Supplemental Online Content

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eMethods.

Statistical analysis

Meta-analysis of the occurrence of IVH at 0-6, 0-12, 0-24, 0-48, and 0-72 hours was challenging, as often there were not complete data on the number of IVH cases in the selected time interval, e.g. due to differences in study timing or reporting problems. The applied time window definitions refer to the period when the IVH occurred prior to the earliest detection. The available data provide only lower and upper bounds for when the actual event occurred; therefore, only interval-censored data was available. We used the nonparametric maximum likelihood approach implemented in the reliability process of SAS software, following the advice of Bogaerts et al.[1], to obtain an occurrence probability estimate with standard error. The classical inverse variance meta-analysis was applied with a restricted maximum likelihood (REML) tau estimator on the logit transformed ratios to obtain pooled occurrence rates. The standard error of the logit transformed ratio was calculated using the delta method.

For each time interval of the form [0,t], those studies, including the exact occurrence numbers, were collected, and pooled proportion was calculated using the approach of Stijnen et al.[2] on the resulting study set. The sensitivity analysis provided a similar pattern to that of the main analyses.

The restricted dataset was also useful for the analysis of the occurrence rates among all IVH cases. For each time interval of the form [0,t] and each study including the exact occurrence number, the number of IVH occurrences in the time interval was divided by the total IVH cases reported in the study. Then, the resulting proportions were meta-analyzed using the approach of Stijnen et al.[2]

Explorative analysis was performed in order to explain heterogeneity based on inclusion criteria and the publication year before and after 2007, and the GA (GA<28, GA<32, non-categorizable like GA<29, GA<30, BW<1500g, BW<1250g).

To assess potential differences between studies with data periods before and after 2007, as a supplementary analysis, we compared mortality, out-born ratio, antenatal steroid ratio, and gestational age across the two periods. To meta-analyze mean differences, we used the classical inverse variance approach with a REML tau estimator. Frequently, mean and standard deviation were not available. We used the default method of the metacont R function to estimate mean and standard deviation from median, lower, and upper quartiles or/and min and max. When gestational age data were reported separately in two distinct groups, we used formula[3] to get the combined outcome. When only the mean was available and the sample size was large, we imputed the value 2 for standard deviation.

The data used in the meta-calculations can be divided into three categories: directly available in a study, calculated from data available in a study, and calculated from raw data received from the authors of a study. Due to this mixed nature of the input data, publication bias analysis was performed only for the overall IVH cases separately in the "before 2007" and "after 2007" subgroups by creating modified funnel plots (the y-axis represents study size) and by performing Peter's test.

eTable 1. Search key in the databases (MEDLINE, Embase, CENTRAL, and Web of Science)

(Infant OR Premature OR prematur* OR preterm OR preterms OR LBW OR "low birth weight" OR ELBW OR "periviable" OR "extremely low gestational age neonate" OR Infant OR Premature OR prematur* OR preterm OR preterms OR LBW OR "low birth weight" OR ELBW OR "periviable" OR "extremely low gestational age neonate" OR ELGAN) AND
("Intracranial Hemorrhages" OR "Intracranial Hemorrhag*" OR "Intracranial Haemorrhag*" OR "Intra-cranial Hemorrhag*" OR "Intra-cranial Haemorrhag*" OR "brain Hemorrhag*" OR "brain Haemorrhag*" OR "cerebral Hemorrhag*" OR "cerebral Haemorrhag*" OR "Intraventricular Hemorrhag*" OR "Intraventricular Haemorrhag*" OR "Intra-ventricular Hemorrhag*" OR "Intra-ventricular Haemorrhag*" OR ICH OR IVH) AND
(Ultrasonography OR Ultraso* OR "cranial ultrasound" OR time OR onset)

eTable 2. a. Baseline characteristics of the included neonatal studies

Study	Country	Study design	Study period	Population Gestational age, wk/Birth weight, g	Mean±SD Gestational age	Median [IQR] Gestational age	Sample size	Patients with any grade IVH	Patients with severe IVH	Onset interval in hours (HOL) or days of life (DOL)	Patients number with any IVH
*Alderliesten at el. (2013)[4]	The Netherlands	case-control (subanalysis of prosp. obs.)	2009 - 2010	≤32	NA	IVH G1:27[5] IVH G2: 27[4] IVH G3:27[6] IVH G4:281]	650	146	35	0-12	61
										individual data in hours and minutes	30
										12-168	55
*Noori et al. (2014)[5]	USA	prospective observational	2009 - 2010	23-27	25.9±1.2	NA	23	7	5	0-6	1
										28-40	3
										40-52	2
										72-672	8
Sarkar et al. (2005)[6]	USA	prospective observational	NA	≤28	26.2±1.6	NA	62	17	NA	0-0.5	5
										0.5-24	0
										24-72	4
										72-672	8
Krediet et al. (2006)[7]	The Netherlands, USA	prospective observational	2002 - 2004	≤32	NoRDS: 30.1± 1.7 RDS:29.0±1	NA	114	28	13	0-11	16
										12-discharge	9
										4-36	1
										8-36	1
										11-36	1
	Italy			<32	NA	IVH:	20	8	1	0-12	0

*Cimatti et al. (2020)[8]		prospective, pilot	2016-2017			25.4[25–26.7] NoIVH: 29.5[27–32.3]				12-24	1
										12-30	1
										18-30	1
										24-32	1
										28-48	1
										24-48	1
										30-48	1
										48-72	1
*Deshpande et al. (2020)[9]	Canada	prospective observational cohort	2016-2017	23-28	NA	25[8]	50	26	4	individual data in hours and minutes	
*El-Dib et al. (2022)[10]	USA	retrospective cohort	2018-2020	<28	NA	NoIVH:26.1[25.3–27.1] IVH:25.1[24.1–26.1]	62	28	14	individual data in hours and minutes	
Babnik et al. (2006)[11]	Slovenia	prospective observational	2000-2002	23-29	Control:27.3±1.5, EarlyIVH: 26.7±1.8, LateIVH:26.7±1.8	NA	125	46	20	0-24	25
										24-discharge	12
										24-168	9
Bada et al. (1984)[12]	USA	prospective	1981-1982	<1500	30.6 ± 2.2 NoIVH:32 ±2, earlyIVH:30±2, lateIVH:31±2	NA	155	122	19	0-24	85
										24-168	37
Chalak et al. (2011)[13]	USA	prospective pilot	2007	23-28 <1000	25±2	NA	30	9	7	0-13	1
										0-120	2
										24-120	6
Dani et al. (2005)[14]	Italy	RCT		<28	Ibuprofen:25.3±1.2,	NA	175	59	NA	0-6	29
										6-24	22

			2002 - 2003		placebo:25.9± 1.1					24-48	6
										48-168	2
Dolfin et al. (1983)[15]	Canada	prospective	1981 - 1982	<32	NA	NA	62	20	12	0-6	4
										6-12	2
										12-24	5
										24-48	6
										48-62	3
										>72	0
Farag et al. (2022)[16]	Egypt	prospective observational	2020 - 2021	≤32 ≤1500	NoIVH:30.3±1.4, IVH:29.3 ± 1.6	NA	132	71	34	0-24	41
										24-72	20
										72-168	10
Ikeda et al. (2014)[17]	Japan	prospective observational	2010 - 2013	<1000	26.5±2.4	NA	81	8	1	0-8	0
										8-16	1
										40-48	2
										48-56	1
										64-72	2
										88-92	1
										92-96	1
										96-104	0
*Ishiguro et al. (2014)[18]	Japan	prospective observational	2008 - 2012	<1500	NA	IVH:26.0 NoIVH:27.6	92	15	7	0-6	3
										6-24	1
										7-22	1
										16-32	1
										22-33	1
										24-47	1
										26-30	1

