S1 Fig

This supporting information formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Tie-Ning Zhang, Xin-Mei Huang, Xin-Yi Zhao, Wei Wang, Ri Wen, Shan-Yan Gao. Risks of specific congenital anomalies in offspring of women with diabetes: A systematic review and meta-analysis of population-based studies including over 80 million births Risks of specific congenital anomalies in offspring of women with diabetes: A systematic review and meta-analysis of population-based studies including over 80 million birth Supporting information

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Fig A. Risk of bias summary: effect on congenital anomalies in offspring with pre-gestational diabetes

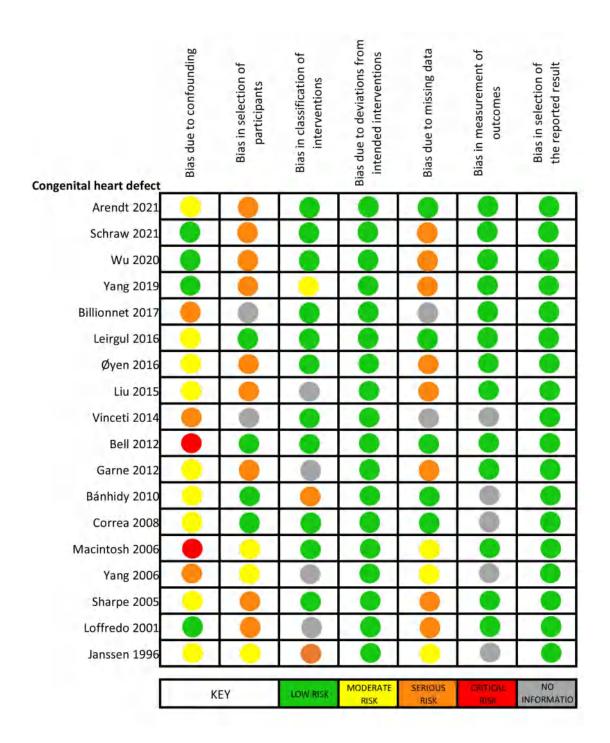


Fig B. Risk of bias summary: effect on congenital heart defects in offspring with pre-gestational diabetes



Fig C. Risk of bias summary: effect on congenital anomalies in offspring with gestational diabetes



Fig D. Risk of bias summary: effect on congenital heart defects in offspring with gestational diabetes

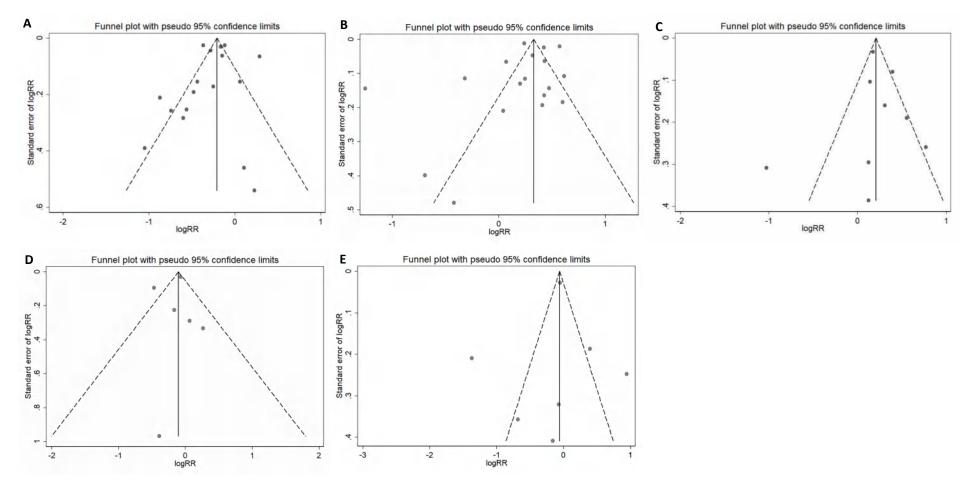


Fig E. Funnel plots of the relative risks of population-based studies on pre-gestational diabetes and the risk of congenital anomalies. A. Overall congenital anomalies (Begg's test P = 0.880, Egger's test P = 0.304). B. Congenital heart defects (Begg's test P = 0.596, Egger's test P = 0.845). C. Ventricular septal defects (Begg's test P = 1.000, Egger's test P = 0.935). D. Congenital anomalies of genitourinary system (Begg's test P = 0.951, Egger's test P = 0.094). E. Congenital anomalies of musculoskeletal system (Begg's test P = 0.640, Egger's test P = 0.525). Log RR: natural logarithm of relative risk.

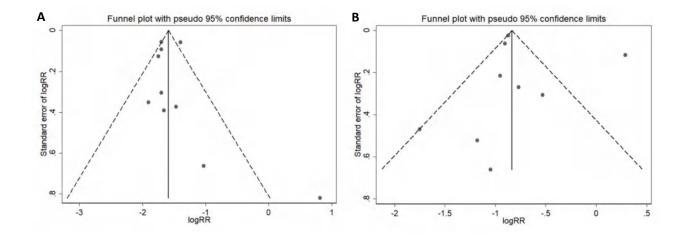


Fig F. Funnel plots of the relative risks of population-based studies on gestational diabetes mellitus and the risk of congenital anomalies. A. Overall congenital anomalies (Begg's test P = 0.392, Egger's test P = 0.323). B. Congenital heart defects (Begg's test P = 0.837, Egger's test P = 0.885). Log RR: natural logarithm of relative risk.

Study	Country	RR (95% CI)	Weight, %
Tinker 2020	American	12.30 (7.30, 20.50)	28.49
Leirgul 2016	European	6.60 (2.69, 16.17)	9.44
Qyen 2016	European	8.76 (5.16, 13.80)	31.39
Liu 2013	American	7.02 (4.27, 11.55)	30.68
Overall, DL (I ² = (0.0%, p = 0.423)	8.78 (6.66, 11.56)	100.00
	.1	1 10	
NOTE: Weights are fr	.1 om random-effects model	1 10	

Fig G1. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of heterotaxia (RR = 8.78, 95% CI, 6.66 to 11.56; $I^2 = 0.0\%$, P = 0.423). DL, DerSimonian and Laird random-effects model; RR, relative risk.

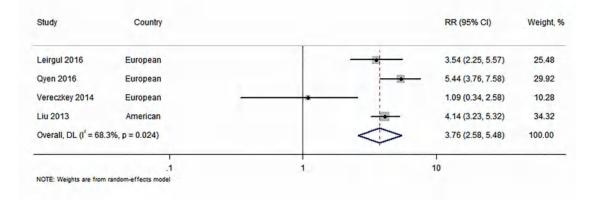


Fig G2. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of conotruncal defects (RR = 3.76, 95% CI, 2.58 to 5.48; $I^2 = 68.3\%$, P = 0.024). DL, DerSimonian and Laird random-effects model; RR, relative risk.

