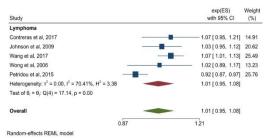
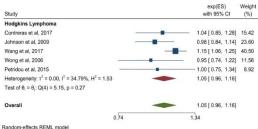
## Supplementary Material





Random-effects REML mode

Intracranial and Intraspinal Embryonal Contreras et al, 2017

Heterogeneity:  $\tau^2$  = 0.00,  $I^2$  = 0.01%,  $H^2$  = 1.00

Test of  $\theta_i = \theta_j$ : Q(2) = 1.35, p = 0.51

Random-effects REML model

Study

Overall

Johnson et al, 2009

Wang et al, 2017

exp(ES) with 95% CI

-

0.90

0.89

1.02 [ 0.95, 1.10]14.221.07 [ 1.00, 1.14]20.181.08 [ 1.03, 1.13]39.55

 -1.08 [0.97, 1.20]
 7.30

 1.10 [1.02, 1.19]
 13.11

 1.02 [0.90, 1.15]
 5.63

1.07 [ 1.04, 1.10]

1.07 [ 1.04, 1.10]

exp(ES)

with 95% CI

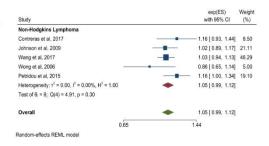
1.40

Weight

(%)

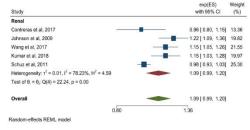
1.20

Weight (%)



exp(ES) with 95% CI	Weigh (%)
- 0.98 [ 0.75, 1.28]	12.82
1.12 [ 0.94, 1.34]	27.64
1.26 [ 1.09, 1.45]	43.69
1.22 [ 0.96, 1.55]	15.86
1.17 [ 1.07, 1.29]	
1.17 [ 1.07, 1.29]	
1.55	
	- 0.96 [ 0.75, 1.28] 1.12 [ 0.94, 1.34] 1.26 [ 1.09, 1.45] 1.22 [ 0.96, 1.55] 1.17 [ 1.07, 1.29] 1.17 [ 1.07, 1.29]

Study		exp(ES) with 95% CI	Weight (%)
Medulloblastoma			
Contreras et al, 2017		1.16 [ 0.95, 1.42]	11.18
Fahmideh et al, 2021	_	- 1.05 [ 0.95, 1.16]	46.05
Lombardi et al, 2021		1.01 [ 0.91, 1.12]	42.77
Heterogeneity: r <sup>2</sup> = 0.00, l <sup>2</sup> = 0.01%, H <sup>2</sup>	= 1.00	1.04 [ 0.98, 1.12]	
Test of $\theta_i = \theta_i$ : Q(2) = 1.45, p = 0.48			
Overall	-	1.04 [ 0.98, 1.12]	
	0.91	1.42	
Random-effects REML model			

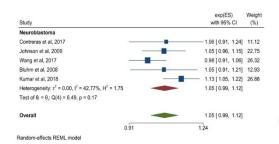


			weduliobiastoria			
- 1.15 [ 0.94,	1.40]	12.40	Contreras et al, 2017		1.16 [ 0.95, 1	1.42] 11.1
1.01 [ 0.89,	1.14]	32.74	Fahmideh et al, 2021		1.05 [ 0.95, 1	1.16] 46.0
1.02 [ 0.93,	1.12]	54.86	Lombardi et al, 2021	_	1.01 [ 0.91, 1	1.12] 42.7
1.03 [ 0.96,	1.11]		Heterogeneity: r <sup>2</sup> = 0.00, I <sup>2</sup> = 0.01%, H <sup>2</sup> = 1.00	-	1.04 [ 0.98, 1	1.12]
			Test of $\theta_i$ = $\theta_j$ : Q(2) = 1.45, p = 0.48			
1.03 [ 0.96,	1.11]		Overall		1.04 [ 0.98, 1	1.12]
.40				0.91	1.42	
			Random-effects REML model			
exp(ES)	Weij		Study		exp(ES) with 95% CI	Weight (%)
with 95% CI	(%	)	Renal			
			Contreras et al, 2017		0.96 [ 0.80, 1.15]	13.36
.84 [ 0.67, 1.0	6] 13.8	30	Johnson et al, 2009			19.82
98 [ 0.84, 1.1	5] 29.1	17	Wang et al, 2017		1.15 [ 1.05, 1.26]	21.55