										33-68	1
										62-71	1
										125-144	1
										168-192	1
										192-336	1
										46-68	1
Katheria et al. (2014)[19]	California, San Diego	RCT	2010-2013	<32	UCM 28 ±2 ICC 28±3	NA	60	19	6	0-6	1
										6-72	18
*Katheria et al. (2019)[20]	California, San Diego	prospective observational	2015-2016	<32	NoIVH/death:28 ±2, IVH/death:26 ± 2	NA	127	13	4	0-4	1
										0-4.5	2
										0-11	1
										0-12	1
										0-26	2
										0-56	1
										0-23	1
										0-44	1
										12.5-60	1
										12.5-62	1
										13-37	1
Meek et al. (1998)[21]	UK	NA	NA	24-31	NA	NA	24	7	5	0-24	2
										24-48	4
										48-72	1
Kluckow et al. (2000)[22]	Australia	prospective observational	1995-1996	23-29	27	NA	126	27	13	0-4	7
										4-8	2
										9-16	1
										16-24	1

										24-32	3
										32-40	3
										40-48	1
										48-56	2
										56-64	1
										64-72	1
										168-192	2
McDonald et al. (1984)[23]	USA	prospective observational	1980 - 1981	<33	NoIVH: 29.3 ±1.7 IVH G1:29.4 IVH G2-4:27 ± 2	NA	50	24	7	0-4	7
										4-8	2
										9-16	1
										16-24	1
										24-32	3
										32-40	3
										40-48	1
										48-56	2
										56-64	1
										64-72	1
										168-192	2
Ment et al. (1984)[24]	USA	prospective observational	1982 - 0983	25-33 600-1250	28.3	NA	31	19	7	0-6	8
										6-18	2
										18-30	4
										30-66	0
										66-78	2
										78-96	1
										96-120	1
										168-336	1

Ment et al. (1994)[25]	USA	RCT	1989 - 1992	600-1250	indomethacin: 27.7±2 Placebo:28±2.2	NA	505	138		0-11	73
										12-35	27
										36-59	2
										60-95	10
										96-119	6
Perlman et al. (1986)[26]	USA	prospective observational	1982 - 1985	500-700	NA	NA	55	34	62	0-18	21
										19-72	7
										>72	6
				701-1000			366	39		0-18	7
										19-72	30
										>72	2
				1001-15000				52		0-18	6
										19-72	44
										>72	2
Amato et al. (1989)[27]	Switzerland	prospective observational	1983 - 1985	<34 <1501	IVH:28.2 ± 2.6, noIVH 31.3 ± 2.4	NA	50	15	1	0-24	2
										24-48	3
										48-72	9
										72-96	1
Dupppré et al. (2015)[28]	Germany	retrospective observational	2010 - 2013	<1500 23-35	NoIVH:29.5 ± 2.4 IVH:27.4± 2.4	NA	250	55	25	0-24	11
										24-48	19
										48-72	14
										>72	11
	Japan	NA		<27	NA	NA	216	NA	55	0-24	7

Naoshi et al. (2021) The 73rd Annual Congress of the Japan[29]			2009 - 2020							24-48	25
										48-72	13
										72-96	6
										96-120	4
Perlman et al. (1983)[30]	USA	NA	1982	<1500	30±3	NA	57	35	NA	0-12	7
										0-24	4
										24-48	18
										48-72	3
										72-96	1
										96-168	2
Schreiner et al. (2021)[31]	Austria	retrospective observational	2010 - 2018	<32	NA	NoIVH: 30.0 [28.3; 31.3] IVH: 28.9 [27.0;30.4]	536	80	16	0-24	7
										24-48	23
										48-72	15
										72-168	14
										>168	21
Salafia et al. (1995)[32]	USA	retrospective observational	1988 - 1993	<32	Early IVH: 26.5±2. Late IVH: 28.4 ± 2.3	NA	406	65	23	<72	44
										72-432	21
Zanardo et al. (2008)[33]	Italy	prospective observational	1999 - 2004	<32	NoIVH: 27.2±2.4, IVH: 25.5±2.4	NA	287	33	3	<72	19
										>72	14
Kalani et al. (2016)[34]	Iran	retrospective observational	2013 - 2014	<32 <1500	30.27±1.7	NA	93	14	NA	0-D3	5
										D3-D7	1
										D3-D14	6
										D7-D14	2

Najib et al. (2018)[35]	Iran	prospective observational	2014-2015	26-32	NA	NA	68	19	NA	0-D3	11
										D7-D10	8
Florio et al. (2006)[36]	Italy	prospective observational	2002-2003	≤32	IVH:28.12± 1.5 noIVH:28.3±9 0.05	NA	53	11	0	0-D1	0
										D1-D10	11
*Galderisi et al. (2019)[37]	Italy	secondary analysis of RCT	2015-2016	≤32	NA	group1: 31[28, 32] group2: 28[26, 28] group3: 30[28,31] group4: 28[28, 32]	50	11	2	0-49	0
										49-71	4
										95-119	3
										119-143	1
										49-168	1
										71-95	2
Osborn et al. (2003)[38]	Australia	prospective observational	1998-1999	<30	NoIVH:27.0±1.7, EarlyIVH:26.6±1.6	NA	128	38	17	0-3	19
										4-D28	19
Paradisis et al. (2009)[39]	Australia	RCT	2003-2006	<30	Milrinon:26±1.1 placebo:26±1.3	NA	93	25	NA	0-6	10
										6-D28	15
Szymonovicz et al. (1984)[40]	Australia	prospective observational	NA	24-32	27.0±4	NA	50	30	NA	0-12	15
										0-24	2
										12-24	2
										24-96	11

Tanaka et al. (2022)[41]	Japan	prospective observational	2015 - 2020	<28 <1500	NA	NoIVH:26.0 [24.0,26.0] G1-2:25.0 [24.0,26.5] sIVH:24.0 [23.0,26.5]	64	13	NA	0-2	3
										2-24	0
										25-36	2
										37-48	3
										49-60	4
										73-84	1
										84-D28	0
Van Bel et al (2002)[42]	The Netherlands	prospective observational	NA	25-32	noIVH:29.1±1.6, MildIVH:28.2±1.7, sIVH:27.4±1.0	NA	83	23	5	0-12	8
										13-24	2
										25-48	7
										49-72	3
										73-168	3
Weindling et al (1985)[43]	UK	prospective observational	1982 - 1983	<32	NA	NA	82	34	3	0-6	4
										6-12	3
										12-18	2
										30-48	4
										0-discharge	21
Iyer et al. (2015)[44]	Sweden	cross-sectional	2005 - 2007	22-28	NA	NA	25	14	5	0-24	5
										0-48	3
										24-48	1
										24-72	5
*Himanshu et al (2019)[45]	Australia	prospective observational	2012 - 2016	<32	27±1	NA	51	11	N.A	0-6	1
										6-168	10
Thanhaeuser et al. (2018)[46]	Austria	prospective		<1000 23-33	NA		128	33	15	0-5,7	15
										0-D30	16

		observational	2013 - 2015			noIVH:25[6], bleeding group:25[2]				0-discharge	2
Zanelli et al. (2021)[47]	USA	retrospective observational	2009 - 2018	<32 <1500	27	NA	638	279	84	0-48	34
										48-D10	37
										0-D10	208
Thorburn et al. (1982)[48]	UK	N.A.	1979	23-32	NA	no IVH:31 IVH:28	95	36	13	0-24	12
										24-48	4
										48-72	8
										72-96	5
										144-168	1
										0-discharge	6
Bates et al. (2015)[49]	UK	retrospective cochort	2008 - 2012	<28	IVH: 25.1 ±1.3 NoIVH:25.7±1.0	NA	108	46	22	0-12	8
										0-168	38
Yang et al. (1990)[50]	Taiwan	prospective observational	N.A.	500-1500	29.30±2.55	NA	83	45	15	0-24	22
										25-72	13
										73-120	7
										120-168	3
Bada et al. (1989)[51]	USA	prospective,random selection, double-blind clinical trial	1989	<1500 <31	28±2.4	NA	145	68	25	0-1	26
										1-336	42
Lampe et al. (2020)[52]	Germany	retrospective observational	2006 - 2016	23-30	control: 26.7±2. group1:	NA	254	136	56	0-24	16
										24-48	20
										48-72	40