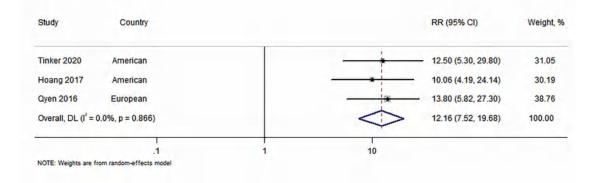


Fig G3. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of truncus arteriosus (RR = 12.16, 95% CI, 7.52 to 19.68; $I^2 = 0.0\%$, P = 0.866). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, 9
Schraw 2021	American	4.05 (3.16, 5.2	0) 40.79
Tinker 2020	American	2.50 (1.20, 5.3	9.45
Qyen 2016	European	4.20 (2.10, 7.4	1) 12.47
Vereczkey 2014	European	2.15 (0.66, 5.1)	2) 5.31
Vinceti 2014	European	× 1.56 (0.16, 15.	04) 1.15
Bell 2012	European	5.50 (1.80, 17.)	20) 4.43
Garne 2012	European	2.00 (1.23, 3.2	5) 18.64
Sharpe 2005	Asian-Pacifc	3.64 (0.90, 14.	55) 2.97
Loffredo 2001	American	3.00 (1.00, 8.7	0) 4.80
Overall, DL (I ² = 15	9%, p = 0.301)	3.25 (2.54, 4.1	5) 100.00
	1	1 10	
NOTE: Weights are from r	Indom-effects model		

Fig G4. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of transposition of great vessels (RR = 3.25, 95% CI, 2.54 to 4.15; $I^2 = 15.9\%$, P = 0.301). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Schraw 2021	American	2.76 (1.98, 3.85)	24.27
Tinker 2020	American	4.40 (2.70, 7.10)	20.80
Qyen 2016	European —	3.65 (1.66, 6.84)	15.87
Vinceti 2014	European	4.69 (1.51, 14.54)	9.38
Bell 2012	European	10.00 (3.70, 27.20)	11.04
Garne 2012	European -	1.55 (0.87, 2.76)	18.64
Overall, DL (I ² =	64.4%, p = 0.015)	3.46 (2.27, 5.28)	100.00
	1	+	
10.5	.1 1 from random-effects model	10	

Fig G5. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of tetralogy of Fallot (RR = 3.46, 95% CI, 2.27 to 5.28; $I^2 = 64.4\%$, P = 0.015). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American		3.41 (2.59, 4.49)	31.40
Tinker 2020	American		6.80 (2.80, 16.30)	8.64
Leirgul 2016	European		- 6.38 (3.15, 12.94)	12.11
Qyen 2016	European		5.27 (2.52, 9.57)	13.13
Liu 2013	American		3.73 (2.30, 6.06)	19.65
Garne 2012	European		2.21 (1.21, 4.04)	15.07
Overall, DL $(l^2 =$	40.0%, p = 0.139)	\diamond	3.94 (2.95, 5.26)	100.00
		1 10		
NOTE: Weights are	from random-effects model	1		

Fig G6. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of atrioventricular septal defects (RR = 3.94, 95% CI, 2.95 to 5.26; $I^2 = 40.0\%$, P = 0.139). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American		4.00 (1.70, 9.60)	31.58
Tinker 2020	American		6.50 (2.00, 21.30)	16.91
Hoang 2017	American		2.49 (1.09, 5.71)	34.51
Leirgul 2016	European	*	1.73 (0.24, 12.44)	6.07
Qyen 2016	European		- 3.63 (0.60, 11.40)	10.92
Overall, DL (I ² =	0.0%, p = 0.684)	\diamond	3.47 (2.13, 5.64)	100.00
	1	1 1	0	-
NOTE: Weights are	from random-effects model		•	

Fig G7. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of anomalous pulmonary venous return (RR = 3.47, 95% CI, 2.13 to 5.64; $I^2 = 0.0\%$, P = 0.684). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Hoang 2017	American	3.55 (2.51, 5.03)	25.60
Leirgul 2016	European -	2.21 (1.14, 4.26)	13.10
Qyen 2016	European	2.74 (1.57, 4.38)	17.86
Vereczkey 2014	European	4.35 (1.94, 8.39)	11.31
Liu 2013	American	5.79 (3.65, 9.18)	20.01
Correa 2008	American -	• 4.58 (1.30, 16.10)	4.70
Loffredo 2001	American	1.80 (0.70, 4.80)	7.42
Overall, DL $(l^2 = 37)$	8%, p = 0.140)	3.46 (2.59, 4.62)	100.00
	1 1	10	
NOTE: Weights are from n	indom-effects model		

Fig G8. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of left ventricular outflow tract (RR = 3.46, 95% CI, 2.59 to 4.62; $I^2 = 37.8\%$, P = 0.140). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American	-	- 4.33 (3.40, 5.51)	31.56
Tinker 2020	American		3.80 (2.00, 7.20)	18.53
Qyen 2016	European		2.87 (1.31, 5.36)	16.83
Vereczkey 2014	European		5.94 (1.80, 14.47)	10.34
Garne 2012	European		1.84 (1.11, 3.03)	22.75
Overall, DL (I ² = 61.4	4%, p = 0.035)	\diamond	3.35 (2.25, 4.99)	100.00
			1	
NOTE: Weights are from	.1 random-effects model	1	10	

Fig G9. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of coarctation of aorta (RR = 3.35, 95%CI, 2.25 to 4.99; I² = 61.4%, P = 0.035). DL, DerSimonian and Laird random-effects model; RR, relative risk.

	=	*	3.00 (1.50, 5.90) 3.15 (1.53, 6.46)	30.01 29.19
		*	3.15 (1.53, 6.46)	29.19
			4.15 (0.68, 13.45)	15.11
			0.74 (0.31, 1.79)	25.69
	<	\Rightarrow	2.23 (1.07, 4.64)	100.00
1	1		1	
)	n) .1 .nodel) 2.23 (1.07, 4.64) 1 1 10

Fig G10. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of hypoplastic left heart (RR = 2.23, 95% CI, 1.07 to 4.64; $I^2 = 64.0\%$, P = 0.040). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Hoang 2017	American		3.12 (2.31, 4.21)	35.48
Leirgul 2016	European	*	2.16 (0.97, 4.83)	8.69
Qyen 2016	European		4.01 (2.30, 4.42)	32.48
Vereczkey 2014	European		3.30 (0.98, 7.93)	5.39
Liu 2013	American		2.44 (0.91, 6.57)	5.98
Correa 2008	American		9.61 (3.53, 26.15)	5.84
Loffredo 2001	American		2.40 (0.90, 6.30)	6.15
Overall, DL (I ² = 20.	9%, p = 0.270)	\diamond	3.41 (2.65, 4.38)	100.00
	1	1 10		
NOTE: Weights are from r	andom-effects model			

Fig G11. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of right ventricular outflow tract (RR = 3.41, 95% CI, 2.65 to 4.38; $I^2 = 20.9\%$, P = 0.270). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Schraw 2021	American	+	2.81 (2.48, 3.18)	98.59
Tinker 2020	American	•	3.00 (0.90, 9.60)	1.09
Vereczkey 2014	European -	•	1.56 (0.09, 7.11)	0.32
verall, DL (l ² = 0.0%, p = 0.865)		\diamond	2.81 (2.48, 3.18)	100.00

Fig G12. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of pulmonary artery anomalies (RR = 2.81, 95% CI, 2.48 to 3.18; $I^2 = 0.0\%$, P = 0.865). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Tinker 2020	American	2.80 (1.60, 4.80)	21.10
Hoang 2017	American	2.95 (2.08, 4.17)	24.76
Qyen 2016	European	4.38 (2.40, 7.25)	21.03
Bell 2012	European	2.90 (0.90, 9.10)	11.41
Garne 2012	European	1.01 (0.60, 1.69)	21.70
Overall, DL (I ² =	76.2%, p = 0.002)	2.51 (1.51, 4.17)	100.00
_	1	1 10	
NOTE: Weights are	from random-effects model	10	

Fig G13. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of pulmonary valve stenosis (RR = 2.51, 95% CI, 1.51 to 4.17; $I^2 = 76.2\%$, P = 0.002). DL, DerSimonian and Laird random-effects model; RR, relative risk.