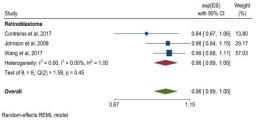
3	Weight (%)	Study		exp(ES) with 95% Cl	Weight (%)
		Hepatoblastoma			
82]	8.28	Contreras et al, 2017		1.21 [ 0.81, 1.80]	8.45
24]	20.41	Johnson et al, 2009		1.00 [ 0.81, 1.24]	28.80
.40]	32.63	Licht et al, 2021		1.02 [ 0.88, 1.18]	62.76
.18]	38.68	Heterogeneity: T <sup>2</sup> = 0.00, I <sup>2</sup> = 0.00%, H <sup>2</sup> = 1	.00 🔷 🔷	1.03 [ 0.92, 1.15]	
.21]		Test of $\theta_i$ = $\theta_i$ : Q(2) = 0.72, p = 0.70			
.21]		Overall	-	1.03 [ 0.92, 1.15]	
			0.81	1.80	
		Random-effects REML model			

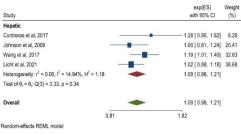
Study	exp(ES) V with 95% Cl	Veight (%)	Study
Burkitt Lymphoma		<u></u>	Contreras et al, 2017
Contreras et al. 2017	0.93 [ 0.69, 1.25]	34.02	Johnson et al, 2009
Johnson et al. 2009	0.93 [ 0.75, 1.15]	35.98	Wang et al, 2017
Heterogeneity: r <sup>2</sup> = 0.00, I <sup>2</sup> = 0.00%, H <sup>2</sup> = 1.00	0.93 [ 0.78, 1.11]		Cantwell et al, 2008 Danysh et al, 2016
Test of $\theta_i = \theta_j$ : Q(1) = 0.00, p = 1.00			Silva et al, 2016 Heterogeneity: r <sup>2</sup> = 0.00, l <sup>2</sup> = 0.04%, H <sup>2</sup> = 1.00
Overall	0.93 [ 0.78, 1.11]		Test of $\theta_i = \theta_j;$ Q(5) = 2.81, $p$ = 0.73
0.69	1.25		Overall
Random-effects REML model			

Study	exp(ES) with 95% CI	Weight (%)
Astrocytoma		
Contreras et al, 2017	0.98 [ 0.86, 1.12]	11.27
Johnson et al, 2009	1.12 [ 1.03, 1.22]	27.46
Wang et al, 2017	1.09 [ 1.02, 1.16]	51.83
Danysh et al, 2016 -	1.21 [ 1.05, 1.40]	9.44
Heterogeneity: τ <sup>2</sup> = 0.00, 1 <sup>2</sup> = 0.02%, H <sup>2</sup> = 1.00	• 1.10 [ 1.05, 1.15]	
Test of $\theta_i = \theta_j$ : Q(3) = 4.74, p = 0.19		
Overall	• 1.10 [ 1.05, 1.15]	
0.86	1.40	
andom effects REMI model		



Study	exp(ES) with 95% CI	Weight (%)
Wilms Tumor		
Contreras et al, 2017	0.93 [ 0.77, 1.12]	18.30
Johnson et al, 2009		25.54
Kumar et al, 2018	1.15 [ 1.03, 1.28]	25.69
Schuz et al, 2011 -	- 0.98 [ 0.93, 1.03]	30.47
Heterogeneity: r <sup>2</sup> = 0.01, l <sup>2</sup> = 82.51%, H <sup>2</sup> = 5.72	1.07 [ 0.95, 1.21]	
Test of $\theta_i = \theta_j$ : Q(3) = 18.39, p = 0.00		
Overall	1.07 [ 0.95, 1.21]	
0.77	1.36	
Random-effects REML model		



