Bijlage 1. Evidence en Risk of Bias tabellen behorende bij de module 'Timing van decision-to-delivery bij ongeplande sectio's' (Beoordeeld: 23-04-2018)

Evidence tabellen

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
Huissoud, 2010	Type of study: Prospective observational study Setting: Multi-center study Country: France Source of funding: Not mentioned	Inclusion criteria: - Woman where the obstetrician or the midwife decided that a caesarean section was indicated. Exclusion criteria: None mentioned. Urgent CS DDI <30 versus >30 N total at baseline: Intervention: 81 Control: 284 Important prognostic factors[2]: *Gestational age [IQR]:* *I: 40 [38-41]* *C: 40 [39-41]* *Neonatal weight (median, IQR):* *I:3235 [2893 – 3542]* *C: 3285 [2857 – 3670]* Exclusion criteria: None mentioned. Very urgent CS DDI <15 versus >15 N total at baseline: Intervention: 15 Control: 64 Important prognostic factors[2]:	Describe intervention (treatment/procedure/test): Urgent CS DDI <30 Very urgent CS DDI <15	Describe control (treatment/procedure/test): Urgent CS DDI >30 Very urgent CS DDI >15	Length of follow-up: Not mentioned Loss-to-follow-up: Not mentioned Incomplete outcome data: Not mentioned	Outcome measures and effect size (include 95%CI and p-value if available): Urgent CS DDI <30 versus >30 **pH <7** I: 1/39 C: 0/74 **Neonatal death** I: 0 / 81 C: 1/284 Very urgent CS DDI <15 versus >15 **pH <7** I: 1/18 C: 3/23 **Neonatal death** I: 1 / 18 C: 3/64	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
		Gestational age [IQR]: *I: 40 [38-41]* *C: 40 [39-41]* *Neonatal weight (median, IQR):* *I:3235 [2893 – 3542]* *C: 3285 [2857 – 3670]*					
Pearson, 2011	Type of study: Prospective observational cohort study Setting: Single center Country: UK Source of funding: No funding source	Inclusion criteria: - Woman where the obstetrician or the midwife decided that a caesarean section was indicated. Exclusion criteria: Not mentioned CS DDI <30 versus >30 - 75 N total at baseline: Intervention: 127 Control: 250	Describe intervention (treatment/procedure/test): CS DDI <30	Describe control (treatment/procedure/test): CS DDI >30 - 75	Length of follow-up: 3 years Loss-to-follow-up: Not mentioned Incomplete outcome data: Not mentioned	Outcome measures and effect size (include 95%CI and p-value if available): **pH <7.10** I:11/127 C: 9/250 **(5:00 min Apgar score <7)** I: 12/127 C: 10/250	
Evidence-table from the NICE guidance Caeserean section, 2011							
	Study details	Participants	Interventions	Methods	Outcome and results	Comments	
Nasrallah, 2004	**Full citation** Nasrallah,F.K., Harirah,H.M., Vadhera,R., Jain,V., Franklin,L.T., Hankins,G.D., The 30-minute decision-to-incision interval for emergency cesarean delivery: fact or fiction?, American Journal of Perinatology, 21, 63-68, 2004 **Ref ID** 92469 **Country/ies where the study**	**Sample size** Total: n = 111 Group I (had skin incision undertaken ≤30 minutes [median = 16 mins, range = 5 to 30 minutes]): n = 83 Group II (had skin incision undertaken >30 minutes [median = 38 mins, range = 5 to 57 minutes]): n = 28 **Characteristics** There were no statistically significant differences	The study was conducted at a tertiary hospital and data was retrospectively collected from women's medical notes. Subjects were identified and categorized into two groups: Group I = decision to incision (D-I) ≤30 min Group II = decision to incision (D-I) >30 min No statistically significant differences were observed between the two groups in maternal age,	The indication for ECD included: no reassuring fetal heart rate patterns, placental abruption, cord prolapse, bleeding placenta praevia, and suspected uterine rupture. The timing of the decision to perform caesarean section,	Time intervals (min) between the two groups = median (range) Group I = decision to incision (D-I) = 16 (5 - 30) Group II = decision to incision (D-I) = 38 (31 - 57) Group I = decision to operating room interval = 6 (2 - 22) Group II = decision to operating room interval = 16 (5 - 30) Group I = operating room to	**Limitations** n = 50/83 (60%) in group I had general anaesthesia compared to n = 2/28 (7%) in group II **Other information**	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	was carried out USA **Study type** Retrospective cohort study **Aim of the study** To identify whether a 30 minute interval has an impact on neonatal and maternal outcome in cases of emergent caesarean delivery (ECD) Study dates January 1999 to December 2001 **Source of funding**	between the two groups in maternal age, parity, weight or gestational age at delivery. Inclusion criteria All women with singleton gestations between 32 and 42 weeks who underwent emergency CS during the study period Exclusion criteria Not reported	parity, weight or gestational age at delivery. In group I there were 10 women with the history of a prior CS compared with 0 in group II. 108/111 were performed through transverse incisions of the lower uterine segment. General anaesthesia was performed more in group I (50/83 [60%]) than group II (2/28 [7%]), p <0.001	presence of the patient in the operating room, skin incision and type of anaesthesia were obtained from the nursing and operating room records.	