					26.3±2.0					72-96	20
										96-120	11
										120-336	29
Rumack et al. (1985)[53]	USA	prospective observational	N.A.	25-32	NA	NA	49	21	7	0-3	1
										0-4	4
										0-7	1
										0-18	1
										0-24	1
										24-48	7
										48-72	4
										120-144	1
										168-192	1
*Vesoulis et al. (2019)[54]	USA	prospective observational	2012 - 2017	<30	NosevereIVH: 25.2±1.9 SevereIVH25.1±1.5	NA	157	61	29	0-24	17
										25-48	20
										49-72	12
										73-168	12
*Vesoulis et al. (2020)[55]	USA	prospective observational	2012 - 2019	<32	26.3±2.0	NA	185	54	16	0-30	13
										0-72	18
										72-168	8
										72-240	7
										240-270	8
Evans et al. (1996)[56]	Australia	retrospective observational	1992 - 1993	<1500 24-33	27.3	NA	141	36	10	0-31	8
										31-D28	19
										0-D28	9
*Sortica da Costa et al. (2018)[57]	UK	prospective	2013 - 2015	<32	NA	NA	56	18	9	individual data in hours and minutes	

		observational									
Paradisis et al. (2006)[58]	Australia	prospective observational	2002 - 2003	<28	NA	NA	29	8	3	0-3	4
										3-30	3
										30-119	1
Hoffman et al. (2018)[59]	USA	prospective observational	2013 - 2016	24-29	noIVH: 26.5±1.6 sIVH:25.3±1.7	NA	61	N.A.	7	0-48	3
										0-168	4
*Juul et al. (2020)[60]	USA	RCT	2013 - 2016	24-28	Group1: 26.0±1.2, Group2: 25.8±1.1	NA	906	344	107	PENUT Trial individual data in hours and minutes	
*Martini et al. (2022)[61]	Italy	prospective observational	2018 - 2022	<32	NA	29[26.1–31]	77	16	5	12-36	4
										9-21	1
										30-50	1
										8-32	1
										48-72	1
										12-24	1
										46-70	1
										10-22	1
										7-19	1
										26-50	1
										8-24	1
										6-30	1
										41-65	1
Rojas et al. (2021)[62]	Lima, Peru	retrospective cohort		<28	NA	NA	72	42	N.A.	0-24	10
										25-48	8

			2013 - 2017							49-72	4
										73-96	6
										97-120	5
										120-144	1
										145-168	1
										169-192	2
										193-384	5
Ment et al. (1985)[63]	USA	RCT	1983 - 1985	600-1250	placebo:28.5± 2.20, Indo:28.7±1.92	NA	66	38	N.A.	0-6	18
										6-18	2
										18-30	6
										30-42	6
										42-54	1
										54-96	4
										67-120	1
Skubisz et al. (2024)[64]	the Netherlands	retrospective case-series analysis from a consecutive cohort	2015 - 2019	<32	N.A.	RBC transfusion before IVH: 26[4] RBC transfusion within 48h after IVH: 26[4] without RBC transfusion in first week after birth: 28[3]	N.A.	139	N.A.	0-6	34
										6-12	19
										12-24	19
										24-48	28
										48-72	14
										72-96	7
										96-120	7
										120-144	5
										168-	6
Jiang et al. (2023)[65]	China	prospective		≤32 ≤1500 g	28.95 ± 2.33	N.A.	92	49	8	0-24	25
										24-72	19

		observational	2020 - 2023							72-168	5
Shan et al. (2023)[66]	China	retrospective observational	2019 - 2022	<1000 g	IVH: 27.4±1.5 NoIVH: 27.8±1.5	N.A.	238	82	28	0-72	68
										72-168	8
										168-	6
June et al. (2021)[67]	US	prospective observational	2018	<1250 g	25.9(22–30) 809(380–1,220)		99	36	21	0-24	5
										0-168	31

*Individual data from the authors; IVH any grade Intraventricular hemorrhage; sIVH severe Intraventricular hemorrhage; G1 grade 1; G2 grade 2; G3 grade 3; G4, grade 4; RDS Respiratory Distress Syndrome; No IVH without any grade Intraventricular hemorrhage; h hours; HOL hours of life; DOL days of life; D days; IQR interquartile range; NA not reported; RCT randomized; UCM umbilical cord milking; ICC immediate cord clamping; RBC red blood cell

eTable 2. b. Baseline characteristics of the included neonatal studies

Study	Early mortality rate (%)	Total mortality rate (%)	Outborn rate (%)	Antenatal steroid prophylaxis rate (%)	DCC rate (%)	Magnesium administration rate (%)
Alderliesten et al. (2013)[4]	NA	NA	NA	NA	NA	NA
*Noori et al. (2014)[5]	NA	22	NA	86	NA	NA
Sarkar et al. (2005)[6]	0	6	NA	90	NA	NA
Krediet et al. (2006)[7]	NA	NA	NA	73	NA	NA
Cimatti et al. (2020)[8]	4	NA	NA	NA	NA	NA
*Deshpande et al. (2020)[9]	2	25	2	90	56	76
El-Dib et al. (2022)[10]	NA	NA	NA	NA	NA	NA
Babnik et al. (2006)[11]	0	10	0	87	NA	NA
Bada et al. (1984)[12]	NA	NA	NA	NA	NA	14,2
Chalak et al. (2011)[13]	NA	NA	0	100	NA	NA
Dani et al. (2005)[14]	NA	NA	NA	74	NA	NA
Dolfin et al. (1983)[15]	3	18	0	NA	NA	NA
Farag et al. (2022)[16]	NA	NA	NA	53	NA	NA
Ikeda et al. (2014)[17]	1	NA	0	12	NA	NA
Ishiguro et al. (2014)[18]	NA	NA	NA	64	NA	NA
Katheria et al. (2014)[19]	NA	3	0	100	NA	78
Katheria et al. (2018)[20]	1	NA	NA	95	0	84
Meek et al. (1998)[21]	0	8	NA	NA	NA	NA
Kluckow et al. (2000)[22]	2	18	9	87	NA	NA
McDonald et al. (1984)[23]	0	14	0	NA	NA	NA
Ment et al. (1984)[24]	0	29	NA	NA	NA	NA
Ment et al. (1994)[25]	7	17	17	30	NA	NA
Perlman et al. (1986)[26]	0	14	NA	NA	NA	NA
Amato et al. (1989)[27]	NA	NA	0	NA	NA	NA
Duppré et al. (2015)[28]	0	10	0	84	NA	NA
Naoshi et al. (2021)[29]	NA	NA	NA	NA	NA	NA
Perlman et al. (1983)[30]	NA	NA	43	NA	NA	NA
Schreiner et al. (2021)[31]	NA	NA	NA	93	NA	NA
Salafia et al. (1995)[32]	NA	NA	NA	34	NA	18
Zanardo et al. (2008)[33]	0	7	NA	80	NA	NA

