

Table S1. Heterogeneity statistics for the aetiology of Gram-negative bacterial infections in high-income and low/middle-income countries (corresponding to results presented in Table 1)

High-income countries (n=55 studies)	τ^2	τ	I² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.79	0.89	98.1% [97.9% - 98.3%]	7.28 [6.86 - 7.73]
<i>Klebsiella</i> spp.	2.45	1.57	94.5% [93.5% - 95.3%]	4.26 [3.92 - 4.63]
<i>Pseudomonas</i> spp.	2.01	1.42	61.9% [49.0% - 71.5%]	1.62 [1.40 - 1.87]
<i>Enterobacter</i> spp.	5.16	2.27	87.7% [84.7% - 90.0%]	2.85 [2.56 - 3.17]
<i>Serratia</i> spp.	5.24	2.29	42.9% [21.3% - 58.7%]	1.32 [1.13 - 1.56]
<i>Proteus</i> spp.	6.67	2.58	0.0%	1.00
<i>Salmonella</i> spp.	23.8	4.87	60.3% [46.7% - 70.4%]	1.59 [1.37 - 1.84]
<i>Citrobacter</i> spp.	8.62	2.94	0.0%	1.00
<i>Haemophilus</i> spp.	10.4	3.22	59.4% [45.3% - 69.8%]	1.57 [1.35 - 1.82]
<i>Neisseria</i> spp.	14.4	3.80	0.0%	1.00
<i>Acinetobacter</i> spp.	7.45	2.73	80.4% [74.9% - 84.6%]	2.26 [2.00 - 2.55]
<i>Moraxella</i> spp.	46.1	6.79	0.0%	1.00
Other spp. or unspecified Gram-negatives	5.07	2.25	91.0% [89.0% - 92.6%]	3.33 [3.02 - 3.67]
Low/middle-income countries (n=90 studies)	τ^2	τ	I² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.85	0.92	92.3% [91.2% - 93.4%]	3.61 [3.36 - 3.88]
<i>Klebsiella</i> spp.	0.79	0.89	95.5% [95.0% - 96.0%]	4.73 [4.45 - 5.03]
<i>Pseudomonas</i> spp.	2.10	1.45	90.1% [88.4% - 91.5%]	3.18 [2.94 - 3.43]
<i>Enterobacter</i> spp.	3.44	1.85	84.0% [80.8% - 86.6%]	2.50 [2.28 - 2.73]
<i>Serratia</i> spp.	11.4	3.38	60.7% [50.6% - 68.8%]	1.60 [1.42 - 1.79]
<i>Proteus</i> spp.	7.65	2.77	42.8% [26.4% - 55.6%]	1.32 [1.17 - 1.50]
<i>Salmonella</i> spp.	43.9	6.63	37.1% [18.5% - 51.4%]	1.26 [1.11 - 1.43]
<i>Citrobacter</i> spp.	6.86	2.62	26.7% [4.3% - 43.9%]	1.17 [1.02 - 1.34]
<i>Haemophilus</i> spp.	54.0	7.35	0.0%	1.00
<i>Neisseria</i> spp.	39.7	6.30	0.0%	1.00
<i>Acinetobacter</i> spp.	1.81	1.34	89.7% [87.9% - 91.2%]	3.11 [2.88 - 3.37]
<i>Moraxella</i> spp.	135.8	11.7	0.0%	1.00
Other spp. or unspecified Gram-negatives	5.81	2.41	77.6% [72.8% - 81.6%]	2.11 [1.92 - 2.33]

Table S2: Gram-negative species as percentages of all neonatal bacteraemia (Gram-negative and Gram-positive) in high- and low/middle-income countries restricted to studies where the neonatal period was defined as up to day 28 or 30 of life*