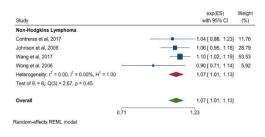


Trosi et al, 2014 Haterogeneity: r <sup>2</sup> = 0.00, l <sup>2</sup> = 0.00%, H <sup>2</sup> = 1.00 Test of θ <sub>i</sub> = θ <sub>i</sub> : Q(3) = 1.36, p = 0.72 <b>Overall</b>	exp(ES) Weight with 95% CI (%) -1.01 [0.84, 1.22] 8.94 1.02 [0.90, 1.16] 19.28 1.02 [0.92, 1.13] 30.40 1.05 [0.99, 1.11] 1.05 [0.99, 1.11]	Study         exp(ES) with 95% CI         Weight (%)         Study           Osteosarcoma Johnson et al, 2009         0.57 [0.80, 118] 1.06 [0.97, 1.17]         20.63         Conteras et al, 2017 Wang et al 2017           Tossi et al, 2014         0.91 [0.00, 119] 1.06 [0.97, 1.17]         79.37         Conteras et al, 2017           Heterogeneity: $t^2 = 0.00, t^2 = 11.77\%, H^2 = 1.13$ 1.06 [0.97, 1.17]         Ghai et al, 1992           Overall         0.80         1.19         79.37           Random-effects REML model         0.76	exp(ES)         Weight (%)           0.90 [0.76, 1.06]         16.10           1.11 [1.00, 1.23]         28.43           1.03 [0.96, 1.11]         39.34           -1.13 [0.95, 1.34]         15.14           1.04 [0.97, 1.13]         1.04           1.34         1.34
Study           Rhabdomyosarcoma           Contreras et al, 2017           Johnson et al, 2009           Ghali et al, 1992           Heterogeneity: r² = 0.00, l² = 12.34%, H² = 1.14           Test of 0, = 0; Q(2) = 2.69, p = 0.26           Overall           0.74           0.74	exp(ES) Weight with 95% CI (%) 0.95 [ 0.74, 1.22] 17.91 -1.21 [ 1.05, 1.40] 46.39 1.13 [ 0.56, 1.34] 35.70 1.13 [ 1.01, 1.26] 1.13 [ 1.01, 1.26]	Study         exp(E5) with 95% Cl         Weight (%)           Gene Contrens et al, 2017         1.17 [0.93, 1.47]         5.89           Johnson et al, 2009         0.98 [0.85, 1.13]         15.14           Wang et al 2017         0.98 [0.85, 1.13]         15.14           Stephansson et al, 2011         1.06 [1.00, 1.12]         1.95           Test of 0. = 6; Q(3) = 1.95, p = 0.58         1.06 [1.00, 1.12]         1.47           Random-effects REML model         1.47         1.47	

**Supplementary Figure 1.** Maternal meta-analysis results for a five-year increase in maternal age at birth by cancer type. Error bars represent 95% confidence intervals. Between study heterogeneity is presented in terms of the  $\tau^2$ ,  $l^2$ , and H<sup>2</sup> statistic. Test of  $\theta i=\theta j$  refers to the Cochran's Q test of between study homogeneity. Random effects modeling using restricted maximum likelihood methods was used to produce summary estimates. All tests were two-sided. CI = confidence interval; ES = estimate ( $\beta$ ); REML = restricted maximum likelihood.