incision interval (D-I) = 8 (2 - 26) Group I = operating room to incision interval (D-I) = 16 (7 - 44) Maternal outcomes Estimated blood loss (ml) Group I (n = 83) = 1000 (500 - 3500) Group II (n = 28) = 950 (800 -1700) p = ns Blood transfusion n (%) Group I (n = 83) = 6 (7%) Group II (n = 28) = 0 (0%) p = ns Surgical injuries n (%) Group I (n = 83) = 10 (12%) Group II (n = 28) = 1 (4%) p = ns Uterine rupture n (%) Group I (n = 83) = 5 (6%) Group II (n = 28) = 0 (0%) p = ns Caesarean hysterectomy n (%) Group I (n = 83) = 2 (2.5%) Group II (n = 28) = 0 (0%) p = ns Neonatal outcomes Apgar score at 1 min ≤3 n (%) Group I (n = 83) = 11 (13%) Group II (n = 28) = 1 (3.6%) p = ns		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					Apgar score at 1 min 4-6 n (%) Group I (n = 83)= 22 (27%) Group II (n = 28) = 2 (7%) p = ns Apgar score at 1 min ≥7 n (%) Group I (n = 83)= 50 (60%) Group II (n = 28) = 25 (89.4%) p = 0.009 Apgar score at 5 min <7 n (%) Group I (n = 83) = 8 (9.5%) Group II (n = 28) = 1 (3.6%) p = ns Apgar score at 5 min ≥7 n (%) Group I (n = 83)= 75 (90.5%) Group II (n = 28) = 2 (96.4%) p = ns Apgar score at 10 min <7 n (%) Group I (n = 83) n = 2 Group II (n = 28) n = not reported Apgar score at 10 min ≥7 n (%) Group I (n = 83) n = 3 Group II (n = 28) n = not reported Umbilical cord venous pH ≥ 7.20 n (%) Group I (n = 83) = 69 (83%) Group II (n = 28) = 25 (89%) p = ns		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					Umbilical cord venous pH 7.17 - 7.00 n (%) Group I (n = 83)= 10 (12%) Group II (n = 28) = 3 (11%) p = ns Umbilical cord venous pH < 7.00 n (%) Group I (n = 83) = 4 (5%) Group II (n = 28) = 0 (0%) p = ns Umbilical cord arterial pH ≥7.20 n (%) Group I (n = 83) = 60 (72%) Group II (n = 28) = 20 (71%) p = ns Umbilical cord arterial pH 7.17 - 7.00 n (%) Group I (n = 83) = 18 (22%) Group II (n = 28) = 8 (29%) p = ns Umbilical cord arterial pH <7.00 n (%) Group I (n = 83) = 5 (6%) Group II (n = 28) = 0 (0%) p = ns Seizures n (%) Group I (n = 83) = 4 (5%) Group II (n = 28) = 0 (0%) p = ns Encephalopathy n (%) Group I (n = 83) = 5 (6%) Group II (n = 28) = 0 (0%) p = ns		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					Admission to NICU n (%) Group I (n = 83) = 21 (25%) Group II (n = 28) = 6 (21%) p = ns NICU stay [days median (range)] Group I (n = 83) = 13 (1 - 40) Group II (n = 28) = 9 (3 - 35) p = ns		
Kolas, 2006	**Full citation** Kolas,T., Hofoss,D., Oian,P., Predictions for the decision-to-delivery interval for emergency cesarean sections in Norway, Acta Obstetricia et Gynecologica Scandinavica, 85, 561-566, 2006 **Ref ID** 92419 **Country/ies where the study was carried out** Norway **Study type** Prospective cohort study **Aim of the study** To identify factors that influence the decision to delivery intervals in emergency caesarean sections. **Study dates** 1st December 1998 to 1st July 1999	**Sample size** n = 1,511 emergency caesarean sections (n = 1,297 acute, n = 214 urgent) **Characteristics** Women in the two groups (acute and urgent) were comparable in age, BMI, parity and also in neonatal birth weight and gestational age. **Inclusion criteria** All women with emergency CS **Exclusion criteria** Not reported	Prospective registration of all emergency caesareans was provided by 24 maternity units (18 level 2 with 400 - 1500 delivery per year and 6 level 3 units with >1500 delivery per year) during the study period. 1,767 emergency singleton caesarean section were registered. However, in 256 cases information about DDI was not provided; therefore n = 1,511 emergency caesarean section included. Data for the study was obtained from the Medical Birth Registry of Norway (MBRN) that routinely collects information about all deliveries.	A registration form was designed for the study. The form gave detailed information about medical and obstetric history, complications during the pregnancy, the operation, and perinatal events. The clinicians filled in the form for every emergency caesarean section done and the MBRN entered the information into the database. The clinician that reported the data was directly involved in the decision making process for the emergency operation.	