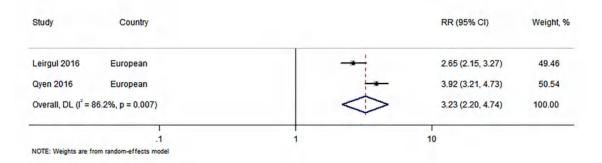


Fig G14. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of septal defects (RR = 3.23, 95% CI, 2.20 to 4.74; $I^2 = 86.2\%$, P = 0.007). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, 9
Schraw 2021	American	-	3.29 (3.04, 3.55)	13.35
Tinker 2020	American		3.10 (1.70, 5.40)	8.83
Kovalenko 2018	European		* 8.72 (3.16, 24.07)	5.14
Qyen 2016	European		4.43 (3.49, 5.54)	12.43
Vereczkey 2014	European		1.18 (0.62, 2.02)	8.70
Liu 2013	American		3.16 (2.51, 3.98)	12.43
Bell 2012	European		3.90 (2.60, 6.00)	10.57
Game 2012	European		1.43 (1.18, 1.74)	12.72
Yang 2006	American		5.71 (3.07, 10.61)	8.39
_offredo 2001	American		3.10 (1.50, 6.30)	7.44
Overall, DL (l ² = 90.	2%, p < 0.001)	\diamond	3.10 (2.32, 4.16)	100.00
	.1	1	1	-
NOTE: Weights are from	random-effects model			

Fig G15. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of ventricular septal defects (RR = 3.10, 95% CI, 2.32 to 4.16; I² = 90.2%, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

American		
American	★ 2.89 (2.74, 3.06)	23.10
American	6.30 (4.30, 9.30)	15.14
European	2.79 (1.78, 4.14)	14.15
European	1.01 (0.25, 2.69)	3.80
European	2.93 (0.96, 8.96)	4.21
American	3.96 (3.17, 4.94)	19.80
European	2.15 (1.72, 2.68)	19.80
o, p < 0.001)	3.12 (2.42, 4.02)	100.00
1	1 10	
	European European European American European	European 2.79 (1.78, 4.14) European 1.01 (0.25, 2.69) European 2.93 (0.96, 8.96) American 3.96 (3.17, 4.94) European 2.15 (1.72, 2.68) . p < 0.001)

Fig G16. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of atrial septal defects (RR = 3.12, 95% CI, 2.42 to 4.02; I² = 81.9%, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

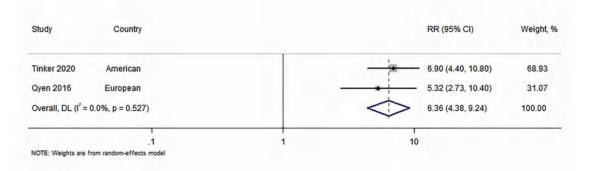


Fig G17. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of ventricular septal defect and atrial septal defects (RR = 6.36, 95% CI, 4.38 to 9.24; $I^2 = 0.0\%$, P = 0.527). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% (CI) Weight, %
Schraw 2021	American	6.17 (3.66,	, 10.40) 31.51
Tinker 2020	American		0, 27.70) 31.34
Vereczkey 2014	European	2.16 (0.12)	, 9.85) 11.13
Garne 2012	European	2.57 (1.05,	, 6.28) 26.03
Overall, DL (1 ² = 80.2	2%, p = 0.002)	5.91 (2.43,	, 14.38) 100.00
	1	1	
NOTE: Weights are from	.1 1	10	

Fig G18. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of single ventricle (RR = 5.91, 95% CI, 2.43 to 14.38; $I^2 = 80.2\%$, P = 0.002). DL, DerSimonian and Laird random-effects model; RR, relative risk.

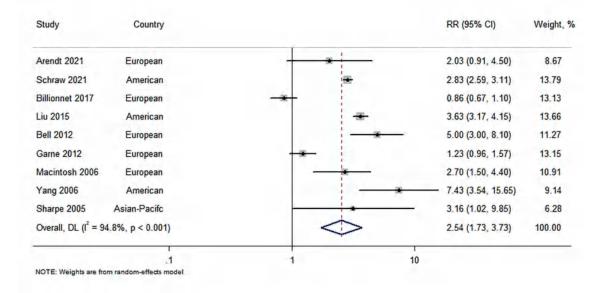


Fig H1. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of congenital anomalies of nervous system (RR = 2.54, 95% CI, 1.73 to 3.73; $I^2 = 94.8\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

European	5.40 (2.90, 10.10)	20.96
European	1.57 (1.14, 2.16)	24.72
European	1.10 (0.50, 2.20)	19.32
European	4.20 (2.00, 7.80)	20.17
Asian-Pacifc	3.87 (0.54, 27.83)	7.34
American	6.20 (0.90, 44.00)	7.49
%, p = 0.001)	2.74 (1.46, 5.14)	100.00
	1 10	
	European European European Asian-Pacifc	European 1.57 (1.14, 2.16) European 1.10 (0.50, 2.20) European 4.20 (2.00, 7.80) Asian-Pacifc 3.87 (0.54, 27.83) American 6.20 (0.90, 44.00) %, p = 0.001) 2.74 (1.46, 5.14)

Fig H2. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of neural tube defects (RR = 2.74, 95% CI, 1.46 to 5.14; $I^2 = 75.5\%$, P = 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American		3.50 (1.80, 6.50)	13.12
Wu 2020	American	-	2.66 (2.07, 3.42)	85.82
Anderson 2005	American	•	0.80 (0.10, 9.10)	1.06
Overall, DL (I ² = 0.00	%, p = 0.416)	\diamond	2.72 (2.16, 3.44)	100.00
	1	1	10	
NOTE: Weights are from	random-effects model		10	

Fig H3. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of an encephaly (RR = 2.72, 95% CI, 2.16 to 3.44; $I^2 = 0.0\%$, P = 0.416). DL, DerSimonian and Laird random-effects model; RR, relative risk.

RR (95% CI)	Weight, %
7.71 (4.83, 12.31)	42.63
6.10 (2.70, 13.80)	25.64
3.27 (1.67, 6.39)	31.73
5.53 (3.24, 9.45)	100.00

Fig H4. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of encephalocele (RR = 5.53, 95% CI, 3.24 to 9.45; $I^2 = 52.8\%$, P = 0.120). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Mowla 2020	European		- 4.35 (1.37, 13.82)	10.27
Tinker 2020	American	 	0.40 (0.10, 1.40)	8.77
Wu 2020	American	+	2.00 (1.59, 2.51)	22.36
Liu 2019	American		3.20 (1.98, 5.16)	19.23
Parker 2013	American		1.84 (0.80, 4.22)	14.09
Bell 2012	European		0.92 (0.53, 1.60)	18.14
Yang 2006	American		17.17 (2.29, 128.76)	4.78
Anderson 2005	European		0.40 (0.01, 4.40)	2.37
Overall DL (1 ² = 71	.1%, p = 0.001)	\Diamond	1.89 (1.15, 3.09)	100.00

Fig H5. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of spina bifida (RR = 1.89, 95% CI, 1.15 to 3.09; $I^2 = 71.1\%$, P = 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

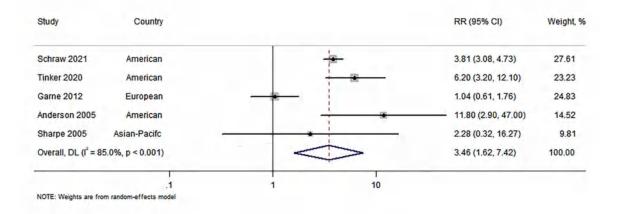


Fig H6. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of hydrocephaly (RR = 3.46, 95% CI, 1.62 to 7.42; $I^2 = 85.0\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

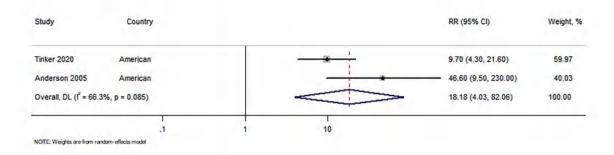


Fig H7. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of holoprosencephaly (RR = 18.18, 95% CI, 4.03 to 82.06; $I^2 = 66.3\%$, P = 0.085). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Country	RR (95	% CI)	Weight, %
European	2.71 (1	.36, 5.40)	1.28
American	+ 3.16 (2	.92, 3.42)	97.08
European	1.04 (0	.23, 4.82)	0.26
European	• 1.67 (0	.53, 5.28)	0.46
European -	1.00 (0	.10, 7.00)	0.13
American	3.97 (1	.65, 9.54)	0.79
%, p = 0.444)	3.14 (2	.90, 3.39)	100.00
.1	10		
	European American European European European	European 2.71 (1 American 3.16 (2 European 1.04 (0 European 1.07 (0 European 3.97 (1 %, p = 0.444) 3.14 (2	European 2.71 (1.36, 5.40) American 3.16 (2.92, 3.42) European 1.04 (0.23, 4.82) European 1.67 (0.53, 5.28) European 1.00 (0.10, 7.00) American 3.97 (1.65, 9.54) %, p = 0.444) 3.14 (2.90, 3.39)