Study	exp(ES) with 95% Cl	Weight (%)
Lymphoma		
Contreras et al, 2017 -	1.04 [ 0.95, 1.14]	19.90
Johnson et al, 2009	1.03 [ 0.96, 1.10]	28.15
Wang et al, 2017		36.54
Wong et al, 2006	0.93 [ 0.83, 1.04]	15.42
Heterogeneity: r <sup>2</sup> = 0.00, I <sup>2</sup> = 51.80%, H <sup>2</sup> = 2.07	1.03 [ 0.98, 1.09]	
Test of $\theta_i = \theta_j$ : Q(3) = 6.38, p = 0.09		
Overall	1.03 [ 0.98, 1.09]	
0.83	1.14	
Random-effects REML model		

Johnson et al, 2009 Wang et al, 2017 Wong et al, 2007 Heterogeneity: r <sup>2</sup> = 0.01, l <sup>2</sup> = 61.21%, H <sup>2</sup> = 2.58 1.00 [0.90, 1.11] Test of θ <sub>i</sub> = θ <sub>i</sub> : Q(3) = 7.37, p = 0.06	Weight (%)
Johnson et al, 2009 Wang et al, 2017 Wong et al, 2017 Wong et al, 2006 Heterogeneity: r <sup>2</sup> = 0.01, l <sup>2</sup> = 61.21%, H <sup>2</sup> = 2.58 Test of θ <sub>1</sub> = θ <sub>2</sub> Q(3) = 7.37, p = 0.06	
Wang et al, 2017	20.60
Wong et al, 2006         0.82 [ 0.69, 0.96]           Heterogeneity: τ <sup>2</sup> = 0.01, l <sup>2</sup> = 61.21%, H <sup>2</sup> = 2.58         1.00 [ 0.90, 1.11]           Test of θ <sub>i</sub> = θ <sub>i</sub> ; Q(S) = 7.37, p = 0.06         1.00 [ 0.90, 1.11]	25.68
Heterogeneity: $r^2 = 0.01, l^2 = 61.21\%, H^2 = 2.58$ Test of $\theta_i = \theta_i: Q(3) = 7.37, p = 0.06$	35.08
Test of $\theta_i=\theta_j;Q(3)=7,37,p=0.06$	18.65
Overall 1.00 [ 0.90, 1.11]	
0.69 1.20	
Random-effects REML model	



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Study

Overall

Ependymoma

Contreras et al, 2017 Johnson et al, 2009

Wang et al, 2017

Heterogeneity:  $\tau^2 = 0.00$ ,  $I^2 = 0.00\%$ ,  $H^2 = 1.00$ 

Test of  $\theta_i = \theta_i$ : Q(2) = 0.94, p = 0.62

Random-effects REML model

exp(ES) Weight with 95% CI (%)

with 95% CI

- 0.93 [ 0.75, 1.16] 15.26 0.90 [ 0.76, 1.06] 27.83 0.99 [ 0.88, 1.11] 56.92

0.95 [ 0.88, 1.04]

0.95 [ 0.88, 1.04]

1.16

Study	exp(ES) with 95% Cl	Weight (%)
Burkitt Lymphoma		
Contreras et al, 2017	1.04 [ 0.83, 1.31]	35.67
Johnson et al, 2009	1.12 [ 0.94, 1.33]	64.33
Heterogeneity: T <sup>2</sup> = 0.00, I <sup>2</sup> = 0.00%, H <sup>2</sup> = 1.00	1.09 [ 0.95, 1.25]	
Test of $\theta_i = \theta_j$ ; Q(1) = 0.25, p = 0.61		
Overall	1.09 [ 0.95, 1.25]	
0.83	1.33	
Random-effects REML model		

Study	exp(ES) with 95% CI	Weight (%)
Astrocytoma		
Contreras et al, 2017	0.98 [ 0.88, 1.09]	16.30
Johnson et al, 2009	0.97 [ 0.90, 1.05]	29.37
Wang et al, 2017	1.00 [ 0.94, 1.06]	54.33
Heterogeneity: r <sup>2</sup> = 0.00, l <sup>2</sup> = 0.00%, H <sup>2</sup> = 1.00	0.99 [ 0.95, 1.03]	
Test of $\theta_i = \theta_i$ : Q(2) = 0.39, p = 0.82		
Overall	0.99 [ 0.95, 1.03]	
0.88	1.09	
Random-effects REML model		