Decision to delivery intervals (DDI) related to NICU admission Total number of cases n = 1,480 (Preterm n = 284 Term n = 1,200) Transfers to NICU (preterm) : ALL = 85.8 % DDI <15 min (total cases n = 39/41) = 97.4 % DDI 16 - 30 min (total cases n = 38/54) = 84.3% DDI 31 - 60 min (total cases n = 70/86) = 82.9% DDI >60 min (total cases n = 86/103) = 84.3% p = ns Transfers to NICU (term ≥37 weeks) total n = 1200 : ALL: 21.9 % DDI <15 min (total cases n = 70/242) = 29.0 % DDI 16-30 min (total cases n = 87/382) = 23.4% DDI 31 - 60 min (total cases n = 75/394) = 19.3% DDI >60 min (total cases n = 27/182) = 15.5% p <0.01	**Limitations** **Other information** All CS performed <8 hours after the decision for operation were classified as emergency. Emergency sections were divided into acute (those that were performed as quickly as possible after decision was made), and urgent (the decision triggered a set of particularly speedy preparation procedures)	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	Source of funding Not reported			Women in the two groups (acute and urgent) were comparable in age, BMI, parity and also in neonatal birth weight and gestational age. For each caesarean section, the clinicians specified the indication by ticking a list of 31 pre-specified indications. Fetal distress, abruptio placentae and umbilical cord prolapse were statistically significantly higher than any other indication listed in the form.	Apgar score at 5 min <7 (preterm) n = 284 ALL = 11.2 % DDI <15 min (total cases n = 10/41) = 25.6% DDI 16-30 min (total cases n = 7/54) = 13.0% DDI 31 - 60 min (total cases n = 7/86) = 8.4% DDI >60 min (total cases n = 7/103) = 7.0% p <0.01 Apgar score at 5 min <7 (term) ALL: 5.8% DDI <15 min (total cases n = 26/242) = 11.0 % DDI 16-30 min (total cases n = 22/382) = 5.9 % DDI 31 - 60 min (total cases n = 39/394) = 1.0 % DDI >60 min (total cases n = 4/182) = 2.2% p <0.01 Apgar score at 5 min <4 (preterm) ALL = 1.5 % DDI <15 min (total cases n = 1/41) = 2.6 % DDI 16-30 min (total cases n = 54) = 0 DDI 31 - 60 min (total cases n = 86) = 0 DDI >60 min (total cases n = 3/103) = 3.0% p = ns Apgar score at 5 min <4 (term) ALL: 1.3% DDI <15 min (total cases n =		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					6/242) = 2.5% DDI 16-30 min (total cases n = 5/382) = 1.3% DDI 31 - 60 min (total cases n = 2/394) = 0.5% DDI >60 min (total cases n = 2/182) = 1.1% p = ns		
Thomas, 2004	**Full citation** Thomas,J., Paranjothy,S., James,D., National cross sectional survey to determine whether the decision to delivery interval is critical in emergency caesarean section, BMJ, 328, 665-, 2004 **Ref ID** 61005 **Country/ies where the study was carried out** UK **Study type** Retrospective observational Study **Aim of the study** To examinethe association between decision to delivery interval and neonatal and maternal outcomes **Study dates** 1st May 2000 to 31st July 2000	**Sample size** Grade 1) Immediate threat to the life of the woman or fetus (n = 4622) Grade 2) Maternal or fetal compromise not immediately life threatening (n = 9122) Grade 3) No maternal or fetal compromise but early delivery needed (n = 347) Total n = 17,780: ≤15 min n = 1381 16 -30 min n = 2577 31 - 45 min n = 3589 46 - 60 min n = 3261 61 - 75 min n = 1865 >75 min n = 3891 **Characteristics** Not reported **Inclusion criteria** Singletons delivered by emergency CS **Exclusion criteria** Multiple pregnancies	The data for the study was obtained from the national sentinel caesarean section audit. The audit was designed to accurately measure caesarean rates and to assess the quality of care given to women having caesarean section in England and Wales.	The decision to delivery interval is defined as the interval in minutes from the date and time of decision to carry out the caesarean section to the date and time of birth of baby Urgency of caesarean section: Grade 1) Immediate threat to the life of the woman or fetus Grade 2) Maternal or fetal compromise not immediately life threatening Grade 3) No maternal or fetal compromise but early delivery needed Grade 4) Delivery timed to suit the woman and staff	Association between decision to delivery interval and maternal and neonatal outcomes Maternal outcomes: <u>Maternal requirement for special care</u> ≤15 min n = 194 (14.1%) adjusted OR 1 16 - 30 min n = 301 (11.7%) adjusted OR 0.8 (95% CI 0.7 to 1.1) 31 - 45 min n = 361 (10.1%) adjusted OR 0.9 (95% CI 0.8 to 1.2) 46 - 60 min n = 277 (8.5%) adjusted OR 0.9 (95% CI 0.7 to 1.1) 61 - 75 min n = 197 (10.6%) adjusted OR 1.1 (95% CI 0.8 to 1.4) >75 min n = 752 (19.4%) adjusted OR 1.5 (95% CI 1.2 to 1.8) Neonatal outcomes: <u>Stillbirth</u> ≤15 min n = 11 (0.8%) adjusted OR 1 16 -30 min n = 16 (0.6%) adjusted OR 0.8 (95% CI 0.3 to 1.7)	Limitations Regression analysis was not able to control bias. Other factors associated with adverse neonatal outcome, bijvoorbeeld gestation and failed instrumental delivery, were not considered Other information Perceived urgency was classified as grade I for 26 % (n=4622), grade 2 for 51.3% (n = 9122), and grade 3 for 20.8% (n = 3689). The most common indications for emergency CS were presumed fetal compromise, intrauterine growth retardation or an abnormal cardiogram (35%), and failure to progress (32%).	