Fig H8. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of eye, ear, face, and neck (RR = 3.14, 95% CI, 2.90 to 3.39; I² = 0.0%, P = 0.444). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Arendt 2021	European		1.22 (0.52, 2.84)	19.90
Liu 2015	American		2.65 (2.08, 3.38)	24.30
Vinceti 2014	European		1.44 (0.47, 4.43)	17.35
Game 2012	European	!	0.56 (0.37, 0.84)	23.45
Sharpe 2005	Asian-Pacifc		1.27 (0.32, 5.10)	15.00
Overall, DL (I ² =	90.4%, p < 0.001)		1.27 (0.54, 2.98)	100.00
	-		1	
	.1 from random-effects model	1	10	

Fig H9. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of orofacial clefts (RR = 1.27, 95% CI, 0.54 to 2.98; $I^2 = 90.4\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

RR (95% CI)	Weight, %
2.50 (1.40, 4.20)	20.52
2.35 (1.97, 2.79)	25.84
3.75 (1.39, 10.11)	13.51
0.59 (0.31, 1.10)	19.08
1.32 (0.51, 3.41)	14.09
1.60 (0.20, 5.90)	6.97
1.75 (1.04, 2.94)	100.00
)

Fig H10. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of cleft palate (RR = 1.75, 95% CI, 1.04 to 2.94; $I^2 = 74.6\%$, P = 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Tinker 2020	American	2.20 (1.40, 3.30)	17.12
Wu 2020	American	2.06 (1.82, 2.33)	20.18
Yang 2019	American	2.89 (1.37, 6.12)	12.79
Vinceti 2014	European	1.44 (0.47, 4.43)	8.70
Garne 2012	European -	0.55 (0.32, 0.94)	15.62
Bánhidy 2010	European	1.60 (0.92, 2.79)	15.40
lanssen 1996	American	• 7.70 (3.00, 20.80) 10.20
Overall, DL $(l^2 = 8)$	1.1%, p < 0.001)	1.89 (1.22, 2.92)	100.00
	1 1	10	

Fig H11. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of cleft lip with or without palate (RR = 1.89, 95% CI, 1.22 to 2.92; $I^2 = 81.1\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Arendt 2021	European		2.06 (1.08, 3.93)	14.04
Schraw 2021	American		3.35 (2.73, 4.10)	18.08
Liu 2015	American	-	2.80 (2.44, 3.23)	18.38
Vinceti 2014	European		1.04 (0.35, 3.08)	9.65
Bell 2012	European		5.70 (3.00, 10.60)	14.20
Game 2012	European		0.80 (0.59, 1.08)	17.41
Macintosh 2006	European		0.80 (0.20, 2.50)	8.26
Overall, DL (I ² = 92	.3%, p < 0.001)	\diamond	2.02 (1.24, 3.28)	100.00
	1	1	10	
NOTE: Weights are from r	random-effects model			

Fig H12. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of congenital anomalies of digestive system (RR = 2.02, 95% CI, 1.24 to 3.28; $I^2 = 92.3\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American	-	1.70 (0.70, 4.00)	7.26
Wu 2020	American	-	1.75 (1.35, 2.27)	81.63
Garne 2012	European		1.13 (0.56, 2.29)	11.11
Overall, DL (I ² =	= 0.0%, p = 0.520)	\Diamond	1.66 (1.32, 2.10)	100.00
	.1	1	10	
NOTE: Weights are	from random-effects model			

Fig H13. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of diaphragmatic hernia (RR = 1.66, 95% CI, 1.32 to 2.10; $I^2 = 0.0\%$, P = 0.520). DL, DerSimonian and Laird random-effects model; RR, relative risk.

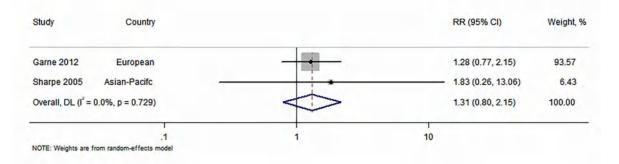


Fig H14. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of abdominal wall defects (RR = 1.31, 95% CI, 0.80 to 2.15; $I^2 = 0.0\%$, P = 0.729). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study Country	RR (95% CI)	Weight, %
Tinker 2020 American	2.60 (1.20, 5.60)	10.47
Wu 2020 American	1.71 (1.27, 2.31)	69.41
Garne 2012 European	2.32 (1.33, 4.04)	20.12
Overall, DL (l ² = 0.0%, p = 0.447)	1.90 (1.48, 2.44)	100.00
1		-
.1 NOTE: Weights are from random-effects model	1 10	

Fig H15. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of omphalocele (RR = 1.90, 95% CI, 1.48 to 2.44; $I^2 = 0.0\%$, P = 0.447). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Raitio 2020	European		1.09 (0.30, 3.98)	5.44
Tinker 2020	American		0.50 (0.20, 1.30)	10.38
Wu 2020	American		0.98 (0.71, 1.37)	84.18
Overall, DL (I ² =	: 0.0%, p = 0.399)	\diamond	0.92 (0.68, 1.24)	100.00
	1	1	10	
NOTE: Weights are	from random-effects model		10	

Fig H16. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of gastroschisis (RR = 0.92, 95% CI, 0.68 to 1.24; $I^2 = 0.0\%$, P = 0.399). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Arendt 2021	European	1.56 (0.85, 2.85)	7.12
Arendt 2021	European	1.47 (0.83, 2.60)	7.46
Schraw 2021	American	2.54 (2.41, 2.69)	12.25
Liu 2015	American	1.87 (1.67, 2.10)	12.01
Vinceti 2014	European	1.97 (1.03, 3.76)	6.71
Bell 2012	European	2.90 (1.70, 5.20)	7.59
Garne 2012	European	0.88 (0.70, 1.11)	11.14
Game 2012	European	0.78 (0.57, 2.68)	5.61
Bánhidy 2010	European	3.69 (1.74, 7.84)	5.78
Macintosh 2006	European	1.20 (0.60, 2.20)	6.68
Macintosh 2006	European	1.50 (0.50, 3.40)	4.35
Yang 2006	American	1.33 (0.43, 4.12)	3.47
Sharpe 2005	Asian-Pacifc	2.34 (1.64, 3.33)	9.85
Overall, DL (I ² = 89.	.2%, p < 0.001)	1.73 (1.35, 2.21)	100.00
	1	1 10	
NOTE: Weights are from	n random-effects model		

Fig H17. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of congenital anomalies of genitourinary system (RR = 1.73, 95% CI, 1.35 to 2.21; $I^2 = 89.2\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country			RR (95% CI)	Weight, %
Schraw 2021	American		1	7.14 (5.97, 8.55)	22.73
Tinker 2020	American			11.40 (5.40, 24.50)	19.22
Vinceti 2014	European			1.56 (0.16, 15.04)	8.31
Garne 2012	European			1.23 (0.67, 2.23)	20.45
Nielsen 2005	European			14.80 (3.50, 62.10)	13.46
Sharpe 2005	Asian-Pacifc			- 10.41 (3.30, 32.85)	15.83
Overall, DL $(l^2 = 3)$	86.1%, p < 0.001)	×	$\langle \rangle$	5.63 (2.48, 12.76)	100.00
	1	1	10		
NOTE: Weights are from	m random-effects model		10		