Study Retinoblastoma

Overall

Contreras et al, 2017

Johnson et al, 2009

Random-effects REML model

Wang et al, 2017 Heterogeneity:  $r^2 = 0.00$ ,  $I^2 = 0.01\%$ ,  $H^2 = 1.00$ Test of  $\theta_i = \theta_i$ : Q(2) = 1.71, p = 0.43

exp(ES) with 95% Cl

1.12 [ 0.94, 1.33] 17.42

0.98 [0.86, 1.12] 28.85

1.07 [ 0.97, 1.18] 53.72 1.05 [ 0.98, 1.13]

1.05 [ 0.98, 1.13]

1.33

Weight (%)

Study	exp(ES) with 95% CI	Weight (%)
CNS		
Contreras et al, 2017	- 0.98 [ 0.92, 1.04]	14.49
Johnson et al, 2009	- 0.99 [ 0.94, 1.04]	20.99
Wang et al, 2017	- 1.02 [ 0.99, 1.05]	59.25
Cantwell et al, 2008	1.06 [ 0.96, 1.17]	5.28
Heterogeneity: T <sup>2</sup> = 0.00, I <sup>2</sup> = 1.15%, H <sup>2</sup> = 1.01	1.01 [ 0.99, 1.03]	
Test of $\theta_i = \theta_j$ : Q(3) = 2.99, p = 0.39		
Overall	1.01 [ 0.99, 1.03]	
0.92	1.17	
Random-effects REML model		

Study	exp(ES) with 95% CI	Weight (%)
Intracranial and Intraspinal Embryonal		
Contreras et al, 2017	- 0.88 [ 0.76, 1.02]	21.20
Johnson et al, 2009	0.99 [ 0.89, 1.10]	34.18
Wang et al, 2017	1.03 [ 0.95, 1.12]	44.62
Heterogeneity: x <sup>2</sup> = 0.00, l <sup>2</sup> = 34.91%, H <sup>2</sup> = 1.54	0.98 [ 0.91, 1.06]	
Test of $\theta_i = \theta_j$ : Q(2) = 3.30, p = 0.19		
Overall	0.98 [ 0.91, 1.06]	
0.76	1.12	
Random-effects REML model		

Study		exp(ES) with 95% CI	Weight (%)	
Renal				
Contreras et al, 2017			10.23	
Johnson et al, 2009	-	0.92 [ 0.84, 1.01]	18.05	
Wang et al, 2017		1.00 [ 0.93, 1.08]	24.71	
Schuz et al, 2011		1.01 [ 0.96, 1.06]	47.01	
Heterogeneity: $\tau^2 = 0.00$ , $l^2 = 20.64\%$ , $H^2 = 1.26$	-	1.00 [ 0.96, 1.04]		
Test of $\theta_i = \theta_j$ : Q(3) = 4.95, p = 0.18				
Overall	•	1.00 [ 0.96, 1.04]		
0.84		1.24		
Random-effects REML model				

Study	exp(ES) with 95% CI	Weight (%)	
Neuroblastoma			
Contreras et al, 2017	0.98 [ 0.87, 1.11]	17.26	
Johnson et al, 2009	1.00 [ 0.93, 1.08]	36.28	
Wang et al, 2017		46.45	
Heterogeneity: r <sup>2</sup> = 0.00, I <sup>2</sup> = 28.49%, H <sup>2</sup> = 1.40	1.03 [ 0.97, 1.09]		
Test of $\theta_i = \theta_j$ : Q(2) = 2.56, p = 0.28			
Overall -	1.03 [ 0.97, 1.09]		
0.87	1.14		
andom-effects REML model			

0.75

Study	exp(ES) with 95% CI	Weight (%)
Wilms Tumor		
Contreras et al, 2017	1.11 [ 0.96, 1.28]	22.14
Johnson et al, 2009	0.92 [ 0.84, 1.01]	32.92
Schuz et al, 2011		44.95
Heterogeneity: r <sup>2</sup> = 0.00, 1 <sup>2</sup> = 65.95%, H <sup>2</sup> = 2.94	1.00 [ 0.92, 1.09]	
Test of $\theta_i = \theta_j$ : Q(2) = 5.29, p = 0.07		
Overall	1.00 [ 0.92, 1.09]	
0.84	1.28	
andom-effects REML model		