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	Source of funding NICE (National Institute for Clinical Excellence)				31 - 45 min n = 5 (0.1%) adjusted OR 0.4 (95% CI 0.1 to 1.3) 46 - 60 min n = 3 (0.1%) adjusted OR 0.5 (95% CI 0.1 to 1.9) 61 - 75 min n = 4 (0.2 %) adjusted OR 1.6 (95% CI 0.5 to 5.3) >75 min n = 11 (0.3 %) adjusted OR (95% CI) <u>5 minute Apgar score <7</u> ≤15 min n = 87 (6.5%) adjusted OR 1 16 -30 min n = 139 (5.5%) adjusted OR 0.9 (95% CI 0.6 to 1.2) 31 - 45 min n = 106 (3%) adjusted OR 1 (95% CI 0.7 to 1.4) 46 - 60 min n = 71 (2.2%) adjusted OR 1.1 (95% CI 0.8 to 0.4) 61 - 75 min n = 35 (1.9%) adjusted OR 1.1 (95% CI 0.7 to 1.7) >75 min n = 116 (3.1%) adjusted OR 1.7 (95% CI 1.2 to 2.4) <u>5 minute Apgar score <4</u> ≤15 min n = 32 (2.4%) adjusted OR 1 16 -30 min n = 44 (1.7%) adjusted OR 0.8 (95% CI 0.5 to 1.3) 31 - 45 min n = 25 (0.7%) adjusted OR (0.795% CI 0.4 to 1.3) 46 - 60 min n = 23 (0.7%) adjusted OR 1.3 (95% CI 0.7 to 2.3)	Presumed fetal compromise was the primary indication (66%) with more cases with grade I urgency.	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					61 - 75 min n = 10 (0.5%) adjusted OR 1.0 (95% CI 0.4 to 2.3) >75 min n = 31 (0.8%) adjusted OR 1.4 (95% CI 0.7 to 2.5) Grade of urgency <u>Maternal requirement for special care</u> Need early delivery n = 233 (6.3%) adjusted OR 1.0 Urgent, not life threatening n = 1154 (12.7%) adjusted OR 1.6 (95% CI 1.3 to 1.9) Urgent, life threatening n = 857 (18.6%) adjusted OR 2.2 (95% CI 1.7 to 2.7) <u>Stillbirth</u> Need early delivery n = 3 (0.1%) adjusted OR 1 Urgent, not life threatening n = 6 (0.1%) adjusted OR 0.9 (95% CI 0.2 to 3.1) Urgent, life threatening n = 43 (0.9%) adjusted OR 8.3 (95% CI 1.5 to 44.7) <u>5 minute Apgar score <4</u> Need early delivery n = 3 (0.1%) adjusted OR 1 Urgent, not life threatening n = 46 (0.5%) adjusted OR 0.8		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					(95% CI 0.4 to 1.9) Urgent, life threatening n = 115 (2.6%) adjusted OR 1.6 (95% CI 0.6 to 4.0) <u>5 minute Apgar score <7</u> Need early delivery n = 31 (0.9%) adjusted OR 1 Urgent, not life threatening n = 189 (2.6%) adjusted OR 1.7 (95% CI 1.1 to 2.6) Urgent, life threatening n = 352 (7.9%) adjusted OR 2.9 (95% CI 1.8 to 4.8) *Data was adjusted for the primary indication for CS, cardiotocography findings, grade of urgency, and type of anaesthesia		
Roy, 2008	**Full citation** Roy,K.K., Baruah,J., Kumar,S., Deorari,A.K., Sharma,J.B., Karmakar,D., Cesarean section for suspected fetal distress, continuous fetal heart monitoring and decision to delivery time, Indian Journal of Pediatrics, 75, 1249-1252, 2008 **Ref ID** 60814 **Country/ies where the study was carried out** India	**Sample size** Total = 217 women **Characteristics** Not reported **Inclusion criteria** Gestational age ≥36 weeks, no fetal anomalies and non reassuring fetal heart rate pattern detected by CTG. **Exclusion criteria** Abnormal presentation Multiple pregnancy Severe intrauterine Growth	Data was collected from the women in one unit who underwent caesarean section for suspected fetal distress during labour. The DDI was the time between the decision to perform the caesarean and exact delivery time. The data obtained was analysed to correlate the non reassuring fetal heart and DDI with adverse neonatal outcome.	The cause of the fetal distress: n = 18 (8.2%) had thick meconium stained liquor n = 17 (7.8%) had two or more tight loops of cord around neck n = 11 (5.1%) women had retroplacental clot with blood stained liquor n = 171 (78.8%) had no detectable cause or effect of	Neonatal outcomes Fresh stillbirth (due to placental abruption) D-D interval ≤30 min n = 1/121 D-D interval >30 min n = nil/96 Mean birth weight D-D interval ≤30 min (n = 121) = 2850 ± 340 D-D interval >30 min (n = 96) = 2760 ± 413 p = ns Mean birth weight <2500 g D-D interval ≤30 min n = 16/121 (14.8%) D-D interval >30 min n = 11/96 (11.4%)	**Limitations** Emergency caesarean sections were not classified. No details about the characteristics of the women are reported. **Other information**	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	Study type Prospective observational Study **Aim of the study** To evaluate whether a 30 minute decision to delivery interval for emergency caesarean section influences perinatal outcome **Study dates** March 2002 to March 2007 **Source of funding** Not reported	Restriction (IUGR) Caesarean section for other primary indications		fetal distress	p = ns Apgar score <7 at 5 min D-D interval ≤30 min n = 18/121 (14.8%) D-D interval >30 min n = 15/96 (15.6%) p = ns Umbilical cord pH <7.10 D-D interval ≤30 min n = 8/121 (6.6%) D-D interval >30 min n = 5/96 (5.2%) p = ns Neonate requiring immediate ventilation D-D interval ≤30 min n = 4/121 (3.3%) D-D interval >30 min n = 96 (2.08%) p = ns Admission to NICU D-D interval ≤30 min n = 26/121 (21.4%) D-D interval >30 min n = 7/96 (7.2%) p <0.05 Indication for NICU admission Severe birth asphyxia (Apgar score <4 at 5 min) D-D interval ≤30 min n = 10/26 D-D interval >30 min n = 3/7 Moderate birth asphyxia (Apgar score <7 at 5 min) D-D interval ≤30 min n = 8/26 D-D interval >30 min n = 2/7 TTN (transient tachpynea of		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					newborn) for observation D-D interval ≤30 min n = 8/26 D-D interval >30 min n = 2/7		