Fig H18. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of renal agenesis/dysgenesis (RR = 5.63, 95% CI, 2.48 to 12.76; $I^2 = 86.1\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country			RR (95% CI)	Weight, %
Tinker 2020	American			2.10 (1.20, 3.80)	9.86
Wu 2020	American		-	1.88 (1.67, 2.12)	19.38
Yang 2019	American			2.02 (1.04, 3.92)	8.45
Arendt 2018	American		-	1.74 (1.45, 2.08)	18.36
Vinceti 2014	European			1.68 (0.60, 4.65)	4.68
Garne 2012	European			0.73 (0.50, 1.07)	13.88
Bánhidy 2010	European	- 12		0.89 (0.54, 1.47)	11.28
Yang 2006	American			2.80 (1.26, 6.22)	6.70
Sharpe 2005	Asian-Pacifc		*	2.20 (1.05, 4.62)	7.39
Overall, DL (I ² =)	74.1%, p < 0.001)		\diamond	1.57 (1.22, 2.02)	100.00
	1	1		10	
NOTE: Weights are fi	rom random-effects model				

Fig H19. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of hypospadias (RR = 1.57, 95% CI, 1.22 to 2.02; $I^2 = 74.1\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study Country	RR (95% CI)	Weight, %
Dyck 2020 American	1.91 (1.38, 2.66)	56.23
Tain 2016 Asian-Pacifc	1.63 (0.38, 7.09)	2.83
Dart 2015 American	1.67 (1.14, 2.46)	40.94
Overall, DL (l ² = 0.0%, p = 0.865)	1.80 (1.41, 2.30)	100.00
1	1 10	
NOTE: Weights are from random-effects model	1 10	

Fig H20. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of congenital anomalies of the kidney and urinary tract (RR = 1.80, 95% CI, 1.41 to 2.30; $I^2 = 0.0\%$, P = 0.865). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, 9
Arendt 2021	European		1.10 (0.56, 2.14)	7.96
Schraw 2021	American		2.58 (2.45, 2.72)	12.40
Liu 2015	American	*	1.29 (1.17, 1.43)	12.29
Vinceti 2014	European		2.35 (1.33, 4.12)	8.89
Bell 2012	European		• 13.00 (4.10, 41.50)	4.65
Game 2012	European		1.66 (1.22, 2.24)	11.16
Bánhidy 2010	European	*	0.82 (0.25, 2.67)	4.52
Macintosh 2006	European	-	1.40 (0.80, 2.10)	9.64
Yang 2006	American		2.54 (1.51, 4.27)	9.30
Sharpe 2005	Asian-Pacifc		1.34 (0.85, 2.12)	9.87
Janssen 1996	American		4.40 (2.60, 7.30)	9.33
Overall, DL (I ² = 9	4.4%, p < 0.001)	\diamond	1.98 (1.45, 2.72)	100.00
	.1	1	10	

Fig H21. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of congenital anomalies of musculoskeletal system (RR = 1.98, 95% CI, 1.45 to 2.72; $I^2 = 94.4\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Country	RR (95% CI)	Weight, %
American	3.01 (2.14, 4.23)	11.85
American	1.98 (1.67, 2.36)	13.16
American	9.50 (5.00, 18.20)	8.80
American	2.50 (1.20, 5.30)	7.90
American	2.80 (2.27, 3.46)	12.92
European	3.40 (2.00, 5.70)	10.03
American	3.95 (1.46, 10.67)	5.92
European	2.01 (0.77, 5.23)	6.17
European	1.01 (0.61, 1.66)	10.27
European	.76 (0.30, 1.96)	6.31
Asian-Pacifc	9.22 (3.79, 22.40)	6.68
.7%, p < 0.001)	2.73 (1.98, 3.76)	100.00
5	1 10	
	American American American American European European European European	American 3.01 (2.14, 4.23) American 1.98 (1.67, 2.36) American 9.50 (5.00, 18.20) American 2.50 (1.20, 5.30) American 2.80 (2.27, 3.46) European 3.40 (2.00, 5.70) American 2.95 (1.46, 10.67) European 2.01 (0.77, 5.23) European 0.76 (0.30, 1.96) Asian-Pacifc 9.22 (3.79, 22.40) 1.7%, p < 0.001)

Fig H22. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of limb reduction (RR = 2.73, 95% CI, 1.98 to 3.76; $I^2 = 81.7\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American	-	1.54 (1.27, 1.87)	29.23
Vinceti 2014	European		1.34 (0.28, 6.45)	7.74
Vinceti 2014	European 🔶		0.78 (0.09, 6.50)	4.71
Garne 2012	European		0.83 (0.53, 1.32)	24.45
Game 2012	European 🛛		0.19 (0.06, 0.59)	11.91
Bánhidy 2010	European		1.28 (0.72, 2.26)	21.95
Overall, DL $(l^2 = 7)$	1.8%, p = 0.003)		0.95 (0.57, 1.57)	100.00
		1		
	.1	1	10	

Fig H23. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of poly/syndactyly (RR = 0.95, 95% CI, 0.57 to 1.57; $I^2 = 71.8\%$, P = 0.003). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American		3.27 (3.11, 3.44)	49.95
Vinceti 2014	European		1.88 (0.83, 4.26)	8.32
Liu 2013	American		3.49 (2.00, 6.08)	15.13
Bell 2012	European		4.90 (2.50, 9.40)	11.68
Bánhidy 2010	European		1.93 (1.10, 3.38)	14.92
Overall, DL $(l^2 = 3)$	89.6%, p = 0.158)	\diamond	3.06 (2.36, 3.96)	100.00
	1	1	1 10	
NOTE: Weights are fr	om random-effects model			

Fig H24. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of multiple congenital anomalies (RR = 3.06, 95% CI, 2.36 to 3.96; $I^2 = 39.6\%$, P = 0.158). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Country		RR (95% CI)	Weight, %
European	-	2.71 (2.32, 3.16)	21.52
Asian-Pacifc		2.49 (0.77, 8.06)	3.99
European		1.19 (0.87, 1.63)	17.33
European		1.87 (1.44, 2.43)	18.81
European		2.20 (1.80, 2.60)	20.85
American		• 3.10 (2.28, 4.22)	17.50
8%, p < 0.001)	\diamond	2.14 (1.65, 2.77)	100.00
1		1	
.1 andom-effects model	1	10	
	European Asian-Pacifc European European European	European Asian-Pacifc European European American 8%, p < 0.001)	European 2.71 (2.32, 3.16) Asian-Pacifc 2.49 (0.77, 8.06) European 1.19 (0.87, 1.63) European 1.87 (1.44, 2.43) European 2.20 (1.80, 2.60) American 3.10 (2.28, 4.22) 8%, p < 0.001)

Fig H25. Forest plot of the relative risks of population-based studies on maternal pre-gestational diabetes and the risk of major congenital anomalies (RR = 2.14, 95% CI, 1.65 to 2.77; $I^2 = 81.8\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

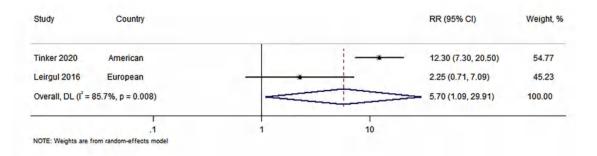


Fig I1. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of heterotaxia (RR = 5.70, 95% CI, 1.09 to 29.91; $I^2 = 85.7\%$, P = 0.008). DL, DerSimonian and Laird random-effects model; RR, relative risk.

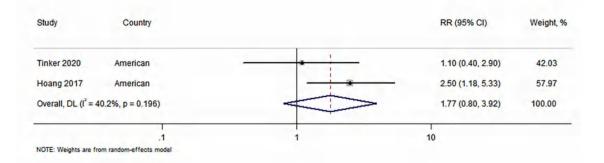


Fig I2. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of truncus arteriosus (RR = 1.77, 95% CI, 0.80 to 3.92; $I^2 = 40.2\%$, P = 0.196). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American	<u>+</u>	1.44 (1.21, 1.71)	58.68
Tinker 2020	American		1.10 (0.80, 1.40)	41.32
Overall, DL $(l^2 = 6)$	61.2%, p = 0.109)	\Diamond	1.29 (0.99, 1.67)	100.00
	1	1	3	
NOTE: Weights are fr	om random-effects model		·	

Fig I3. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of transposition of great vessels (RR = 1.29, 95% CI, 0.99 to 1.67; $I^2 = 61.2\%$, P = 0.109). DL, DerSimonian and Laird random-effects model; RR, relative risk.

