## Supporting information

Supplement to: Pregnancy outcomes in Italy during COVID- 19 pandemic: a population-based cohort study.

## Figure S1. Forest plot for risks of stillbirths in pandemic vs historical period in the studied Regions. Unadjusted analysis.

Cohort-specific and overall RR and 95% CI are shown; I-squared: percentage of between-studies heterogeneity and relative P value; % Weight: set of weights attributed to each cohort; pandemic and historic events: number of stillbirths over total live births in the 2 periods.



		RR	%
Region		(95% CI)	Weight
Piedmont	<u>ا</u>	1.02 (0.78, 1.33)	8.73
Lombardy	F	0.96 (0.82, 1.12)	26.61
Veneto	F	0.98 (0.77, 1.24)	11.09
Province of Trento	F	1.32 (0.74, 2.36)	1.87
Friuli-Venezia Giulia	kI	0.96 (0.58, 1.53)	2.72
Emilia Romagna		0.86 (0.66, 1.11)	9.72
Tuscany	F	1.22 (0.88, 1.68)	6.13
Campania	F B	0.87 (0.67, 1.12)	9.85
Apulia	⊧∎¦I	0.91 (0.71, 1.15)	11.24
Sicily	F F	1.02 (0.81, 1.28)	12.05
Overall, IV (l <sup>2</sup> = 0.0%, p	o = 0.815)	0.97 (0.89, 1.05)	100.00
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Figure S2. Forest plot for risks of stillbirths in pandemic vs historical period in the studied Regions. Adjusted analysis.

Adjusted analysis included the following variables: maternal country of birth, maternal age at index birth, parity, maternal educational degree, maternal employment, pregnancy conceived with assisted reproductive technology, sex of the child. Observation with missing variables were excluded from the model. The Lazio Region is not included in adjusted analyses.

Figure S3. Forest plot for risks of liveborn preterm birth (<37 weeks' gestational age) in pandemic vs historical period in the studied Regions. Adjusted analysis.



Figure S4. Forest plot for risks of liveborn late preterm birth (32-36 weeks' gestational age) in pandemic vs historical period in the studied Regions. Adjusted analysis.



Figure S5. Forest plot for risks of liveborn very preterm birth (<32 weeks' gestational age) in pandemic vs historical period in the studied Regions. Adjusted analysis.

Region				<b>RR</b> (95% CI)	% Weight
Piedmont	F			0.91 (0.78, 1.06)	8.21
Lombardy	H	-1		0.95 (0.87, 1.04)	25.47
Veneto				0.82 (0.72, 0.94)	10.88
Province of Trento	F			0.93 (0.63, 1.38)	1.27
Friuli-Venezia Giulia				0.87 (0.66, 1.13)	2.66
Emilia Romagna	F • •			0.84 (0.73, 0.96)	9.99
Tuscany	<b>⊢</b>			0.82 (0.69, 0.98)	6.34
Campania	<b>⊢</b>			0.84 (0.74, 0.95)	12.23
Apulia	F F	-1		0.91 (0.80, 1.04)	10.78
Sicily	F			0.86 (0.76, 0.97)	12.17
Overall, IV ( $I^2 = 0.0\%$	b, p = 0.699)			0.88 (0.84, 0.92)	100.00
	.6666667	1	1.5		

Figure S6. Forest plot for risks of liveborn extremely preterm birth (<28 weeks' gestational age) in pandemic vs historical period in the studied Regions. Adjusted analysis.

	RR	0/2
Region	(95% CI)	Weight
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Piedmont	0.82 (0.62, 1.09)	7.50
Lombardy	0.99 (0.85, 1.16)	24.96
Veneto H	0.75 (0.60, 0.95)	11.15
Province of Trento	0.93 (0.47, 1.83)	1.31
Friuli-Venezia Giulia 🛏 🖬 🖬	0.99 (0.64, 1.49)	3.36
Emilia Romagna 🛛 🛏 🖬	0.83 (0.65, 1.05)	10.46
Tuscany 🛏 🔹 🕂	0.66 (0.47, 0.94)	5.08
Campania L	0.89 (0.71, 1.10)	12.35
Apulia Harris	0.96 (0.77, 1.21)	11.79
Sicily Hard	0.96 (0.77, 1.20)	12.06
Overall, IV (I <sup>2</sup> = 0.0%, p = 0.485)	0.89 (0.82, 0.96)	100.00
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Figure S7. Forest plot for risks of liveborn preterm birth (<37 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Unadjusted analysis.



Figure S8. Forest plot for risks of liveborn late preterm birth (32-36 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Unadjusted analysis.



Figure S9. Forest plot for risks of liveborn very preterm birth (<32 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Unadjusted analysis.



Figure S10. Forest plot for risks of liveborn extremely preterm birth (<28 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Unadjusted analysis.