Kalani et al. (2016)[34]	NA	NA	NA	NA	NA	NA
Najib et al. (2018)[35]	NA	NA	0	60	NA	NA
Florio et al. (2006)[36]	NA	NA	NA	17	NA	NA
Galderisi et al. (2019)[37]	NA	NA	NA	NA	NA	NA
Osborn et al. (2003)[38]	NA	NA	NA	92	NA	NA
Paradisis et al. (2009)[39]	NA	NA	0	96	NA	NA
Szymonovicz et al. (1984)[40]	11	NA	7	NA	NA	NA
Tanaka et al. (2022)[41]	NA	8	0	42	NA	NA
Van Bel et al. (2002)[42]	NA	NA	NA	NA	NA	NA
Weindling et al. (1985)[43]	NA	NA	21	NA	NA	NA
Iyer et al. (2015)[44]	NA	NA	NA	NA	NA	NA
Himanshu et al (2019)[45]	NA	NA	NA	98	0	NA
Thanhaeuser et al. (2018)[46]	7	14	NA	94	NA	NA
Zanelli et al. (2021)[47]	NA	NA	17	NA	NA	NA
Thorburn et al. (1982)[48]	0	29	58	11	NA	NA
Bates et al. (2015)[49]	9	10	20	91	NA	NA
Yang et al. (1990)[50]	10	26	0	NA	NA	NA
Bada et al. (1989)[51]	NA	NA	0	46	NA	NA
Lampe et al. (2020)[52]	NA	NA	0	NA	NA	NA
Rumack et al. (1985)[53]	NA	NA	NA	NA	NA	NA
Vesoulis et al. (2019)[54]	NA	NA	NA	75	NA	NA
Vesoulis et al. (2020)[55]	11	21	NA	75	28	NA
Evans et al. (1996)[56]	2	NA	NA	72	NA	NA
*Sortica da Costa et al. (2018)[57]	0	7	12	98	NA	27
Paradisis et al. (2006)[58]	NA	NA	0	100	NA	NA
Hoffman et al. (2018)[59]	NA	NA	NA	NA	NA	NA
*Juul et al. (2020)[60]	6	NA	NA	90	47	79
Martini et al. (2022)[61]	NA	NA	NA	NA	NA	NA
Rojas et al. (2021)[62]	NA	NA	NA	NA	NA	NA
Ment et al. (1985)[63]	NA	NA	NA	NA	NA	NA
Skubisz et al. (2024)[64]	NA	NA	9,3	92	NA	NA
Jiang et al. (2023)[65]	2	9	0	60	NA	NA
Shan et al. (2023)[66]	NA	NA	NA	NA	NA	NA
June et al. (2021)[67]	NA	NA	4	NA	NA	NA

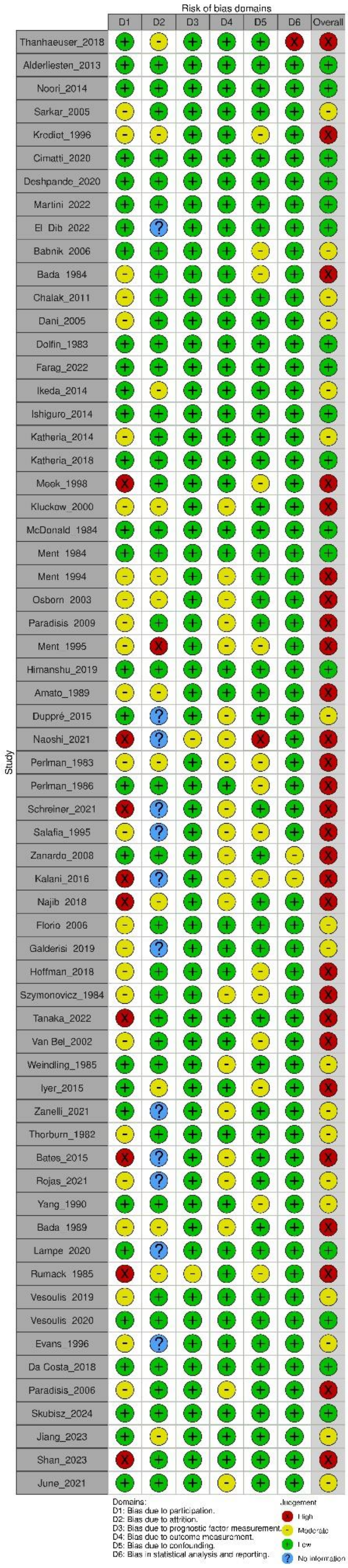
*Individual data from the authors, DCC delayed cord clamping

eTable 3. IVH rate among GA<28 and GA<32 weeks infants by postnatal age after 2007

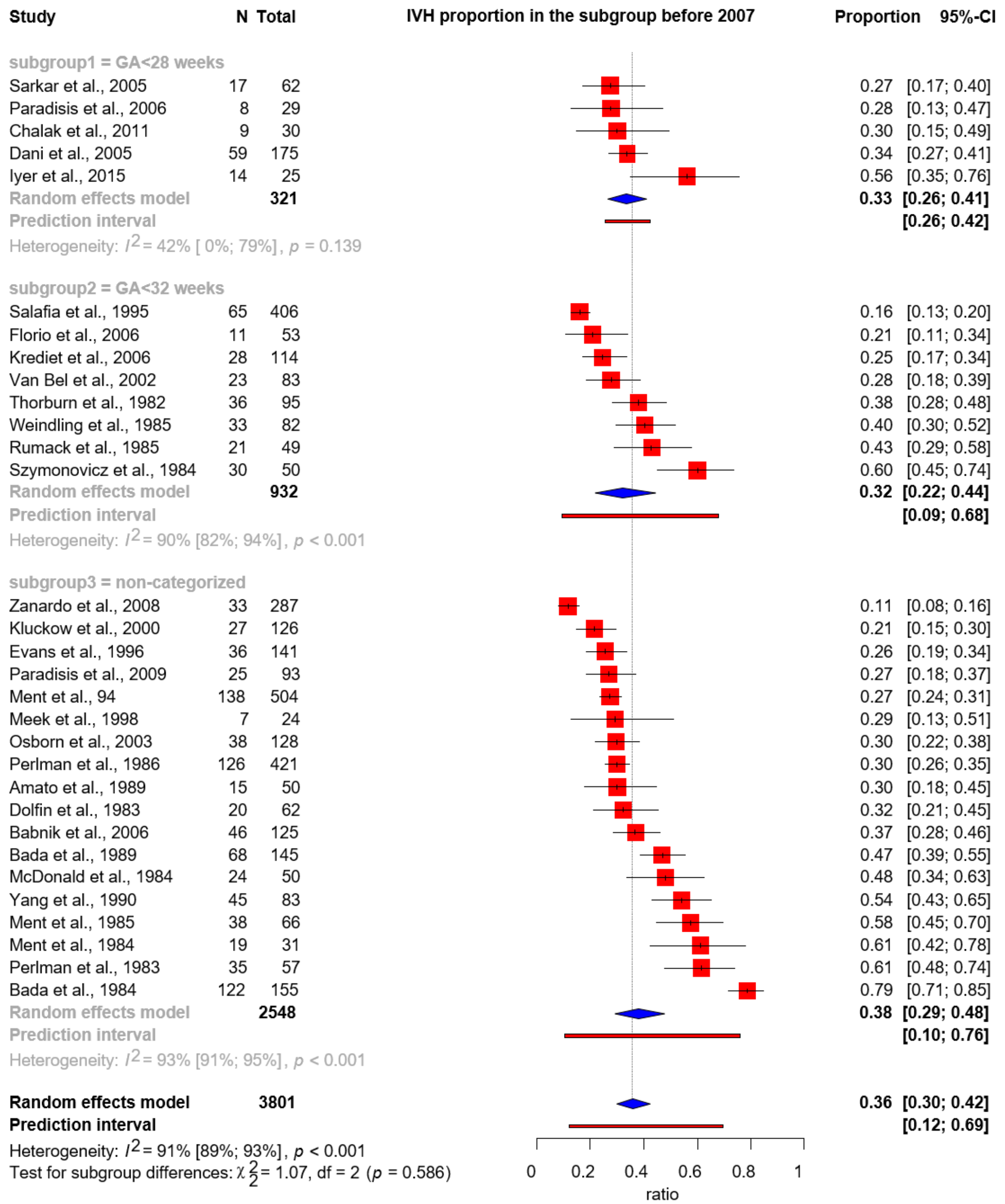
Hours of life (HOL)	Subgroup	Proportion	95%CI
0-6	GA<28	0.1	0.02-0.34
	GA<32	0.04	0.01-0.13
0-12	GA<28	0.11	0.04-0.31
	GA<32	0.07	0,02-0,25
0-24	GA<28	0.15	0.07-0.31
	GA<32	0.12	0.05-0.27
0-48	GA<28	0.29	0.15-0.48
	GA<32	0.16	0.08-0.30
0-72	GA<28	0.30	0.19-0.45
	GA<32	0.24	0.13-0.40