Study		exp(ES) with 95% CI	Weight (%)
Hepatic			
Contreras et al,2017			12.23
Johnson et al, 2009			28.81
Wang et al, 2017		1.03 [ 0.91, 1.17]	58.96
Heterogeneity: $\tau^2 = 0.00$ , $I^2 = 0.00\%$ , $H^2 = 1.00$		1.03 [ 0.93, 1.13]	
Test of $\theta_i = \theta_j$ : Q(2) = 0.28, p = 0.87			
Overall	-	1.03 [ 0.93, 1.13]	
0.73		1.27	
Random-effects REML model			

0.86

Study	exp(ES) with 95% CI	Weight (%)
Hepatoblastoma		
Contreras et al,2017		25.12
Johnson et al, 2009	- 1.05 [ 0.88, 1.26]	74.88
Heterogeneity: r <sup>2</sup> = 0.00, I <sup>2</sup> = 0.00%, H <sup>2</sup> = 1.00	1.04 [ 0.89, 1.21]	
Test of $\theta_i = \theta_j$ : Q(1) = 0.07, p = 0.79		
Overall	1.04 [ 0.89, 1.21]	
0.73	1.37	
Random-effects REML model		

Study		exp(ES) with 95% CI	Weight (%)	
Bone				
Contreras et al, 2017 -		1.06 [ 0.92, 1.22]	17.20	
Johnson et al, 2009		1.06 [ 0.94, 1.19]	25.40	
Wang et al, 2017 -		1.00 [ 0.93, 1.08]	57.40	
Heterogeneity: $\tau^2 = 0.00$ , $I^2 = 0.00\%$ , $H^2 = 1.00$		1.03 [ 0.97, 1.09]		
Test of $\theta_i = \theta_j$ : Q(2) = 0.94, p = 0.63				
Overall	-	1.03 [ 0.97, 1.09]		
0.92	2	1.22		
Random-effects REML model				

Study		exp(ES) with 95% CI	Weight (%)	Study		exp(ES) with 95% CI	Weight (%)
Soft Tissue Sarcoma				Germ Cell Tumor			
Contreras et al, 2017		— 1.05 [ 0.93, 1.19]	13.43	Contreras et al, 2017		- 1.00 [ 0.83, 1.20]	8.25
Johnson et al, 2009		1.03 [ 0.95, 1.12]	29.97	Johnson et al, 2009		1.04 [ 0.94, 1.15]	27.13
Wang et al, 2017		1.05 [ 0.98, 1.12]	50.49	Wang et al, 2017		1.04 [ 0.97, 1.11]	64.62
Ghali et al, 1992		1.03 [ 0.86, 1.24]	6.11	Heterogeneity: r <sup>2</sup> = 0.00, l <sup>2</sup> = 0.00%, H <sup>2</sup> = 1.00	-	1.04 [ 0.98, 1.09]	
Heterogeneity: $\tau^2$ = 0.00, $I^2$ = 0.00%, $H^2$ = 1.00 Test of $\theta_i = \theta_i$ : Q(3) = 0.16, p = 0.98	•	1.04 [ 1.00, 1.09]	1	Test of $\theta_i = \theta_j$ : Q(2) = 0.16, p = 0.92			
Overall	-	1.04 [ 1.00, 1.09]	I	Overall	-	1.04 [ 0.98, 1.09]	
0.86		1.24		0.83 Random-effects REML model		1.20	
Random-effects REML model							

**Supplementary Figure 2.** Paternal meta-analysis results for a five-year increase in paternal age at birth by cancer type. Error bars represent 95% confidence intervals. Between study heterogeneity is presented in terms of the  $\tau^2$ , P, and H<sup>2</sup> statistic. Test of  $\theta i=\theta j$  refers to the Cochran's Q test of between study homogeneity. Random effects modeling using restricted maximum likelihood methods was used to produce summary estimates. All tests were two-sided. CI = confidence interval; ES = estimate ( $\beta$ ); REML = restricted maximum likelihood.