	RR	%	Pandemic	Historical
Region	(95% CI)	Weight	Events	Events
Piedmont	0.86 (0.64, 1.17)	7.03	54/27648	201/88338
Lombardy	0.91 (0.75, 1.09)	18.48	141/71048	513/233907
Veneto	0.78 (0.61, 1.00)	10.08	76/33749	306/106700
Province of Trento	1.07 (0.54, 2.13)	1.34	11/4249	31/12803
Friuli-Venezia Giulia	1.11 (0.68, 1.77)	2.77	23/8249	62/25120
Emilia Romagna	1.03 (0.81, 1.31)	10.75	86/31128	265/99439
Tuscany	0.86 (0.62, 1.18)	6.29	48/23552	182/77142
Lazio H	0.95 (0.76, 1.19)	12.18	95/39056	326/128161
Campania H	0.97 (0.75, 1.24)	10.17	89/46368	199/100385
Apulia I I I I I I I I I I I I I I I I I I I	1.03 (0.80, 1.31)	10.27	82/27831	254/89015
Sicily H	0.85 (0.66, 1.08)	10.64	82/38261	298/118249
Overall, IV (I <sup>2</sup> = 0.0%, p = 0.892)	0.92 (0.85, 1.00)	100.00		
.5 1 2				

Figure S11. Forest plot for risks of liveborn preterm birth (<37 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Adjusted analysis.



Figure S12. Forest plot for risks of liveborn late preterm birth (32-36 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Adjusted analysis.



Figure S13. Forest plot for risks of liveborn very preterm birth (<32 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Adjusted analysis.

	RR	%
Region	(95% CI)	Weight
Piedmont	0.93 (0.78, 1.12)	8.24
Lombardy	0.89 (0.80, 0.99)	24.18
Veneto Handa	0.86 (0.74, 1.00)	11.20
Province of Trento	⊣ 0.97 (0.63, 1.50)	1.42
Friuli-Venezia Giulia	0.87 (0.62, 1.19)	2.51
Emilia Romagna 🛛 🛏 🗖	0.92 (0.78, 1.08)	10.57
Tuscany H	0.88 (0.72, 1.09)	6.26
Campania H	0.91 (0.78, 1.05)	12.29
Apulia	0.86 (0.74, 1.01)	11.14
Sicily Hard	0.87 (0.75, 1.01)	12.19
Overall, IV (l <sup>2</sup> = 0.0%, p = 0.999)	0.89 (0.85, 0.94)	100.00

Figure S14. Forest plot for risks of liveborn extremely preterm birth (<28 weeks' gestational age) in pandemic vs historical period in the studied Regions, singleton pregnancies. Adjusted analysis.

	RR	%
Region	(95% CI)	Weight
Piedmont	0.87 (0.63, 1.20)	7.31
Lombardy	0.91 (0.75, 1.09)	22.36
Veneto	0.81 (0.63, 1.05)	11.78
Province of Trento	1.09 (0.54, 2.19)	1.60
Friuli-Venezia Giulia	1.14 (0.69, 1.82)	3.29
Emilia Romagna 🗾 🕶 🚽	0.99 (0.76, 1.29)	10.94
Tuscany H	0.84 (0.58, 1.20)	5.91
Campania	1.01 (0.78, 1.29)	12.30
Apulia H	1.02 (0.79, 1.30)	12.56
Sicily	0.92 (0.72, 1.19)	11.96
Overall, IV ( $I^2 = 0.0\%$ , p = 0.934)	0.93 (0.85, 1.02)	100.00
.5 1 2		

Figure S15. Forest plot for risks of liveborn preterm birth (<37 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Unadjusted analysis.



Figure S16. Forest plot for risks of liveborn late preterm birth (32-36 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Unadjusted analysis.



Figure S17. Forest plot for risks of liveborn very preterm birth (<32 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Unadjusted analysis.



Figure S18. Forest plot for risks of liveborn extremely preterm birth (<28 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Unadjusted analysis.

	RR	%	Pandemic	Historical
Region	(95% CI)	Weight	Events	Events
Piedmont H	0.76 (0.45, 1.29)	10.14	16/819	74/2807
Lombardy	1.20 (0.91, 1.59)	14.28	64/2254	183/8153
Veneto H	0.58 (0.34, 0.99)	9.94	15/905	87/3451
Friuli-Venezia Giulia	0.72 (0.27, 1.63)	5.66	6/261	29/835
Emilia Romagna 🖂 🛋	0.47 (0.29, 0.78)	10.52	17/937	109/3365
Tuscany I I	0.22 (0.08, 0.61)	4.86	4/754	62/2882
Lazio H	1.13 (0.73, 1.77)	11.40	23/1233	87/4818
Campania H	0.70 (0.45, 1.10)	11.34	23/1482	84/3695
Apulia La Apulia	0.87 (0.51, 1.48)	9.96	16/961	66/3345
Sicily	1.16 (0.76, 1.76)	11.91	28/1282	80/4152
Overall, DL (l <sup>2</sup> = 63.0%, p = 0.004)	0.78 (0.60, 1.01)	100.00		
.0625 1	16			
NOTE: Weights are from random-effects model				

Figure S19. Forest plot for risks of liveborn preterm birth (<37 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Adjusted analysis.