	High-income countries (n=30 studies)		Low/middle-income countries (n=53 studies)	
	Isolates, n	proportion [95%CI]	Isolates, n	proportion [95%CI]
<i>Escherichia coli</i>	3,458	11.0% [8.62 - 14.0%]	1,786	8.18% [6.53 - 10.2%]
<i>Klebsiella</i> spp.	1,541	2.69% [1.34 - 5.35%]	3,719	18.6% [15.39 - 22.4%]
<i>Pseudomonas</i> spp.	439	0.74% [0.40 - 1.35%]	649	2.18% [1.38 - 3.43%]
<i>Enterobacter</i> spp.	990	0.60% [0.21 - 1.68%]	580	1.28% [0.70 - 2.33%]
<i>Serratia</i> spp.	306	0.22% [0.08 - 0.60%]	59	0.02% [0.00 - 0.13%]
<i>Proteus</i> spp.	10	0.01% [0.00 - 0.08%]	108	0.05% [0.01 - 0.20%]
<i>Salmonella</i> spp.	15	0.00% [0.00 - 24.8%]	29	0.00% [0.00 - 1.10%]
<i>Citrobacter</i> spp.	50	0.01% [0.00 - 0.11%]	161	0.12% [0.04 - 0.35%]
<i>Haemophilus</i> spp.	253	0.03% [0.03 - 0.03%]	0	NA
<i>Neisseria</i> spp.	19	0.00% [0.00 - 0.23%]	1	0.00% [0.00 - 0.81%]
<i>Acinetobacter</i> spp.	394	0.14% [0.03 - 0.61%]	1,378	2.91% [1.91 - 4.42%]
<i>Moraxella</i> spp.	3	0.00% [0.00 - 0.67%]	6	0.00% [0.00 - 7.11%]
Other spp. or unspecified Gram-negative	689	0.04% [0.00 - 0.40%]	732	0.04% [0.00 - 0.40%]

* Estimates obtained by random-effects meta-analysis; see Table S5 for heterogeneity statistics

Table S3. Heterogeneity statistics for early-onset invasive Gram-negative bacterial infection in high- and low/middle-income countries (corresponding to results presented in Table 2)

High-income countries (n=24 studies)	τ^2	τ	I ² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.32	0.57	91.7% [89.0% - 93.8%]	3.48 [3.01 - 4.02]
<i>Klebsiella</i> spp.	41.6	20.4	82.0% [74.1% - 87.5%]	2.36 [1.97 - 2.82]
<i>Pseudomonas</i> spp.	42.4	20.6	19.3% [0.0% - 51.0%]	1.11 [1.00 - 1.43]
<i>Enterobacter</i> spp.	5.54	2.35	0.0%	1.00
<i>Serratia</i> spp.	85.08	9.22	0.0%	1.00
<i>Proteus</i> spp.	2.91	1.71	0.0%	1.00
<i>Salmonella</i> spp.	N/A	N/A	N/A	N/A
<i>Citrobacter</i> spp.	6.66	2.58	0.0%	1.00
<i>Haemophilus</i> spp.	2.55	1.60	0.0% [0.0% - 43.1%]	1.00 [1.00 - 1.33]
<i>Neisseria</i> spp.	N/A	N/A	N/A	N/A
<i>Acinetobacter</i> spp.	7.25	2.69	5.4% [0.0% - 37.3%]	1.03 [1.00 - 1.26]
<i>Moraxella</i> spp.	N/A	N/A	N/A	N/A
Other spp. or unspecified Gram-negative	3.00	1.73	59.5% [36.6% - 74.2%]	1.57 [1.26 - 1.97]