Holcroft, 2005	**Full citation** Holcroft,C.J., Graham,E.M., ina-Mumuney,A., Rai,K.K., Henderson,J.L., Penning,D.H., Cord gas analysis, decision-to-delivery interval, and the 30-minute rule for emergency cesareans, Journal of Perinatology, 25, 229-235, 2005 **Ref ID** 60225 **Country/ies where the study** **was carried out** USA **Study type** Retrospective cohort study **Aim of the study** To examine the relationship between umbilical arterial gas analysis and decision to delivery interval for emergency caesareans performed for non reassuring fetal status to determine if this would validate the 30 minute rule **Study dates** September 2001 to January	**Sample size** Total n =117 Emergent n = 34 Urgent n = 83 **Characteristics** Of the 145 women who underwent a caesarean section for non reassuring fetal status, 117 met the inclusion criteria. Of the 117 women, 34 were classified as emergent and 83 as urgent There were no statistically significant differences between the two groups (emergent and urgent) in gestational age, neonatal birth weight, spinal and epidural. Women in the emergent group had more general anaesthesia compared with women in the urgent group (p = 0.003). **Inclusion criteria** All caesarean sections performed for non reassuring fetal status during the study period.	All delivery records at a single tertiary hospital from 2001 to 2003 were reviewed. The electronic FHR tracing from the hour prior to birth was obtained for each of births, and reviewed by three board-eligible or board-certified maternal - fetal medicine specialists blinded to neonatal outcomes. The reviewers then graded each case as either emergent or urgent. An emergent CS was defined as one where the reviewer wished to deliver the infant as quickly as possible. An urgent delivery was defined as one where the reviewer was willing to wait up to 30 minutes. In the event of disagreement, the cases were classified in the group that two of the three reviewers favoured. The Kappa correlation for agreement for these reviewers in classifying the cases as emergent versus urgent was 0.35, which shows fair/moderate correlation.	An emergent CS was defined as one where the reviewer wished to deliver the infant as quickly as possible. An urgent delivery was defined as one where the reviewer was willing to wait up to 30 minutes. In the event of disagreement, the cases were classified in the group that two of the three reviewers favoured. The institution used a computerized FHR monitoring system integrated with a centralised clock. Once the physician made a decision to proceed with an emergency caesarean section, the women were taken off the monitor in the labour room and brought back to	Women in emergent group had more general anaesthesia compared with women in urgent group (p = 0.003) Decision to delivery interval (min) Emergent = 23 ± 15.3 Urgent = 36.7 ± 14.9 p <0.001 Neonatal death Emergent = n = 1/34 Urgent = n = 0/83 p = 0.64 1 minute Apgar <7 Emergent = n = 15/34 (44%) Urgent = n = 27/83 (33%) p = 0.24 5 minute Apgar <7 Emergent = n = 3/34 (9%) Urgent = n= 8/83 (33%) p = 1.0 Umbilical arterial pH Emergent = 7.12 ± 0.16 Urgent = 7.22 ± 0.08 p <0.001 Umbilical arterial BE (mmol/l) Emergent = -8.8 ± 4.3 Urgent = -3.9 ± 2.4 p <0.001 Cord pH ≤7.0 Emergent = n = 6/34 (17.7%) Urgent = n= 2/83 (2.4%) p = 0.007	Limitations The decision time was designated as the time the women were taken off the monitor in the labour room Other information	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	2003 **Source of funding** Not reported	**Exclusion criteria** Non vertex presentation Chromosomal abnormalities Congenital malformations Lack of an umbilical arterial gas Those who were not monitored for at least 1 hour prior to delivery		operating room. The decision time was designated as the time the women were taken off the monitor in the labour room. The time of incision and delivery were determined from the same centralised clock as used for EFM.	Cord BE <-12.0 (mmol/l) Emergent = n = 8/34 (23.5%) Urgent = n= 1/83 (1.2%) p <0.001 Intraventricular haemorrhage Emergent = n = 2/34 (5.9%) Urgent = n= 5/83 (6.0%) p = 1.0 Linear regression of decision to delivery interval versus umbilical arterial pH and umbilical base excess A statistically significant correlation was found between increasing decision to delivery interval and marginally improved umbilical arterial pH (r = 0.22, p = 0.02) and base excess (r = 0.33, p<0.001) These correlations were not clinically significant in predicting when the fetus would develop metabolic acidosis severe enough to increase the risk of long term neurologic morbidity.		