HOL hours of life; CI Confidence Intervals; GA Gestational age

eTable 4. Risk of bias assessment using Quality in Prognostic Studies 2 (QUIPS2) tool

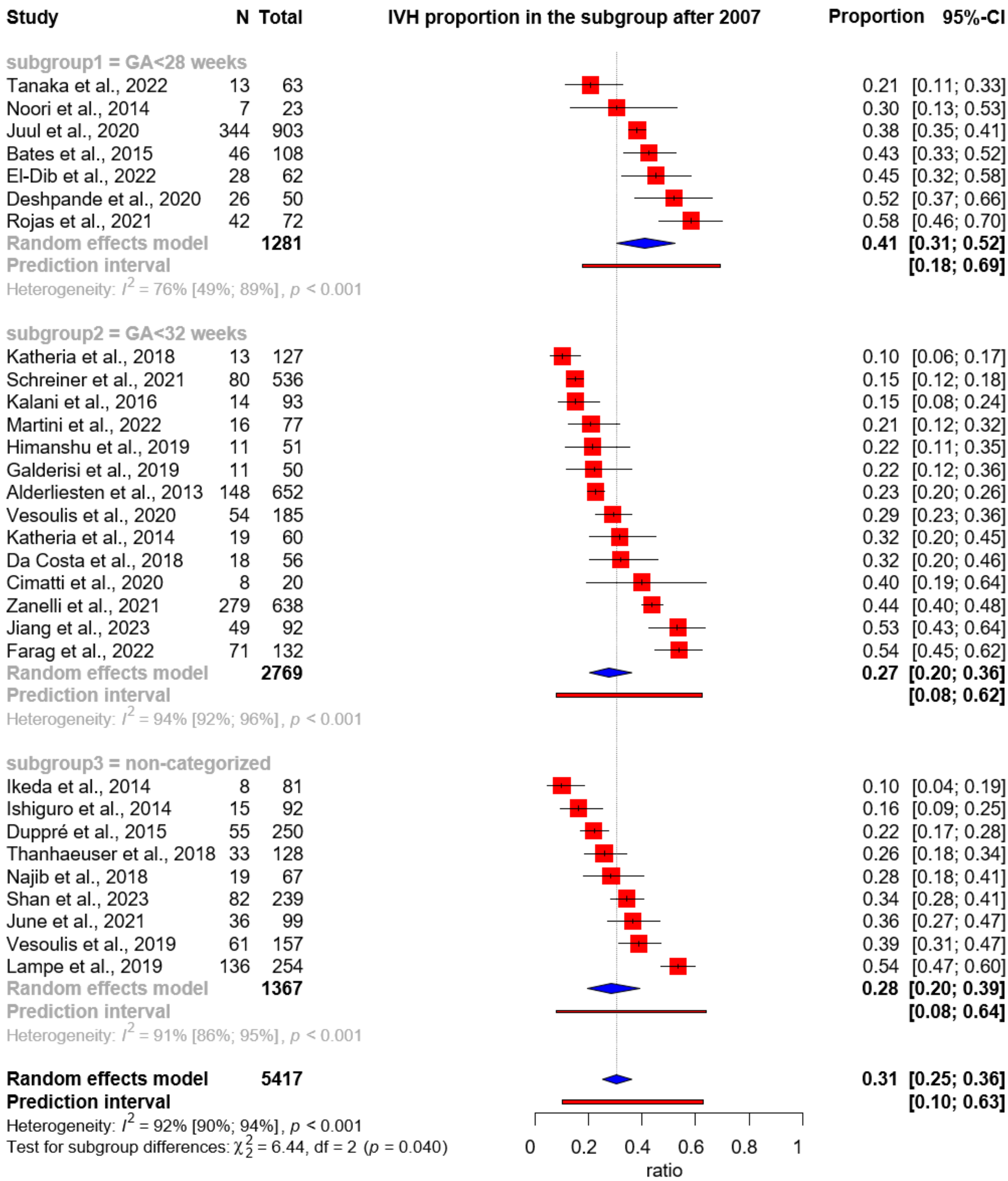


eFigure 1. Any grade IVH proportion by GA limits in GA<28, GA<32 and non-categorized studies before 2007