1.37 (1.12, 1.67) 65.18
1.50 (1.10, 1.90) 34.82
1.41 (1.20, 1.66) 100.00
2

Fig I4. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of tetralogy of Fallot (RR = 1.41, 95% CI, 1.20 to 1.66; $I^2 = 0.0\%$, P = 0.600). DL, DerSimonian and Laird random-effects model; RR, relative risk.

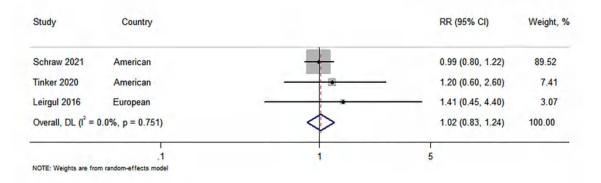


Fig I5. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of atrioventricular septal defects (RR = 1.02, 95% CI, 0.83 to 1.24; $I^2 = 0.0\%$, P = 0.751). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95%	Cl) Weig	ht, %
Tinker 2020	American	0.90 (0.40	, 1.70) 31.9	98
Tinker 2020	American	1.20 (0.40	, 3.20) 21.0	03
Hoang 2017	American	2.10 (1.37	, 3.21) 46.9	99
Overall, DL (I ² =	53.3%, p = 0.117)	1.42 (0.79	, 2.56) 100.0	00
				_
NOTE: Weights are	.1 from random-effects model	1 5		

Fig I6. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of anomalous pulmonary venous return (RR = 1.42, 95% CI, 0.79 to 2.56; $I^2 = 53.3\%$, P = 0.117). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Hoang 2017	American	-*	1.69 (1.36, 2.11)	43.91
Leirgul 2016	European		1.13 (0.56, 2.27)	18.05
Csaky-Szunyogh 2014	European		2.74 (1.57, 4.38)	25.87
Correa 2008	American		0.98 (0.39, 2.47)	12.17
Overall, DL (1 ² = 50.0%, p =	0.112)		1.67 (1.15, 2.41)	100.00

Fig I7. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of left ventricular outflow tract (RR = 1.67, 95% CI, 1.15 to 2.41; $I^2 = 50.0\%$, P = 0.112). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Schraw 2021	American	1.61 (1.36, 1.89)	66.87
Tinker 2020	American	1.30 (1.00, 1.80)	33. <mark>1</mark> 3
Overall, DL (l ² = 3	5.4%, p = 0.213)	1.50 (1.23, 1.83)	100.00
	1	1 2	
NOTE: Weights are fro	m random-effects model	·	

Fig I8. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of coarctation of aorta (RR = 1.50, 95% CI, 1.23 to 1.83; $I^2 = 35.4\%$, P = 0.213). DL, DerSimonian and Laird random-effects model; RR, relative risk.

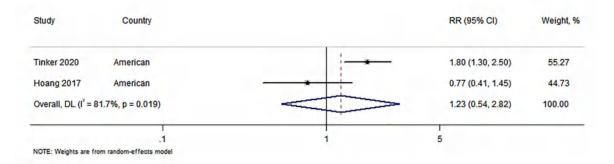


Fig I9. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of hypoplastic left heart (RR = 1.23, 95% CI, 0.54 to 2.82; $I^2 = 81.7\%$, P = 0.019). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Hoang 2017	American	+	1.26 (1.02, 1.56)	88.98
Leirgul 2016	European		- 1.43 (0.68, 3.02)	7.23
Correa 2008	American		0.87 (0.31, 2.43)	3.79
Overall, DL (I ² =	0.0%, p = 0.739)	\Diamond	1.25 (1.03, 1.53)	100.00
	1	1	5	
NOTE: Weights are	from random-effects model		5	

Fig I10. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of right ventricular outflow tract (RR = 1.25, 95% CI, 1.03 to 1.53; $I^2 = 0.0\%$, P = 0.739). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American	*	1.51 (1.40, 1.62)	64.07
Tinker 2020	American	•	- 0.50 (0.20, 2.00)	35.93
Overall, DL (l ² = 7	1.6%, p = 0.060)		1.02 (0.36, 2.87)	100.00
	.1	1	5	
NOTE: Weights are fro	m random-effects model			

Fig I11. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of pulmonary artery anomalies (RR = 1.02, 95% CI, 0.36 to 2.87; $I^2 = 71.6\%$, P = 0.060). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American	+	1.50 (1.20, 1.90)	53.45
Hoang 2017	American		1.10 (0.80, 1.40)	46.55
Overall, DL (I ² = 6	64.5%, p = 0.093)	$\langle \rangle$	1.30 (0.96, 1.76)	100.00
	1		1	
NOTE: Weights are fr	.1 rom random-effects model	1	3	

Fig I12. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of pulmonary valve stenosis (RR = 1.30, 95% CI, 0.96 to 1.76; $I^2 = 64.5\%$, P = 0.093). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Schraw 2021	American	1.31 (1.24, 1.38)	96.79
Tinker 2020	American	➡ 1.30 (1.00, 1.80)	3.21
Overall, DL (I ² = 0.	0%, p = 0.960)	1.31 (1.24, 1.38)	100.00
	.1	1 1.5	
NOTE: Weights are fro	m random-effects model		

Fig I13. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of ventricular septal defects (RR = 1.31, 95% CI, 1.24 to 1.38; $I^2 = 0.0\%$, P = 0.960). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study Country	RR (95% CI)	Weight, %
Schraw 2021 American	1.45 (1.40, 1.50)	97.97
Tinker 2020 American	1.60 (1.30, 2.10)	2.03
Overall, DL (l ² = 0.0%, p = 0.426)	1.45 (1.40, 1.50)	100.00
.1	1 2	-
NOTE: Weights are from random-effects model		

Fig I14. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of atrial septal defects (RR = 1.45, 95% CI, 1.40 to 1.50; $I^2 = 0.0\%$, P = 0.426). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American		1.11 (0.68, 1.82)	63.53
Tinker 2020	American		1.20 (0.60, 2.20)	36.47
Overall, DL (l ² = 0.0%, p = 0.851)			1.14 (0.77, 1.69)	100.00
	.1	1	3	
NOTE: Weights are f	from random-effects model			

Fig I15. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of single ventricle (RR = 1.14, 95% CI, 0.77 to 1.69; $I^2 = 0.0\%$, P = 0.851). DL, DerSimonian and Laird random-effects model; RR, relative risk.

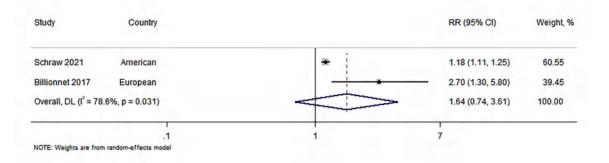


Fig J1. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of congenital anomalies of nervous system (RR = 1.64, 95% CI, 0.74 to 3.61; $I^2 = 78.6\%$, P = 0.031). DL, DerSimonian and Laird random-effects model; RR, relative risk.

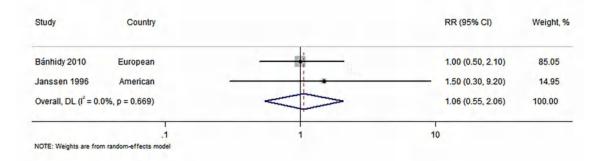


Fig J2. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of neural tube defects (RR = 1.06, 95% CI, 0.55 to 2.06; $I^2 = 0.0\%$, P = 0.669). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American		0.80 (0.50, 1.20)	25.83
Wu 2020	American		0.85 (0.72, 1.01)	70.03
Anderson 2005	American 🕳		0.30 (0.10, 1.20)	4.14
Overall, DL (I ² = 25.	1%, p = 0.262)	$\langle \rangle$	0.80 (0.62, 1.04)	100.00
1	.1	1	2	
NOTE: Weights are from	random-effects model			

Fig J3. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of an encephaly (RR = 0.80, 95% CI, 0.62 to 1.04; $I^2 = 25.4\%$, P = 0.262). DL, DerSimonian and Laird random-effects model; RR, relative risk.