Bloom, 2006	**Full citation** Bloom,S.L., Leveno,K.J., Spong,C.Y., Gilbert,S., Hauth,J.C., Landon,M.B., Varner,M.W., Moawad,A.H., Caritis,S.N., Harper,M., Wapner,R.J., Sorokin,Y., Miodovnik,M., O'Sullivan,M.J., Sibai,B.M., Langer,O., Gabbe,S.G.,	Sample size n = 11,481 Characteristics Maternal age (mean in years): ≥30 minutes = 25 ± 6.7 (13-46) ≤31 minutes = 26.5 ± 6.7 (13-47)	The caesarean registry was a prospective observational study, conducted between 1999 and 2002 (at the network centre composed of 13 institutions and one coordinator centre). The study was designed to assess several specific contemporary issues related to caesarean delivery. During	Emergency procedures were defined as those performed for umbilical cord prolapse, placental abruption, placenta praevia with haemorrhage,	Maternal complications associated with emergency caesarean section Postoperative endometritis (fever with abnormal uterine tenderness in the absence of another source of infection) ≥30 minutes n= 212/1,814 (11.7)	Limitations Indications for CS were very different in the two groups. 7% women in DDI <30 minutes had cord prolapse compared with 0.2% in DDI > 30 group.	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network., Decision-to-incision times and maternal and infant outcomes, Obstetrics and Gynecology, 108, 6-11, 2006 **Ref ID** 59743 **Country/ies where the study was carried out** USA **Study type** Prospective cohort study **Aim of the study** To prospectively audit decision to incision intervals in a large cohort of women undergoing caesarean section for an emergency indication at the multiple hospitals throughout the United States, in order to measure maternal and infant outcomes potentially related to the caesarean section response time **Study dates** 1999 to 2001 **Source of funding**	Race White: ≥30 minutes n= 558 (30.8%) ≤31 minutes n= 269 (27.1%) African: ≥30 minutes n= 788 (43.4%) ≤31 minutes n= 437 (44.0%) Hispanic: ≥30 minutes n= 372 (20.5%) ≤31 minutes n= 219 (22%) Asian: ≥30 minutes n= 29 (1.6%) ≤31 minutes n= 16 (1.6%) Nulliparous ≥30 minutes n= 1,115 (61.6%) ≤31 minutes n= 699 (70.5%) Education (mean years of education)	the study period (1999 - 2001) data was collected on all women undergoing a caesarean section at the participating centres. Data from 13 centres was transmitted weekly by telecommunications link to the data coordinating centre at the George Washington University Biostatistics Centre where they were edited for missing, out of range, and inconsistent values. The edited report was then transmitted to each centre for correction or clarification	non reassuring fetal heart rate pattern, or uterine rupture. Detailed information regarding medical and obstetrical history was extracted directly from maternal and infant charts by a specially trained and certified research nurse. The intervals between the point of decision to perform caesarean to the actual skin incision were calculated by a trained research nurses. The decision time was determined from either the physician's or nurse's progress notes and if notes were not available, the time the women was prepped was used as a substitute. The	≤31 minutes n= 129/994 (13.0) p = 0.32 Wound complication ≥30 minutes n= 23/1,814 (1.3) ≤31 minutes n= 9/994 (0.9) p = 0.39 Cystotomy ≥30 minutes n= 2/1,814 (0.1) ≤31 minutes n= 3/994 (0.3) p = 0.35 Bowel laceration ≥30 minutes n= 1/1,814 (0.1) ≤31 minutes n= 1/994 (0.1) p = 1.00 Ureteral injury ≥30 minutes n= 2/1,814 (0.1) ≤31 minutes n= 1/994 (0.1) p = 1.00 Infant outcomes associated with emergency caesarean section Neonatal Death With no malformation ≥30 minutes n= 7/1,814 (0.4) ≤31 minutes n= 1/994 (0.1) p = 0.27 With malformation ≥30 minutes n= 8/1,814 (0.4) ≤31 minutes n= 3/994 (0.3) p = 0.76 Fetal death in labour ≥30 minutes n= 3/1,814 (0.2) ≤31 minutes n= 0/994 (0) p = 0.31	Other information Emergency caesarean sections were defined to include those performed for umbilical cord prolapse, placental abruption, placenta praevia, haemorrhage, non reassuring fetal heart rate patterns, or uterine rupture There were no significant differences between the two groups (≥30) and (≤31 min) in maternal age, race, parity, education and proportion who received antenatal care Indication for CS <30 min n = 1814 : Non reassuring FHR n = 1647 Cord prolapse n = 128 Placenta abruption n = 34 Placenta praevia n = 34	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	Supported by grants from the National Institute of Child Health and Human Development	≥30 minutes = 11.7 ± 2.9 ≤31 minutes n= 12.2 ± 2.7 Received antenatal care ≥30 minutes n= 1,778 (98%) ≤31 minutes n= 968 (97.4%) Inclusion criteria Women who gave birth to a singleton infant weighting 2,500 g or more by primary caesarean, and women who were in active labour, defined as reaching a minimum of 4 cm cervical dilatation (to ensure that all women studied had their emergency event occur in a labour and delivery unit) Exclusion criteria Not reported		skin incision times were determined from intra operative records.	Hypoxic ischaemic encephalopathy ≥30 minutes n= 12/1,814 (0.7) ≤31 minutes n= 5/994 (0.5) p = 0.61 Umbilical cord pH <7* ≥30 minutes n= 52/1,814 (4.8) ≤31 minutes n= 9/994 (1.6) p = 0.001 * Umbilical artery pH was missing for 41% of the infants Intubation in delivery room ≥30 minutes n= 56/1,814 (3.1) ≤31 minutes n= 13/994 (1.3) p = 0.004 CPR ≥30 minutes n= 32/1,814 (1.8) ≤31 minutes n= 13/994 (1.2) p = 0.26 5 minute Apgar score ≥3 ≥30 minutes n= 18/1,814 (1.0) ≤31 minutes n= 9/994 (0.9) p = 0.82	Uterine rupture n = 1 Indication for CS <30 min n= 994 : Non reassuring FHR n = 991 Cord prolapse n = 2 Placenta abruption n = 1 Placenta praevia n = 0 Uterine rupture n = 0	