Low/middle-income countries (n=32 studies)	τ^2	τ	I ² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	1.29	1.13	89.4% [86.1% - 91.9%]	3.06 [2.68 - 3.51]
<i>Klebsiella</i> spp.	1.24	11.2	94.2% [92.8% - 95.4%]	4.16 [3.72 - 4.65]
<i>Pseudomonas</i> spp.	2.95	17.2	95.2% [94.1% - 96.1%]	4.56 [4.10 - 5.07]
<i>Enterobacter</i> spp.	2.16	1.47	81.1% [74.1% - 86.2%]	2.30 [1.96 - 2.70]
<i>Serratia</i> spp.	6.10	2.47	43.7% [14.4% - 63.0%]	1.33 [1.08 - 1.64]
<i>Proteus</i> spp.	14.67	3.83	0.0%	1.00
<i>Salmonella</i> spp.	22.6	4.75	0.0% [0.0% - 16.0%]	1.00 [1.00 - 1.09]
<i>Citrobacter</i> spp.	5.61	2.37	0.0% [0.0% - 38.5%]	1.00 [1.00 - 1.28]
<i>Haemophilus</i> spp.	N/A	N/A	N/A	N/A
<i>Neisseria</i> spp.	N/A	N/A	N/A	N/A
<i>Acinetobacter</i> spp.	2.74	1.66	87.8% [83.9% - 90.8%]	2.86 [2.49 - 3.29]
<i>Moraxella</i> spp.	N/A	N/A	N/A	N/A
Other spp. or unspecified Gram-negative	4.73	2.18	77.6% [68.7% - 83.9%]	2.11 [1.79 - 2.49]

Table S4. Heterogeneity statistics for late-onset invasive Gram-negative bacterial infection in high- and low/middle-income countries (corresponding to results presented in Table 2)

High-income countries (n=25 studies)	τ^2	τ	I² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.75	0.87	96.2% [95.3% - 97.0%]	5.15 [4.61 - 5.76]
<i>Klebsiella</i> spp.	12.2	11.0	96.1% [95.1% - 96.9%]	5.05 [4.51 - 5.65]
<i>Pseudomonas</i> spp.	10.4	10.2	73.1% [60.0% - 81.9%]	1.93 [1.58 - 2.35]
<i>Enterobacter</i> spp.	27.7	16.7	77.4% [67.0% - 84.5%]	2.10 [1.74 - 2.54]
<i>Serratia</i> spp.	24.5	15.7	61.5% [40.5% - 75.0%]	1.61 [1.30 - 2.00]
<i>Proteus</i> spp.	45.5	21.3	0.0% [0.0% - 23.4%]	1.00 [1.00 - 1.14]
<i>Salmonella</i> spp.	53.5	7.31	0.0%	1.00
<i>Citrobacter</i> spp.	71.1	26.7	0.0%	1.00
<i>Haemophilus</i> spp.	13.8	3.72	0.0%	1.00
<i>Neisseria</i> spp.	97.6	31.224	0.0%	1.00
<i>Acinetobacter</i> spp.	56.7	23.8	84.1% [77.6% - 88.7%]	2.51 [2.11 - 2.98]
<i>Moraxella</i> spp.	170.7	13.0	0.0%	1.00
Other spp. or unspecified Gram-negative	41.07	20.3	92.0% [89.4% - 93.9%]	3.53 [3.07 - 4.06]

Low/middle-income countries (n=30 studies)	τ^2	τ	I² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.87	0.93	96.3% [95.5% - 97.0%]	5.22 [4.69 - 5.80]
<i>Klebsiella</i> spp.	15.0	12.2	95.4% [94.3% - 96.3%]	4.66 [4.18 - 5.19]
<i>Pseudomonas</i> spp.	0.56	0.75	70.6% [57.5% - 79.7%]	1.84 [1.53 - 2.22]
<i>Enterobacter</i> spp.	2.57	1.60	75.9% [65.1% - 83.3%]	2.04 [1.69 - 2.45]
<i>Serratia</i> spp.	2.26	1.50	58.6% [36.7% - 72.9%]	1.55 [1.26 - 1.92]
<i>Proteus</i> spp.	4.56	2.13	0.0% [0.0% - 15.0%]	1.00 [1.00 - 1.08]
<i>Salmonella</i> spp.	54.1	7.36	0.0%	1.00
<i>Citrobacter</i> spp.	7.22	2.69	0.0%	1.00
<i>Haemophilus</i> spp.	14.1	3.75	0.0%	1.00
<i>Neisseria</i> spp.	9.10	3.02	0.0%	1.00
<i>Acinetobacter</i> spp.	5.83	2.41	82.8% [75.9% - 87.7%]	2.41 [2.04 - 2.85]
<i>Moraxella</i> spp.	171.3	13.1	0.0%	1.00
Other spp. or unspecified Gram-negative	4.29	2.07	91.6% [88.9% - 93.6%]	3.44 [3.00 - 3.95]