	RR	%
Region	(95% CI)	Weight
Piedmont	1.02 (0.97, 1.08)	11.84
Lombardy	0.95 (0.90, 1.02)	11.50
Veneto H	0.91 (0.85, 0.97)	11.34
Province of Trento	0.86 (0.66, 1.11)	2.71
Friuli-Venezia Giulia	1.09 (0.90, 1.31)	4.40
Emilia Romagna 🛏 🕶	0.82 (0.76, 0.89)	10.51
Tuscany	0.91 (0.86, 0.98)	11.18
Campania	1.01 (0.97, 1.06)	12.59
Apulia	1.02 (0.96, 1.08)	11.52
Sicily	1.03 (0.98, 1.08)	12.41
Overall, DL (l <sup>2</sup> = 78.6%, p = 0.000)	0.96 (0.92, 1.01)	100.00
.6666667 1	1.5	

Figure S20. Forest plot for risks of liveborn late preterm birth (32-36 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Adjusted analysis.

Region		<b>RR</b> (95% CI)	% Weight
Piedmont	<b>⊢</b> <u></u> − −	1.03 (0.97, 1.10)	11.85
Lombardy	F B	0.94 (0.88, 1.00)	11.56
Veneto	<b>⊢ ≡</b> 4	0.90 (0.84, 0.97)	11.25
Province of Trento		0.83 (0.62, 1.10)	2.62
Friuli-Venezia Giulia	⊢	1.12 (0.92, 1.37)	4.55
Emilia Romagna	<b>⊢</b> ∎_1	0.82 (0.75, 0.89)	10.38
Tuscany	F-∎ H	0.91 (0.85, 0.98)	11.21
Campania	<u>⊨</u> ∎ 1	1.02 (0.97, 1.07)	12.67
Apulia	1- <b>1</b>	1.01 (0.94, 1.08)	11.48
Sicily	H <del>a</del> I	1.04 (0.98, 1.09)	12.42
Overall, DL (l <sup>2</sup> = 77.9%, p	= 0.000)	0.96 (0.91, 1.01)	100.00
.6666	667 1 1.5		

Figure S21. Forest plot for risks of liveborn very preterm birth (<32 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Adjusted analysis.

Region		<b>RR</b> (95% CI)	% Weight
Piedmont	r-jan-r	0.97 (0.74, 1.28)	10.60
Lombardy	<b>⊢</b> ∎_1	1.09 (0.93, 1.27)	14.80
Veneto	<b>⊢_</b> ∎ •	0.79 (0.62, 1.01)	11.63
Province of Trento	L	1.11 (0.44, 2.78)	1.91
Friuli-Venezia Giulia	F 1	1.03 (0.62, 1.67)	5.27
Emilia Romagna	<b>⊢</b> ∎1	0.62 (0.48, 0.82)	10.51
Tuscany	F F	0.73 (0.54, 0.99)	9.46
Campania	<b>⊢</b> ∎ +	0.84 (0.67, 1.05)	12.08
Apulia	<b>⊢ –</b> •	1.23 (0.96, 1.57)	11.31
Sicily	<b>⊢</b>	0.97 (0.78, 1.20)	12.44
Overall, DL (l <sup>2</sup> = 59.7%,	p = 0.008)	0.91 (0.79, 1.04)	100.00
	.5 1	2	

Figure S22. Forest plot for risks of liveborn extremely preterm birth (<28 weeks' gestational age) in pandemic vs historical period in the studied Regions, multiple pregnancies. Adjusted analysis.



Figure S23. Comparison of observed preterm birth (<37 weeks' gestational age) monthly percentages (solid line) with those expected under a seasonally adjusted model estimated using data until February 2020 (dashed line: a counterfactual scenario of no change from March 2020). All observed points except 1 are below expected points, with a large drop in September-December 2020.



Figure S24. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn late preterm births (32-36 weeks' gestational age) over total births. Time starts at January 1<sup>st</sup> 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.



Figure S25. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn very preterm births (<32 weeks' gestational age) over total births. Time starts at January 1<sup>st</sup> 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.



Figure S26. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn extremely preterm births (<28 weeks' gestational age) over total births. Time starts at January 1st 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.



Figure S27. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn preterm births (<37 weeks' gestational age) over total births in singleton pregnancies. Time starts at January 1<sup>st</sup> 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.



Figure S28. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn late preterm births (32-36 weeks' gestational age) over total births in singleton pregnancies. Time starts at January 1<sup>st</sup> 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.



Figure S29. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn very preterm births (<32 weeks' gestational age) over total births in singleton pregnancies. Time starts at January 1<sup>st</sup> 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.



Figure S30. Interrupted time series regression. Each dot represents the average monthly percentage of liveborn extremely preterm births (<28 weeks' gestational age) over total births in singleton pregnancies. Time starts at January 1<sup>st</sup> 2017. Solid line: predicted trend based on the seasonally adjusted regression model. Dashed line: de-seasonalized trend.