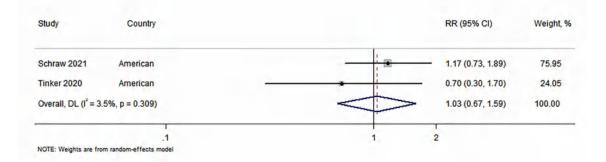


Fig J4. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of encephalocele (RR = 1.03, 95% CI, 0.67 to 1.59; $I^2 = 3.5\%$, P = 0.309). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95%	CI)	Weight, %
Mowla 2020	European		1, 1.38)	2.09
Tinker 2020	American	0.90 (0.6	0, 1.20)	9.71
Wu 2020	American	1.13 (1.0	0, 1.28)	76.54
Parker 2013	American	1.19 (0.8	4, 1.71)	9.23
Anderson 2005	American	1.20 (0.6	0, 2.40)	2.43
Overall, DL (I ² = 0.0	0%, p = 0.459)	1.10 (0.9	9, 1.22)	100.00
	.1	1 3		
NOTE: Weights are from	random-effects model			

Fig J5. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of spina bifida (RR = 1.10, 95% CI, 0.99 to 1.22; $I^2 = 0.0\%$, P = 0.459). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American	+	1.33 (1.14, 1.54)	87.69
Tinker 2020	American		1.30 (0.80, 2.20)	7.75
Bánhidy 2010	European		1.60 (0.50, 5.00)	1.50
Anderson 2005	American		1.60 (0.70, 3.50)	3.06
Overall, DL (l ² = 0.0%, p = 0.960)		\diamond	1.34 (1.16, 1.54)	100.00
	.1	1	5	
NOTE: Weights are from			-	

Fig J6. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of hydrocephaly (RR = 1.34, 95% CI, 1.16 to 1.54; $I^2 = 0.0\%$, P = 0.960). DL, DerSimonian and Laird random-effects model; RR, relative risk.

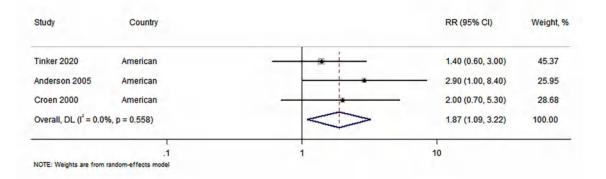


Fig J7. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of holoprosencephaly (RR = 1.87, 95% CI, 1.09 to 3.22; $I^2 = 0.0\%$, P = 0.558). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% Cl)	Weight, %
Schraw 2021	American	+	1.15 (1.08, 1.21)	99.90
Bánhidy 2010	European	•	0.50 (0.10, 3.40)	0.10
Overall, DL (I ² = 0.	0%, p = 0.355)	\diamond	1.15 (1.09, 1.22)	100.00
	.1	1	1 5	
NOTE: Weights are from	m random-effects model			

Fig J8. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of eye, ear, face, and neck (RR = 1.15, 95% CI, 1.09 to 1.22; $I^2 = 0.0\%$, P = 0.355). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% Cl)) Weight, %
Tinker 2020	American	1.40 (1.10, 1	1.80) 32.32
Wu 2020	American	1.40 (1.28, 1	1.53) 44.71
Yang 2019	American	1.06 (0.54, 2	2.08) 10.52
Garne 2012	European	• 0.59 (0.31, 1	1.10) 11.58
Bánhidy 2010	European 🗲 🔹	0.30 (0.01, 2	2.00) 0.86
Overall, DL (I ² = 5	4.9%, p = 0.064)	1.21 (0.95, 1	1.56) 100.00
	1	1 3	
NOTE: Weights are fro	m random-effects model		

Fig J9. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of cleft palate (RR = 1.21, 95% CI, 0.95 to 1.56; $I^2 = 54.9\%$, P=0.064). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American		1.10 (0.90, 1.40)	7.22
Wu 2020	American	+	1.28 (1.20, 1.36)	89.96
Yang 2019	American		1.04 (0.65, 1.65)	1.62
Bánhidy 2010	European		1.00 (0.50, 2.00)	0.73
Janssen 1996	American		1.60 (0.70, 4.00)	0.46
Overall, DL (I ² = 0	.0%, p = 0.547)	\$	1.26 (1.19, 1.34)	100.00
	.1	1	5	
NOTE: Weights are fro	om random-effects model			

Fig J10. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of cleft lip with or without palate (RR = 1.26, 95% CI, 1.19 to 1.34; $I^2 = 0.0\%$, P = 0.547). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American	-	1.00 (0.70, 1.60)	8.23
Wu 2020	American	-i	1.23 (1.08, 1.39)	88.37
Yang 2019	American		1.41 (0.69, 2.89)	2.74
Bánhidy 2010	European -		1.40 (0.30, 5.60)	0.66
Overall, DL (I ² = (0.0%, p = 0.779)	\diamond	1.21 (1.08, 1.37)	100.00
	.1	1	7	
NOTE: Weights are fr	om random-effects model			

Fig J11. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of diaphragmatic hernia (RR = 1.21, 95% CI, 1.08 to 1.37; $I^2 = 0.0\%$, P = 0.779). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% C	l) Weight, %
Tinker 2020	American		2.00) 5.66
Wu 2020	American	1.22 (1.05,	1.41) 94.34
Overall, DL (I ² = (0.0%, p = 0.743)	1.21 (1.05,	1.40) 100.00
	.1	1 2	
NOTE: Weights are fr	om random-effects model	. –	

Fig J12. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of omphalocele (RR = 1.21, 95% CI, 1.05 to 1.40; $I^2 = 0.0\%$, P = 0.743). DL, DerSimonian and Laird random-effects model; RR, relative risk.

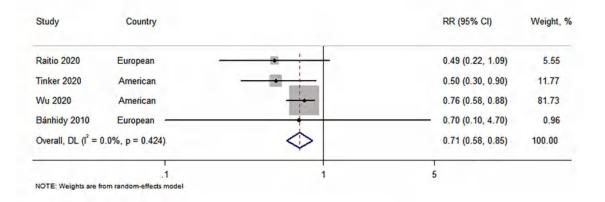


Fig J13. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of gastroschisis (RR = 0.71, 95% CI, 0.58 to 0.85; $I^2 = 0.0\%$, P = 0.424). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country			RR (95% CI)	Weight, %
Schraw 2021	American		+	2.54 (2.41, 2.69)	53.17
Bánhidy 2010	European	+•		1.24 (0.87, 1.78)	46.83
Overall, DL (I ² = 93	3.4%, p < 0.001)	<		1.82 (0.90, 3.66)	100.00
	1	1		5	
NOTE: Weights are fro	m random-effects model				

Fig J14. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of congenital anomalies of genitourinary system (RR = 1.82, 95% CI, 0.90 to 3.66; $I^2 = 93.4\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

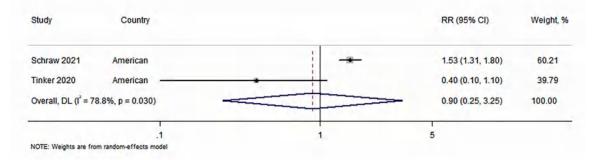


Fig J15. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of renal agenesis/dysgenesis (RR = 0.90, 95% CI, 0.25 to 3.25; $I^2 = 78.8\%$, P = 0.030). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Tinker 2020	American		1.40 (1.10, 1.80)	13.16
Wu 2020	American	+	1.29 (1.21, 1.36)	39.50
Yang 2019	American		1.27 (0.93, 1.74)	9,16
Arendt 2018	American	-	1.19 (1.05, 1.34)	28.20
Mavrogenis 2015	European		1.94 (1.34, 2.81)	6.96
Bánhidy 2010	European		0.80 (0.40, 1.30)	3.03
Overall, DL (I ² = 45.99	6, p = 0.100)	\diamond	1.29 (1.16, 1.44)	100.00
	Ţ		1	
NOTE: Weights are from ra	.1 ndom-effects model	1	3	