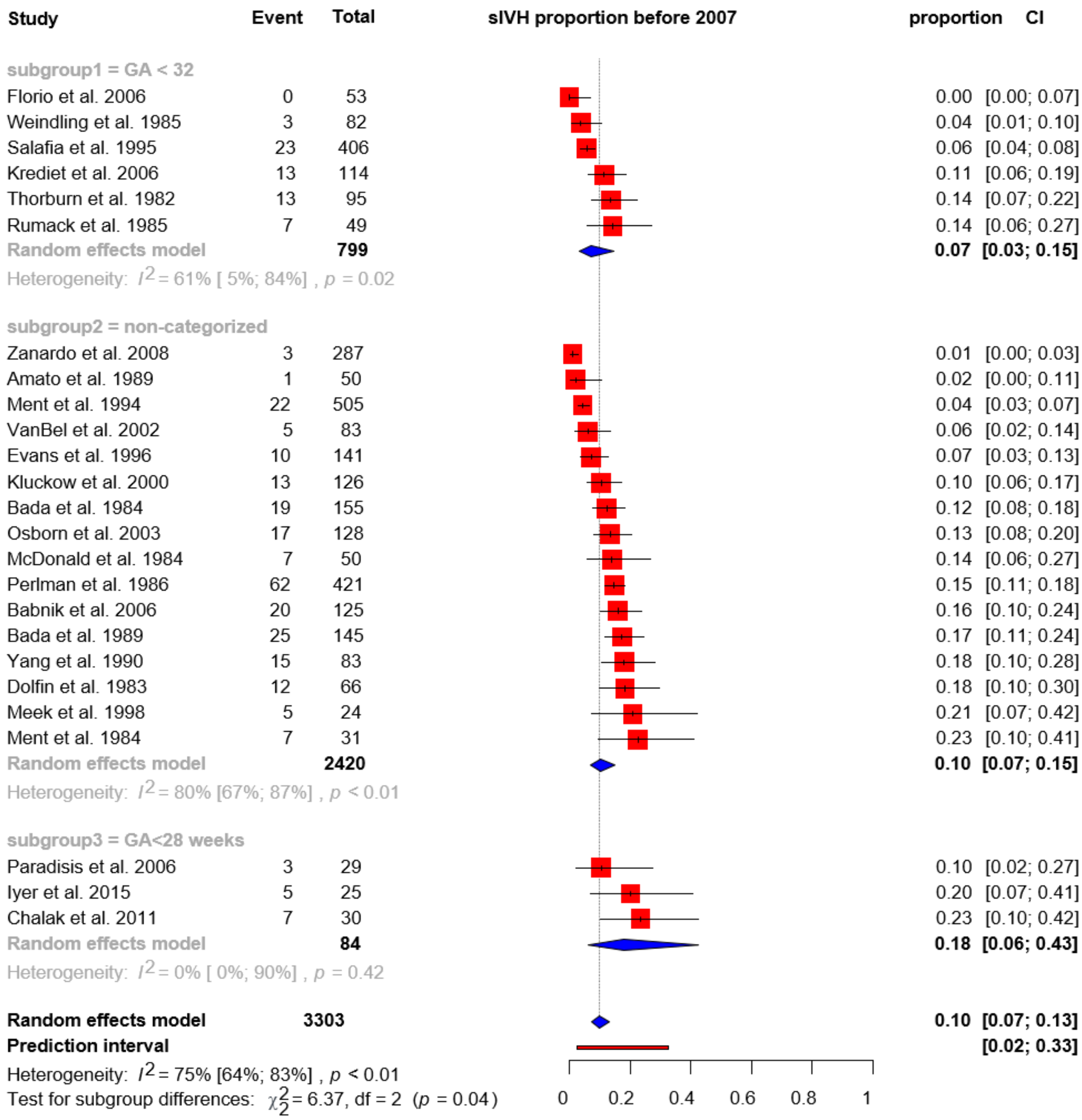
IVH: Intraventricular hemorrhage; CI: Confidence Intervals

eFigure 2. Any grade IVH proportion by GA limits in GA<28, GA<32, and non-categorized studies after 2007



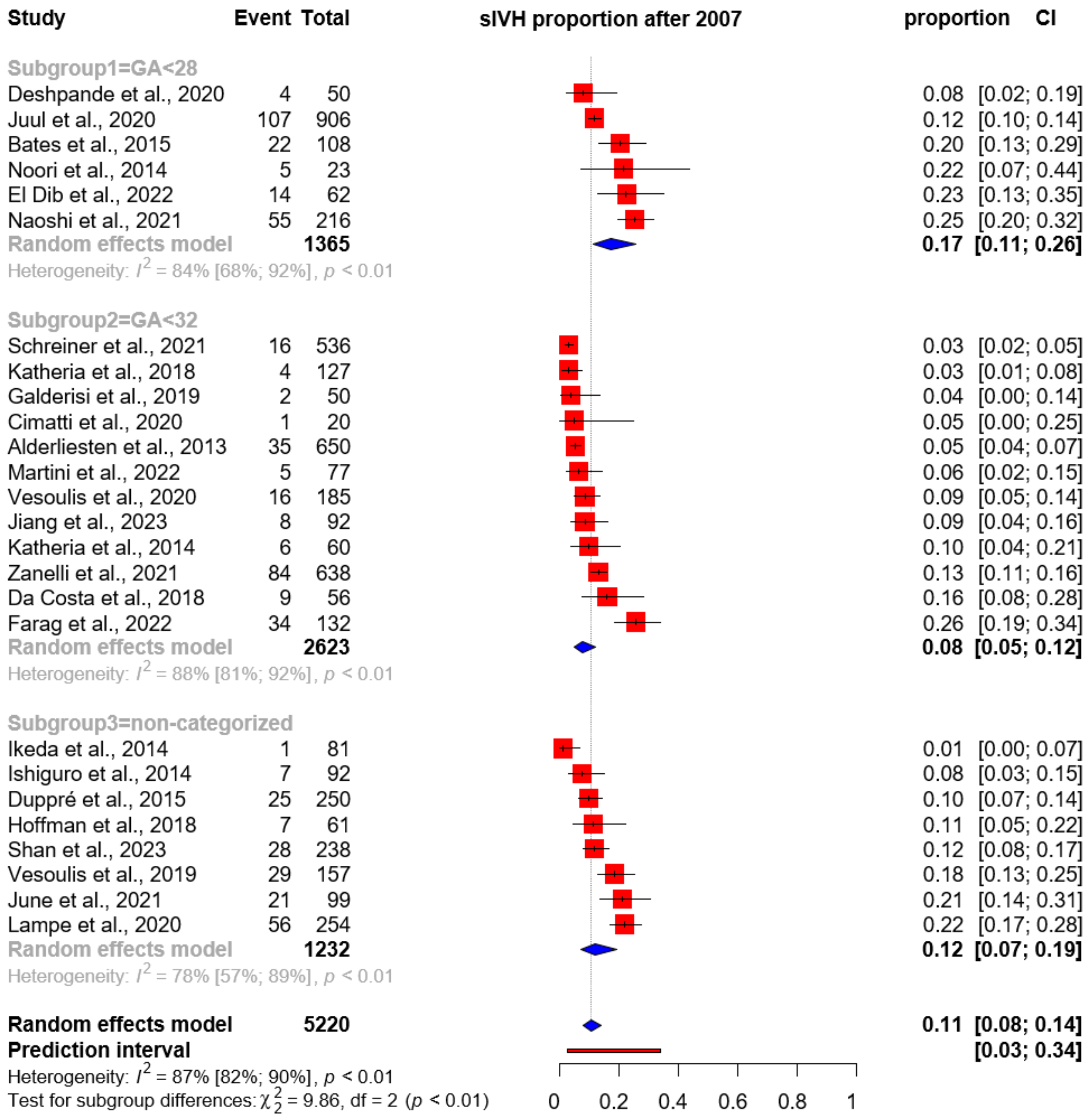
IVH: Intraventricular hemorrhage; CI: Confidence Intervals; GA: gestational age

eFigure 3. Proportion of severe IVH by GA limits in GA<28, GA<32, non-categorized subgroups before 2007