Hillemanns, 2003	**Full citation** Hillemanns,P., Hasbargen,U., Strauss,A., Schulze,A., Genzel-Boroviczeny,O., Hepp,H., Maternal and neonatal morbidity of	Sample size Total n = 218 Cases n= 109 Control n = 109 Additional Control (Bavarian registry) n = 1,095,722	Subjects eligible for the study were identified from the central delivery book between 1997 and 1998. All emergency caesarean sections were identified as cases. Controls were matched for gestational	The study was conducted at the University Hospital Munich-Grosshadern (a level	Maternal outcomes Change in haemoglobin (mean ± SD) Emergency CS = 3.6 ± 1.8 Control group = 3.1 ± 1.6 p = 0.05	Limitations The control group consisted of women who underwent intrapartum non-emergency	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	emergency caesarean sections with a decision-to-delivery interval under 30 minutes: Evidence from 10 years, Archives of Gynecology and Obstetrics, 268, 136-141, 2003 **Ref ID** 57811 **Country/ies where the study was carried out** Germany **Study type** Retrospective cohort study **Aim of the study** To investigate the decision to delivery interval for emergency caesarean section and to compare the preoperative maternal and neonatal morbidity to that of intrapartum non-emergency caesarean section **Study dates** 1997 to 1998 **Source of funding** Not reported	Characteristics No statistically significant differences were observed between the cases and control groups in maternal age, parity, gestational age, smoking during pregnancy and previous CS. The gravidity was higher in control than in cases (p ≤.001) Obstetric characteristic: No statistically significant differences were observed between the case and control groups in preterm labour, PROM, preeclampsia, IUGR, twin gestation, gestational diabetes and fetal malformation. Oligo hydraminous were more common in cases (p ≤.05) and gestational diabetes was more common in controls (p ≤.05) Inclusion criteria Cases = All women with emergency caesarean sections Controls = Women who	age from women who underwent intrapartum non emergency caesarean section due to failure to progress, preeclampsia, malpresentation and other reasons. A second control group of women who had delivered in the state of Bavaria during the study period was selected from the Bavarian perinatal registry. Data was collected by reviewing the labour, delivery and anaesthesia and neonatal records. Caesarean section was defined as an emergency if severe fetal distress or clinical maternal condition were presented and required immediate caesarean section in the delivery room, referred to as 'crash' aesarean sections (cord prolapse, placenta abruption, severe bradycardia etc) If the decision for caesarean section was made during labour as a result of fetal distress, failing labour or maternal reasons it was classified as intrapartum non-emergent caesarean section. For the emergency caesarean sections, the decision to delivery time was defined as the time interval from the decision to perform	3 hospital with total of 14,706 deliveries during the study interval)	Blood transfusion Emergency CS n = 11/109 (10.1%) Control group n= 1/109 (0.9%) p ≤0.05 Perioperative morbidity Emergency CS n = 18/109 (16.5%) Control group n= 12/109 (11.0%) p = ns Uterine / bladder laceration Emergency CS n = 7/109 (6.4%) Control group n= 8/109 (7.4%) p = ns Postpartum haemorrhage Emergency CS n = 2/109 (1.8%) Control group n= 1/109 (0.9%) p = ns Postpartum morbidity Emergency CS n = 17/109 (15.6%) Control group n= 16/109 (14.7%) p = ns Intensive care unit Emergency CS n = 11/109 (10.1%) Control group n= 5/109 (4.6%) p = ns Standard ferbrile morbidity	caesarean section due to failure to progress, preeclampsia, malpresentation and other reasons Other information The leading indications for emergency CS were: - Abnormal fetal heart (91%) - Prolapsed cord (21%) - Placental abruption (20%) - No reason could be identified from the records (26.6%) Failure to progress, malpresentation and amnionitis/chrionitis were the main indications for CS in the control group	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
		underwent intrapartum non emergency caesarean section due to failure to progress, preeclampsia, malpresentation and other reasons. Exclusion criteria Not reported	caesarean section until delivery. All emergency CS were performed in delivery rooms		Emergency CS n = 8/109 (7.3%) Control group n= 6/109 (5.5%) p = ns Endometritis Emergency CS n = 3/109 (2.8%) Control group n= 2/109 (1.8%) p = ns Wound infection Emergency CS n = 1/109 (0.9%) Control group n= 5/109 (4.6%) p =ns Urinary tract infection Emergency CS n = 3/109 (2.8%) Control group n= 2/109 (1.8%) p =ns Neonatal outcomes Birth weight (mean ± SD) Emergency CS = 2,292 ± 1,025 Control group = 2,328 ± 1,013 p = ns Apgar score <7 after 5 min Emergency CS n = 21/124 (16.9%) Control group n = 9/124 (7.3%) p ≤0.05 Apgar score at 1 min (mean		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					± SD) Emergency CS = 5.7 ± 2.8 Control group = 7.1 ± 2.3 p ≤0.001 Apgar score at 5 min (mean ± SD) Emergency CS = 8.2 ± 1.9 Control group = 8.8 ± 1.6 p ≤0.01 Apgar score at 10 min (mean ± SD) Emergency CS = 8.8 ± 1.5 Control group = 9.3 ± 1.0 p ≤0.01 Arterial cord pH (mean ± SD) Emergency CS = 7.18 ± 0.15 Control group = 7.29 ± 0.07 p ≤0.001 pH <7.10 Emergency CS n = 34/124 (29.3%) Control group n = 2/124 (1.6%) p ≤0.001 pH <7.00 Emergency CS n = 10/124 (8.6%) Control group n = 0/124 (0%) p ≤0.001 Perinatal mortality Emergency CS n = 7/124 (5.6%) Control group n = 3/124		

