

## Erratum to: Effects of codeine on pregnancy outcome: results from a large population-based cohort study

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Published online: 24 October 2012  
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### Erratum to: Eur J Clin Pharmacol DOI 10.1007/s00228-011-1069-5

We would like to bring your attention to an error in the article “The effects of codeine on pregnancy outcome: results from a large population-based cohort study” published in Eur J Clin Pharmacology volume 67, year 2011, pages 1253–1261. The error was purely technical and led to some double counting and misclassification.

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The online version of the original article can be found at <http://dx.doi.org/10.1007/s00228-011-1069-5>.

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We found one new statistically significant pregnancy outcome (atonic uterus) related to codeine exposure as shown in the tables below. This relationship was borderline significant in the old analysis (lower limit of the confidence interval 1.0). The outcome is directly biologically linked to postpartum hemorrhage, which was found to be significantly associated with codeine both in the previous analysis and in the new one. Otherwise, the odds ratios remained virtually unaltered as did the maternal socio-demographic and medical characteristics. No significant differences were found in the survival rate [adjusted odds ratio (OR) 0.9, 95 % confidence interval (CI) 0.6–1.5] or the congenital malformation rate (adjusted OR 0.9, 95 % CI 0.7–1.2) between codeine-exposed and unexposed infants. Codeine use anytime during pregnancy was associated with planned Cesarean delivery (adjusted OR 1.6, 95 % CI 1.3–2.0;  $P < 0.0001$ ) and atonic uterus (adjusted OR 1.4, 95 % CI 1.1–1.8;  $P < 0.0001$ ). Third trimester use was associated with acute Cesarean delivery (adjusted OR 1.6, 95 % CI 1.2–2.2;  $P < 0.0001$ ) and postpartum hemorrhage (adjusted OR 1.4, 95 % CI 1.1–1.7;  $P < 0.0001$ ). No significant associations with other adverse pregnancy outcomes were found.

In conclusion, no effects of maternal codeine intake during pregnancy were observed on infant survival or congenital malformation rate. Our findings are reassuring; however, the association with acute Cesarean delivery, atonic uterus, and postpartum hemorrhage may justify a certain level of caution when administering codeine toward the end of pregnancy.

We sincerely hope that our error can be rectified.

With kind regards,  
Kateřina Nezvalová-Henriksen

Old Table 4. Statistically significant outcomes are highlighted in yellow

**Table 4** Adjusted odds ratios (OR) for pregnancy outcome in women who used codeine during pregnancy compared with the unexposed control group