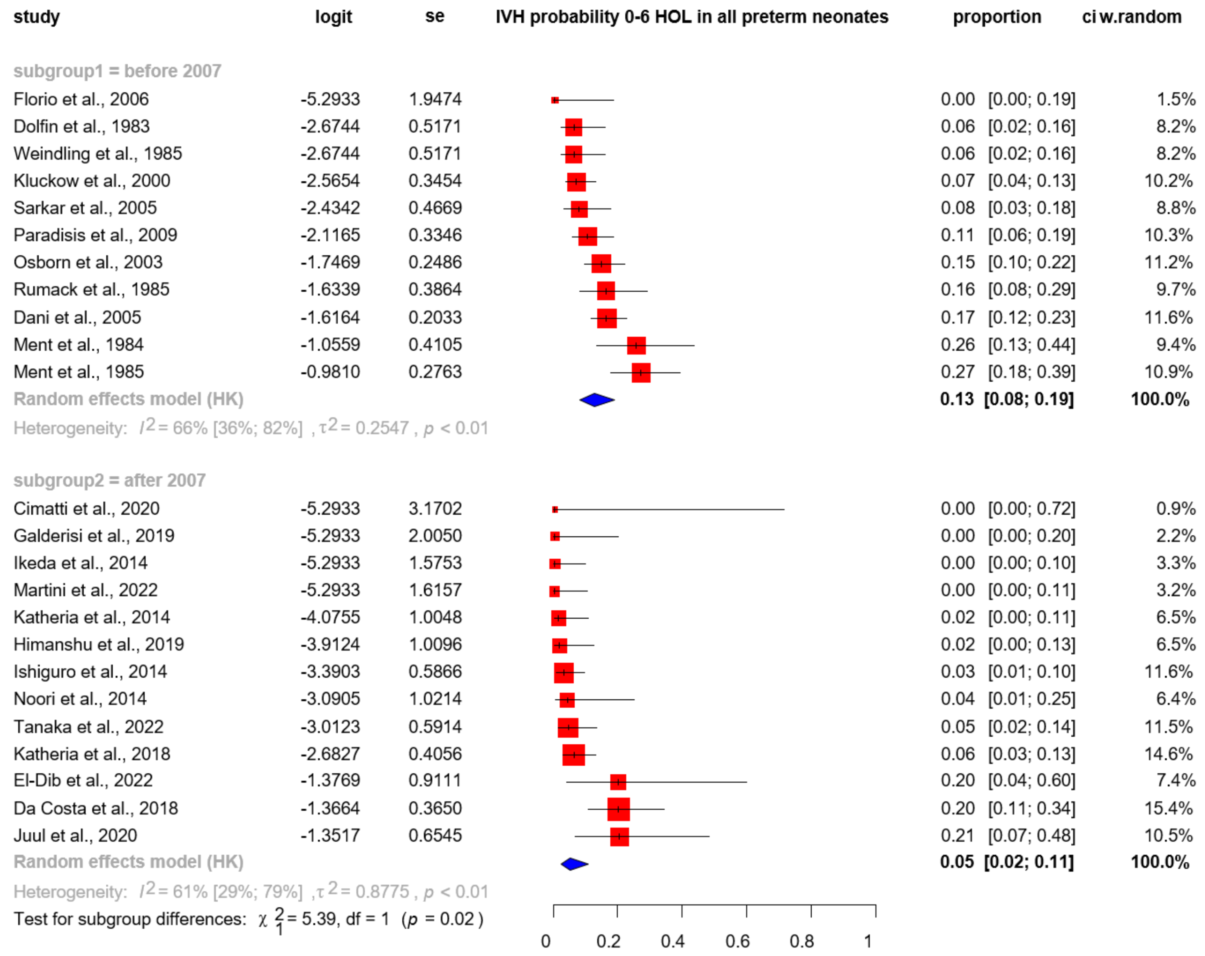
IVH: Intraventricular hemorrhage; CI: Confidence Intervals; GA: gestational age

eFigure 4. Proportion of severe IVH by GA limits in GA<28, GA<32, and non-categorized studies after 2007



sIVH: severe intraventricular hemorrhage; CI: Confidence Intervals; GA: gestational age

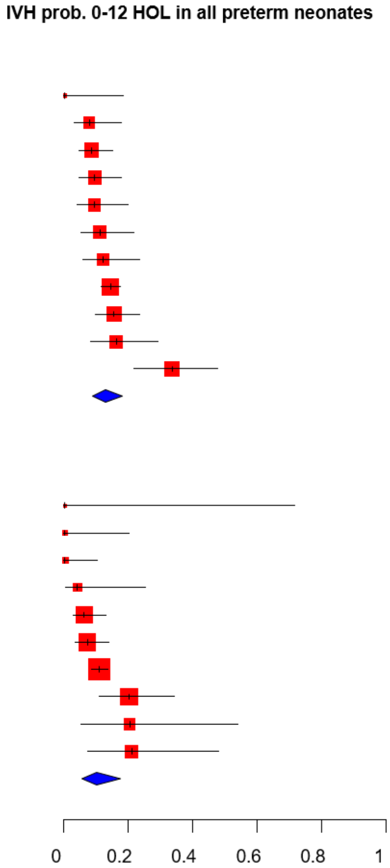
eFigure 5. IVH rate up to 6 HOL of all preterm infants in the subgroups before and after 2007



IVH: intraventricular haemorrhage; HOL: hours of life

eFigure 6. IVH rate up to 12 HOL of all preterm infants in the subgroups before and after 2007

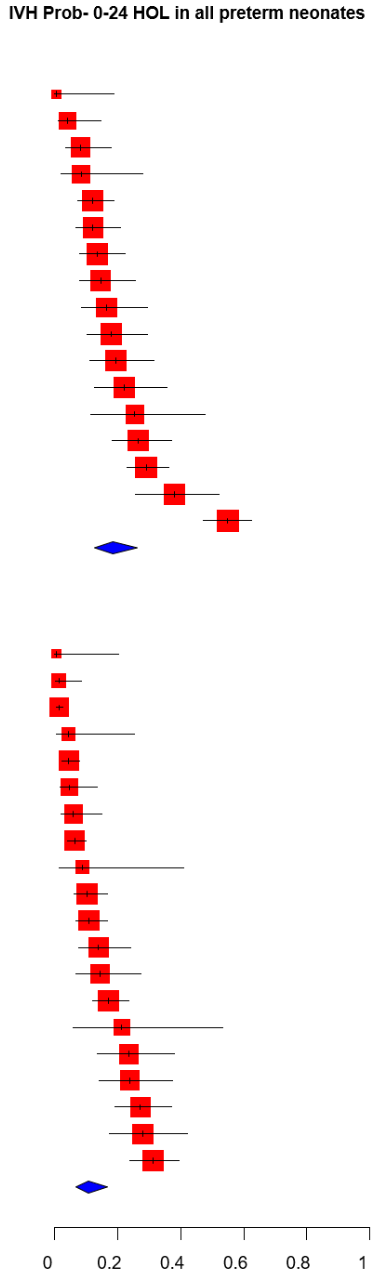
study	logit	se	Proportion		ci w.random
subgroup1 = before 2007					
Florio et al., 2006	-5.2933	1.9474	0.00	[0.00; 0.19]	0.7%
Sarkar et al., 2005	-2.4342	0.4669	0.08	[0.03; 0.18]	7.3%
Kluckow et al., 2000	-2.3471	0.3150	0.09	[0.05; 0.15]	10.6%
Van Bel et al., 2002	-2.2379	0.3720	0.10	[0.05; 0.18]	9.2%
Dolfin et al., 1983	-2.2333	0.4289	0.10	[0.04; 0.20]	8.0%
Weindling et al., 1985	-2.0615	0.4014	0.11	[0.05; 0.22]	8.6%
Perlman et al., 1983	-1.9662	0.4038	0.12	[0.06; 0.24]	8.5%
Ment et al., 1994	-1.7760	0.1268	0.14	[0.12; 0.18]	15.3%
Krediet et al., 2006	-1.6822	0.2587	0.16	[0.10; 0.24]	12.0%
Rumack et al., 1985	-1.6339	0.3864	0.16	[0.08; 0.29]	8.9%
Szymonovicz et al., 1984	-0.6843	0.3029	0.34	[0.22; 0.48]	10.9%
Random effects model (HK)			**0.13**	**[0.09; 0.18]**	**100.0%**
Heterogeneity: $I^2 = 60\%$ [23%; 79%], $\tau^2 = 0.1659$, $p < 0.01$					
subgroup2 = after 2007					
Cimatti et al., 2020	-5.2933	3.1702	0.00	[0.00; 0.72]	0.5%
Galderisi et al., 2019	-5.2933	2.0050	0.00	[0.00; 0.20]	1.2%
Martini et al., 2022	-5.2933	1.6157	0.00	[0.00; 0.11]	1.8%
Noori et al., 2014	-3.0910	1.0225	0.04	[0.01; 0.25]	4.2%
Katheria et al., 2018	-2.6827	0.4056	0.06	[0.03; 0.13]	15.3%
Bates et al., 2015	-2.5257	0.3674	0.07	[0.04; 0.14]	16.8%
Alderliesten et al., 2013	-2.0826	0.1309	0.11	[0.09; 0.14]	27.5%
Da Costa et al., 2018	-1.3664	0.3650	0.20	[0.11; 0.34]	16.9%
Juul et al., 2020	-1.3517	0.7721	0.21	[0.05; 0.54]	6.7%
El-Dib et al., 2022	-1.3117	0.6275	0.21	[0.07; 0.48]	9.1%
Random effects model (HK)			**0.10**	**[0.06; 0.18]**	**100.0%**
Heterogeneity: $I^2 = 51\%$ [0%; 76%], $\tau^2 = 0.1935$, $p = 0.03$					
Test for subgroup differences: $\chi^2_1 = 0.75$, df = 1 ($p = 0.39$)					