Table S5. Heterogeneity statistics for the aetiology of Gram-negative species as percentages of all neonatal bacteraemia (Gram-negative and Gram-positive) in high- and low/middle-income countries restricted to studies where the neonatal period was defined as up to day 28 or 30 of life (corresponding to results presented in Table S2)

High-income countries (n=55 studies)	τ^2	τ	I² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.73	0.54	98.3% [98.0% - 98.6%]	7.68 [7.10 - 8.31]
<i>Klebsiella</i> spp.	1.49	2.22	97.5% [97.2% - 97.7%]	6.26 [5.94 - 6.61]
<i>Pseudomonas</i> spp.	1.47	2.17	68.6% [54.3% - 78.4%]	1.79 [1.48 - 2.15]
<i>Enterobacter</i> spp.	2.49	6.20	91.0% [88.3% - 93.1%]	3.34 [2.92 - 3.81]
<i>Serratia</i> spp.	1.96	3.85	50.2% [24.1% - 67.3%]	1.42 [1.15 - 1.75]
<i>Proteus</i> spp.	2.28	5.21	0.0%	1.00
<i>Salmonella</i> spp.	6.57	43.21	0.0%	1.00
<i>Citrobacter</i> spp.	3.06	9.34	0.0%	1.00
<i>Haemophilus</i> spp.	3.48	12.08	73.0% [61.2% - 81.2%]	1.92 [1.61 - 2.30]
<i>Neisseria</i> spp.	2.52	6.37	0.0%	1.00
<i>Acinetobacter</i> spp.	3.11	9.64	84.4% [78.7% - 88.6%]	2.53 [2.17 - 2.96]
<i>Moraxella</i> spp.	1.75	3.08	0.0%	1.00
Other spp. or unspecified Gram-negatives	4.21	17.75	93.0% [91.1% - 94.5%]	3.79 [3.35 - 4.28]
Low/middle-income countries (n=90 studies)	τ^2	τ	I² [95% CI]	H [95% CI]
<i>Escherichia coli</i>	0.85	0.72	93.2% [91.8% - 94.3%]	3.61 [3.36 - 3.88]
<i>Klebsiella</i> spp.	1.49	2.22	97.5% [97.2% - 97.7%]	4.73 [4.45 - 5.03]
<i>Pseudomonas</i> spp.	1.56	2.43	89.4% [87.0% - 91.4%]	3.18 [2.94 - 3.43]
<i>Enterobacter</i> spp.	1.94	3.77	87.4% [84.3% - 89.9%]	2.50 [2.28 - 2.73]
<i>Serratia</i> spp.	2.96	8.78	42.6% [20.2% - 58.7%]	1.60 [1.42 - 1.79]
<i>Proteus</i> spp.	2.93	8.56	57.8% [42.8% - 68.9%]	1.32 [1.17 - 1.50]
<i>Salmonella</i> spp.	7.52	56.59	0.0%	1.26 [1.11 - 1.43]
<i>Citrobacter</i> spp.	2.46	6.07	31.9% [4.2% - 51.5%]	1.17 [1.02 - 1.34]
<i>Haemophilus</i> spp.	0.00	0.00	0.0%	1.00
<i>Neisseria</i> spp.	2.05	4.21	0.0%	1.00
<i>Acinetobacter</i> spp.	1.46	2.12	90.6% [88.5% - 92.3%]	3.11 [2.88 - 3.37]
<i>Moraxella</i> spp.	7.91	62.61	0.0%	1.00
Other spp. or unspecified Gram-negatives	4.21	17.75	93.0% [91.1% - 94.5%]	2.11 [1.92 - 2.33]