Pregnancy outcome	Women who used codeine during pregnancy (The exposed group)												Women who did not use opioids during pregnancy (The unexposed group)					
	Use during pregnancy (total)				Use during the first trimester (gestational weeks 0 to 12)			Use during the second trimester (gestational weeks 13 to 28)			Use during the third trimester (gestational week 29 until delivery)							
	No.	% of n	OR	95%CI	No.	% of n	OR	95%CI	No.	% of n	OR	95%CI			No.	% of n		
<b>Congenital malformations detected at birth</b>																		
<i>Any</i>	130	4.9%	0.9	0.8–1.1	77	4.5%	0.9	0.7–1.1	91	4.7%	0.9	0.7–1.1	67	5.3%	1.0	0.7–1.3	3,247	5.0%
<i>Major</i>	77	2.9%	0.9	0.7–1.2	40	2.4%	0.8	0.5–1.1	50	2.6%	0.8	0.6–1.1	45	3.6%	1.1	0.8–1.6	1,904	2.9%
<b>Survival (live birth)</b>	2,649	99.4%	0.9	0.6–1.5	1,677	99.1%	0.6	0.4–1.0	1,939	99.2%	0.7	0.4–1.2	1,252	99.8%	2.4	0.7–7.5	64,797	99.2%
<b>Birth weight &lt; 2500g</b>	124	4.7%	1.1	0.9–1.3	78	4.6%	1.1	0.8–1.4	94	4.8%	1.1	0.9–1.4	63	5.0%	1.1	0.8–1.5	2,579	3.9%
<b>Gestational age &lt; 37 weeks</b>	209	7.8%	1.1	0.9–1.3	132	7.8%	1.1	0.9–1.4	151	7.7%	1.1	0.9–1.3	106	8.4%	1.2	0.9–1.5	3,910	6.0%
<b>Apgar score</b>																		
<b>&lt; 7 at 1 min</b>	183	6.9%	1.2	1.0–1.5	118	7.0%	1.3	1.0–1.6	131	6.7%	1.2	1.0–1.5	83	6.6%	1.2	0.9–1.6	3,506	5.4%
<b>&lt; 7 at 5 min</b>	44	1.7%	1.3	0.9–1.9	33	1.9%	1.6	1.0–2.6	35	1.8%	1.5	0.9–2.3	15	1.2%	1.0	0.5–1.8	875	1.3%
<b>Neonatal respiratory depression</b>	131	4.9%	1.0	0.9–1.3	76	4.5%	0.9	0.7–1.2	88	4.5%	0.9	0.7–1.1	65	5.2%	1.1	0.8–1.4	2,706	4.1%
<b>Hypoglycemia</b>	72	2.7%	1.1	0.8–1.4	45	2.7%	1.0	0.7–1.4	50	2.6%	1.0	0.7–1.4	41	3.3%	1.2	0.9–1.7	1,415	2.2%
<b>Newborn admitted to intensive care unit</b>																		
<b>cesarean delivery (acute)</b>	340	12.8%	1.3	1.1–1.5	191	11.3%	1.1	0.9–1.3	223	11.4%	1.1	0.9–1.3	189	15.1%	1.5	1.3–1.8	5,834	8.9%
<b>cesarean delivery (planned)</b>	198	7.4%	1.4	1.2–1.7	124	7.3%	1.4	1.1–1.7	147	7.5%	1.5	1.2–1.8	112	8.9%	1.6	1.3–2.0	3,265	5.0%
<b>Atonic uterus</b>	137	5.1%	1.2	1.0–1.5	88	5.2%	1.3	1.0–1.6	97	5.0%	1.2	1.0–1.5	69	5.5%	1.3	1.0–1.7	2,808	4.3%
<b>Prolonged labor<sup>†</sup></b>	217	8.1%	1.1	0.9–1.2	128	7.6%	1.0	0.8–1.2	149	7.6%	1.0	0.9–1.2	99	7.9%	1.0	0.8–1.2	4,542	7.0%
<b>Postpartum hemorrhage<sup>‡</sup></b>	489	18.3%	1.2	1.1–1.4	301	17.8%	1.2	1.1–1.4	344	17.5%	1.2	1.0–1.4	255	20.3%	1.3	1.1–1.5	9,488	14.5%

\*Pearson’s  $\chi^2$  test  $P < 0.0001$

<sup>†</sup>Labor lasting > 18 h

<sup>‡</sup>Hemorrhage > 500 ml

New Table 4. Statistically significant outcomes are highlighted in yellow. Frames indicate associations that were not statistically significant in the old analysis

**Table 4** Adjusted odds ratios (OR) for pregnancy outcome in women who used codeine during pregnancy compared with the unexposed control group

