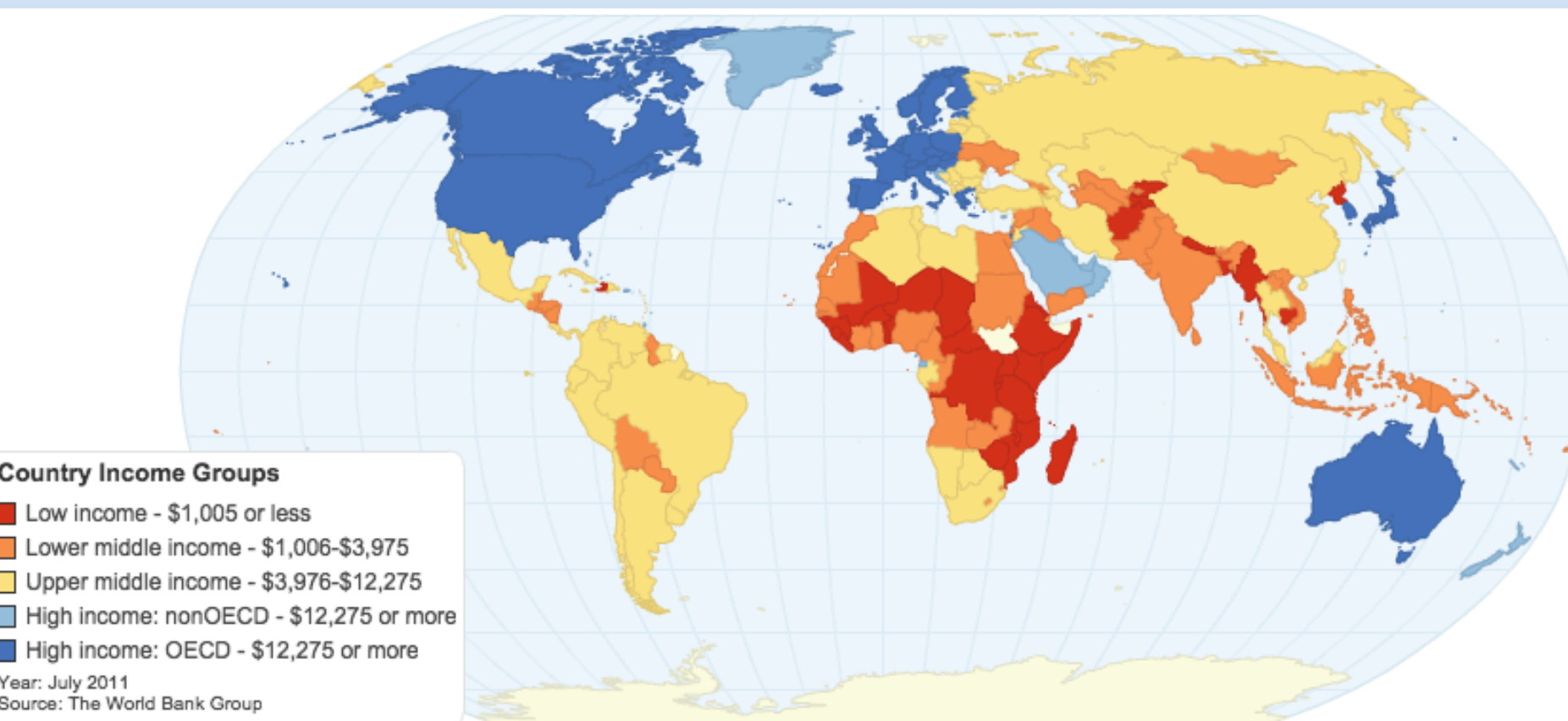


Image 4: Low-, middle- and high-income countries, 2011

## DISCUSSION

- Prevalence rates of curable STIs in pregnant women in low- and middle-income countries range from low to high and vary by testing methodology and country
- Median prevalence values are *high* and suggest a large population-level burden of untreated curable infections in pregnant women
- Interventions to screen and treat pregnant women in low- and middle-income countries to reduce preterm delivery and subsequent under-5 years of age mortality need *urgent* evaluation



Image 5: SDSN, which includes Target #3.2: By 2030 end preventable deaths of newborns and under-5 children

## ACKNOWLEDGEMENTS

We would like to acknowledge the UCLA Department of Medicine.