Fig J16. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of hypospadias (RR = 1.29, 95% CI, 1.16 to 1.44; $I^2 = 45.9\%$, P=0.100). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study Country	RR (95% CI)	Weight, %
Dyck 2020 American	1.14 (0.90, 1.44)	54.96
Tain 2016 Asian-Pacifc	2.22 (1.06, 4.67)	10.90
Dart 2015 American	1.29 (0.90, 1.85)	34.14
Overall, DL (l ² = 31.1%, p = 0.234)	1.28 (0.99, 1.66)	100.00
1	1 5	
. I NOTE: Weights are from random-effects model	1 5	

Fig J17. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of congenital anomalies of the kidney and urinary tract (RR = 1.28, 95% CI, 0.99 to 1.66; $I^2 = 31.1\%$, P = 0.234). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Schraw 2021	American	÷	1.18 (1.14, 1.21)	99.56
Bánhidy 2010	European	• ;	0.60 (0.10, 2.30)	0.04
Janssen 1996	American		- 1.50 (0.90, 2.30)	0.40
Overall, DL (I ² = 0.0	9%, p = 0.424)	♦	1.18 (1.15, 1.22)	100.00
	1	1	1	
NOTE: Weights are from				

Fig J18. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of congenital anomalies of musculoskeletal system (RR = 1.18, 95% CI, 1.15 to 1.22; $I^2 = 0.0\%$, P = 0.424). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95%	CI)	Weight, %
Schraw 2021	American	1.29 (1.04	4, 1.60)	11.28
Schraw 2021	American	1.10 (1.0), 1.22)	52.95
Tinker 2020	American	1.10 (0.60), 2.00)	1.44
Tinker 2020	American	1.00 (0.60	0, 1.50)	2.49
Wu 2020	American	1.18 (1.03	3, 1.34)	30.25
Yang 2019	American	1.15 (0.55	9, 2.26)	1.16
Bánhidy 2010	European	• 0.90 (0.30), 2.80)	0.42
Overall, DL (1 ² =)	0.0%, p = 0.866)	1.14 (1.00	5, 1.23)	100.00

Fig J19. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of limb reduction (RR = 1.14, 95% CI, 1.06 to 1.23; $I^2 = 0.0\%$, P = 0.866). DL, DerSimonian and Laird random-effects model; RR, relative risk.

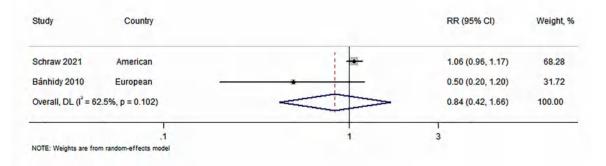


Fig J20. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of poly/syndactyly (RR = 0.84, 95% CI, 0.42 to 1.66; $I^2 = 62.5\%$, P = 0.102). DL, DerSimonian and Laird random-effects model; RR, relative risk.

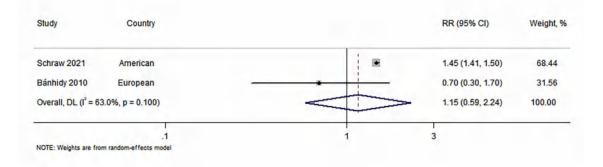


Fig J21. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of multiple congenital anomalies (RR = 1.15, 95% CI, 0.59 to 2.24; $I^2 = 63.0\%$, P = 0.100). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Bayoumi 2021	Asian-Pacifc		0.80 (0.37, 1.74)	4.94
Persson 2014	European		1.44 (1.07, 1.93)	28.16
Fadl 2010	European		1.19 (1.02, 1.39)	66.90
Overall, DL (I ² = 18.	5%, p = 0.293)	\Diamond	1.23 (1.03, 1.47)	100.00
	.1	1	1	
NOTE: Weights are from				

Fig J22. Forest plot of the relative risks of population-based studies on maternal gestational diabetes and the risk of major congenital anomalies (RR = 1.23, 95% CI, 1.03 to 1.47; $I^2 = 18.5\%$, P = 0.293). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Allen 2020	European		3.18 (2.29, 4.44)	14.28
Liu 2015	American	-	2.38 (2.20, 2.57)	22.57
Wu 2012	European		1.70 (1.50, 2.00)	20.85
Bánhidy 2010	European		1.50 (1.10, 2.00)	15.38
Eidem 2010	European	-+	2.04 (1.60, 2.59)	17.47
Peticca 2009	American		1.71 (1.03, 2.82)	9.45
Overall, DL $(l^2 = 8)$	2.5%, p < 0.001)	\diamond	2.03 (1.66, 2.48)	100.00
	1	1 2.5	5	
NOTE: Weights are fr	om random-effects model	1 2.5	5	

Fig K1. Forest plot of the relative risks of population-based studies on maternal Type 1 diabetes and the risk of overall congenital anomalies (RR = 2.03, 95% CI, 1.66 to 2.48; $I^2 = 82.5\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country			RR (95% CI)	Weight, %
Arendt 2021	European			5.00 (4.10, 6.20)	15.26
Ludvigsson 2018	European	- 20 - 1		3.19 (2.69, 3.80)	15.32
Billionnet 2017	European	*		1.20 (1.10, 1.30)	15.43
Liu 2015	American			6.55 (5.89, 7.29)	15.41
Bánhidy 2010	European			2.50 (1.60, 3.90)	14.56
Eidem 2010	European		Η.	3.50 (2.70, 4.70)	15.10
Becerra 1990	American	-		> 18.00 (3.90, 82.50)	8.94
Overall, DL (l ² = 99.1%, p < 0.001)			~	3.75 (1.86, 7.57)	100.00

Fig K2. Forest plot of the relative risks of population-based studies on maternal Type 1 diabetes and the risk of congenital heart defects (RR = 3.75, 95% CI, 1.86 to 7.57; $I^2 = 99.1\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country		RR (95% CI)	Weight, %
Liu 2015	American	*	2.31 (2.16, 2.47)	29.05
Wu 2012	European	-	1.20 (1.10, 1.30)	28.97
Bánhidy 2010	European		0.90 (0.70, 1.20)	26.90
Peticca 2009	American		1.00 (0.41, 2.43)	15.08
Overall, DL (l ² = 98.2%, p < 0.001)			1.31 (0.80, 2.15)	100.00
			1	
	.1	1	5	

Fig L1. Forest plot of the relative risks of population-based studies on maternal Type 2 diabetes and the risk of overall congenital anomalies (RR = 1.31, 95% CI, 0.80 to 2.15; $I^2 = 98.2\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

Study	Country	RR (95% CI)	Weight, %
Arendt 2021	European	3.00 (1.80, 5.00)	23.16
Billionnet 2017	European	5.30 (3.90, 7.20)	25.88
Liu 2015	American	÷ 5.35 (4.83, 5.89)	27.50
Bánhidy 2010	European	1.00 (0.60, 1.60)	23.46
Overall, DL (l ² = 93.6%, p < 0.001)		3.15 (1.72, 5.78)	100.00
	.1	1 10	
NOTE: Weights are from	random-effects model		

Fig L2. Forest plot of the relative risks of population-based studies on maternal Type 2 diabetes and the risk of congenital heart defects (RR = 3.15, 95% CI, 1.72 to 5.78; $I^2 = 93.6\%$, P < 0.001). DL, DerSimonian and Laird random-effects model; RR, relative risk.

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