Pregnancy outcome	Women who used codeine during pregnancy (The exposed group)												Women who did not use opioids during pregnancy (The unexposed group)					
	Use during pregnancy (total)				Use during the first trimester (gestational weeks 0 to 12)			Use during the second trimester (gestational weeks 13 to 28)			Use during the third trimester (gestational week 29 until delivery)							
	No.	% of n	OR	95%CI	No.	% of n	OR	95%CI	No.	% of n	OR	95%CI			No.	% of n		
<b>Congenital malformations detected at birth</b>																		
<i>Any</i>	73	5.0%	0.9	0.7–1.2	29	4.6%	0.9	0.6–1.4	35	5.2%	1.0	0.7–1.4	23	4.9%	0.8	0.5–1.3	3,387	5.0%
<i>Major</i>	43	3.0%	0.9	0.7–1.3	16	2.6%	0.8	0.5–1.4	20	3.0%	1.0	0.7–1.7	17	3.6%	1.1	0.6–1.8	1,995	3.0%
<b>Survival (live birth)</b>	1,436	99.1%	0.7	0.4–1.1	619	98.7%	0.4	0.1–2.7	671	99.1%	0.6	0.3–1.4	466	99.6%	1.3	0.3–5.4	66,933	99.2%
<b>Birth weight &lt; 2500g</b>	72	5.0%	1.1	0.9–1.5	30	4.8%	1.1	0.8–1.7	35	5.2%	1.3	0.9–1.9	32	6.8%	1.5	1.0–1.2	2,698	4.0%
<b>Gestational age &lt; 37 weeks</b>	115	7.9%	1.0	0.8–1.3	49	7.8%	1.3	0.9–1.8	52	7.7%	1.0	0.7–1.4	48	10.3%	1.3	0.9–1.9	4,090	6.1%
<b>Apgar score</b>																		
<b>&lt; 7 at 1 min</b>	90	6.2%	1.1	0.9–1.5	41	6.5%	1.4	0.9–2.0	38	5.6%	0.9	0.6–1.4	31	6.6%	1.3	0.8–2.0	3,665	5.4%
<b>&lt; 7 at 5 min</b>	25	1.7%	1.2	0.7–2.1	15	2.4%	2.1	1.0–4.2	8	1.2%	0.7	0.2–1.9	6	1.3%	1.3	0.5–3.2	912	1.4%
<b>Neonatal respiratory depression</b>	66	4.6%	0.9	0.7–1.2	26	4.1%	0.9	0.6–1.4	32	4.7%	0.9	0.6–1.3	22	4.7%	0.8	0.5–1.3	2,828	4.2%
<b>Hypoglycemia</b>	41	2.8%	1.1	0.8–1.5	21	3.3%	1.3	0.8–2.1	22	3.2%	1.3	0.8–2.0	21	4.5%	1.6	1.0–2.6	1,473	2.2%
<b>Newborn admitted to intensive care unit</b>																		
<b>cesarean delivery (acute)</b>	171	11.8%	1.3	1.1–1.6	67	10.7%	1.3	1.0–1.7	74	10.9%	1.2	1.0–1.6	65	13.9%	1.6	1.2–2.2	6,156	9.1%
<b>cesarean delivery (planned)</b>	115	7.9%	1.6	1.3–2.0	43	6.9%	1.5	1.1–2.5	68	10.0%	2.0	1.5–2.7	39	8.3%	1.5	1.1–2.2	3,413	5.1%
<b>Atonic uterus</b>	77	5.3%	1.4	1.1–1.8	35	5.6%	1.5	1.1–2.2	39	5.8%	1.6	1.1–2.2	31	6.6%	1.6	1.1–2.4	2,905	4.3%
<b>Prolonged labor<sup>†</sup></b>	99	6.8%	0.9	0.7–1.1	38	6.1%	0.8	0.6–1.2	47	6.9%	0.9	0.7–1.3	26	5.6%	0.7	0.5–1.1	4,736	7.0%
<b>Postpartum hemorrhage<sup>‡</sup></b>	269	18.6%	1.3	1.1–1.5	128	20.4%	1.6	1.3–1.9	117	17.3%	1.2	1.0–1.5	98	20.9%	1.4	1.1–1.7	9,861	14.6%

\*Pearson’s  $\chi^2$  test  $P < 0.0001$

<sup>†</sup>Labor lasting > 18 h

<sup>‡</sup>Hemorrhage > 500 ml