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
					(2.4%) Bavarian registry n = (0.6%) *p ≤0.05 *compared with Bavarian registry (n = 1,100,995) NICU admission Emergency CS n = 74/124 (59.7%) Control group n = 65/124 (52.4%) Bavarian registry n = (4.2%) *p ≤0.001 *compared with Bavarian registry (n = 1,100,995)		
Chauleur, 2009	**Full citation** Chauleur,C., Collet,F., Furtos,C., Nourrissat,A., Seffert,P., Chauvin,F., Identification of factors influencing the decision-to-delivery interval in emergency caesarean sections, Gynecologic and Obstetric Investigation, 68, 248-254, 2009 **Ref ID** 92326 **Country/ies where the study** **was carried out** France **Study type** Retrospective cohort study **Aim of the study** To investigate decision to	**Sample size** Total n = 68 women with emergency caesarean section (EmCS) Class 1 (Extremely urgent CS) + Class 2 (Urgent CS) n = 34 Class 3 (Non urgent CS) n =34 Neonatal outcomes were reviewed for 71 babies (3 twins) **Characteristics** Univariate analysis of DDI of 68 CS: There were no statistically significant differences	Data for the study was collected from a clinical audit which was carried out in Saint-Etienne University Hospital. All emergency caesarean sections performed during the study period were included.	All files concerning an emergency CS performed during the study period were reviewed, and 68 women were identified for study inclusion. Class 1 and class 2 CS were combined in one group (n = 34) and the remaining 34 women were classified as class 3 CS.	Apgar score total n =70 DDI >30 min: <7 = n = 2 (0.04%) ≥7 = n = 43 (0.96%) DDI <30 min: <= n = 0(0%) ≥7 = n = 25 (100%) p = 0.53 Lactates n =54 DDI >30 min: <6 = n = 31 (0.89%) ≥6 = n = 4 (0.11%) DDI <30 min: <6 = n = 15 (0.79%) ≥6 = n = 4 (0.21%) p = 0.43 pH	**Limitations** No definition for DDI given Indication for CS not specified **Other information** The classification of the CS was retrospectively done by 3 obstetricians who were among the authors of this article. Three classes of CS were defined as: Extremely urgent = class 1 - imminent threat to life (extraction of infant within	

Study reference	Study characteristics	Patient characteristics [2]	Intervention (I)	Comparison / control (C) [3]	Follow-up	Outcome measures and effect size [4]	Comments
	delivery intervals with regard to the compliance with the recommended intervals and their influencing factors **Study dates** 1st September to 1st November 2007 **Source of funding** The study was supported by the University Hospital of Saint Etienne, Saint-Etienne (France)	observed in decision to delivery interval (min) with regards to maternal gravidity (1 and >1), parity (1 and >1), gestational age at delivery (≤36 weeks and >36) and outside standard working hours (yes and no). Women who were hospitalised in the pathological pregnancy unit had longer DDI compared with women who were in the labour ward on the same hospital floor (p = 0.03) **Inclusion criteria** All emergency caesarean sections performed during the study period **Exclusion criteria** Not reported			DDI >30 min: ≤7.10 = n = 1 (0.03%) >7.10 = n = 36 (0.97%) DDI <30 min: ≤7.10 = n = 2 (0.11%) >7.10 = n = 17 (0.89%) p = 0.26 Paediatric reanimation DDI >30 min: No = n = 27(0.59%) Yes = n = 19 (0.41%) DDI <30 min: No = n = 17(0.68%) Yes = n = 8 (0.32%) p = 0.44 Paediatric reanimation unit DDI >30 min: No = n = 35(0.76%) Yes = n = 11(0.24%) DDI <30 min: No = n = 24 (0.96%)	15 min) Urgent = class 2 - short term threat to life (extraction of infant within 30 min) Non-urgent = class 3 - no threat to life (extraction of infant with >30 min)	

Risk of bias table for intervention studies (observational: non-randomized clinical trials, cohort and case-control studies)

Study reference (first author, year of publication)	Bias due to a non-representative or ill-defined sample of patients?[1] (unlikely/likely/unclear)	Bias due to insufficiently long, or incomplete follow-up, or differences in follow-up between treatment groups?[2] (unlikely/likely/unclear)	Bias due to ill-defined or inadequately measured outcome ?[3] (unlikely/likely/unclear)	Bias due to inadequate adjustment for all important prognostic factors?[4] (unlikely/likely/unclear)
Huissoud, 2010	Unlikely	Unlikely	Unlikely	Likely
Pearson, 2011	Unlikely	Unlikely	Unlikely	Likely

Study reference (first author, year of publication)				
Hillemanns, 2003	Serious limitations 1	Incomplete reporting		
Bloom, 2006	Serious limitations 1,4	Incomplete reporting, Indications for CS were different in the two groups		
Holcroft, 2005	Serious limitations 1,5	Incomplete reporting, The start of the DDI was chosen as the time women were taken off the cardiotocograph [CTG] monitor in the labour room.		
Roy, 2008	Serious limitations1,2	Incomplete reporting, CS were not categorised. Women"s characteristics were not reported.		
Thomas, 2004	Serious limitations 7	Women"s characteristics not reported		
Kolas, 2006	Serious limitations 1,5	Incomplete reporting, The start of the DDI was chosen as the time women were taken off the cardiotocograph [CTG] monitor in the labour room		
Nasrallah, 2004	Serious limitations 1	Incomplete reporting		