IVH: intraventricular haemorrhage; HOL: hours of life

eFigure 7. IVH rate up to 24 HOL of all preterm infants in the subgroups before and after 2007

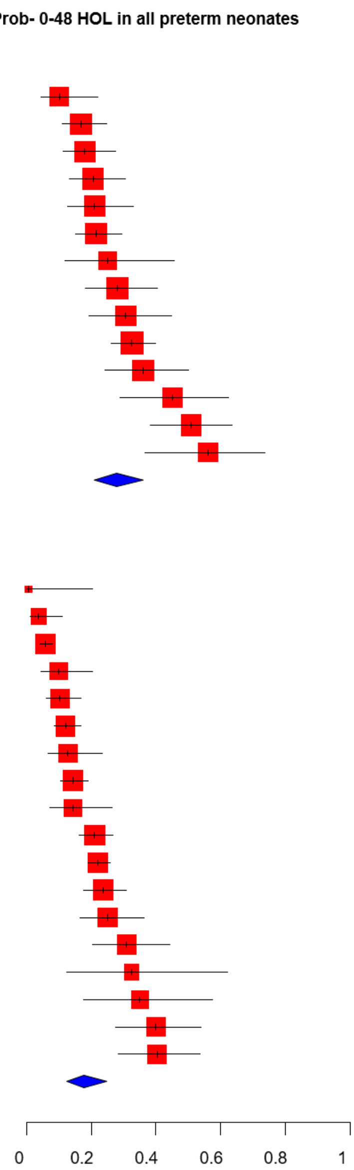
study	logit	se	proportion	CI	w.random
subgroup1 = before 2007					
Florio et al., 2006	-5.2933	1.9474	0.00	[0.00; 0.19]	1.2%
Amato et al., 1989	-3.1781	0.7214	0.04	[0.01; 0.15]	4.4%
Sarkar et al., 2005	-2.4342	0.4669	0.08	[0.03; 0.18]	5.7%
Meek et al., 1998	-2.3983	0.7386	0.08	[0.02; 0.28]	4.3%
Kluckow et al., 2000	-2.0019	0.2757	0.12	[0.07; 0.19]	6.7%
Van Bel et al., 2002	-1.9877	0.3369	0.12	[0.07; 0.21]	6.4%
Thorburn et al., 1982	-1.8592	0.3104	0.13	[0.08; 0.22]	6.5%
Weindling et al., 1985	-1.7728	0.3601	0.15	[0.08; 0.26]	6.3%
Rumack et al., 1985	-1.6339	0.3864	0.16	[0.08; 0.29]	6.1%
Dolfin et al., 1983	-1.5238	0.3329	0.18	[0.10; 0.29]	6.4%
Perlman et al., 1983	-1.4306	0.3358	0.19	[0.11; 0.32]	6.4%
McDonald et al., 1984	-1.2657	0.3415	0.22	[0.13; 0.36]	6.4%
Iyer et al., 2015	-1.0748	0.5028	0.25	[0.11; 0.48]	5.5%
Yang et al., 1990	-1.0196	0.2484	0.27	[0.18; 0.37]	6.8%
Dani et al., 2005	-0.8886	0.1666	0.29	[0.23; 0.36]	7.1%
Szymonovicz et al., 1984	-0.4895	0.2912	0.38	[0.26; 0.52]	6.6%
Bada et al., 1984	0.1942	0.1615	0.55	[0.47; 0.62]	7.1%
Random effects model (HK)			**0.18**	**[0.13; 0.26]**	**100.0%**
Heterogeneity: $I^2 = 87\%$ [81%; 91%], $\tau^2 = 0.5006$, $p < 0.01$					
subgroup2 = after 2007					
Galderisi et al., 2019	-5.2933	2.0050	0.00	[0.00; 0.20]	1.1%
Ikeda et al., 2014	-4.3858	1.0125	0.01	[0.00; 0.08]	2.8%
Schreiner et al., 2021	-4.3220	0.3790	0.01	[0.01; 0.03]	5.6%
Noori et al., 2014	-3.0910	1.0225	0.04	[0.01; 0.25]	2.8%
Duppre et al., 2015	-3.0786	0.3091	0.04	[0.02; 0.08]	5.9%
Tanaka et al., 2022	-3.0123	0.5914	0.05	[0.02; 0.14]	4.6%
Ishiguro et al., 2014	-2.7748	0.5248	0.06	[0.02; 0.15]	4.9%
Lampe et al., 2019	-2.6995	0.2575	0.06	[0.04; 0.10]	6.1%
Cimatti et al., 2020	-2.3445	1.0057	0.09	[0.01; 0.41]	2.9%
Katheria et al., 2018	-2.1708	0.2927	0.10	[0.06; 0.17]	6.0%
Vesoulis et al., 2019	-2.1082	0.2568	0.11	[0.07; 0.17]	6.1%
Rojas et al, 2021	-1.8245	0.3411	0.14	[0.08; 0.24]	5.8%
Martini et al., 2022	-1.7914	0.4180	0.14	[0.07; 0.27]	5.4%
Alderliesten et al., 2013	-1.5856	0.2062	0.17	[0.12; 0.23]	6.3%
El-Dib et al., 2022	-1.3117	0.7370	0.21	[0.06; 0.53]	3.9%
Juul et al., 2020	-1.1808	0.3478	0.23	[0.13; 0.38]	5.7%
Da Costa et al., 2018	-1.1637	0.3286	0.24	[0.14; 0.37]	5.8%
Jiang et al., 2023	-0.9860	0.2345	0.27	[0.19; 0.37]	6.2%
Deshpande et al., 2020	-0.9445	0.3150	0.28	[0.17; 0.42]	5.9%
Farag et al., 2022	-0.7973	0.1882	0.31	[0.24; 0.39]	6.3%
Random effects model (HK)			**0.11**	**[0.07; 0.17]**	**100.0%**
Heterogeneity: $I^2 = 87\%$ [82%; 91%], $\tau^2 = 0.8793$, $p < 0.01$					
Test for subgroup differences: $\chi^2_1 = 3.90$, df = 1 ($p = 0.05$)					



IVH: intraventricular haemorrhage; HOL: hours of life

eFigure 8. IVH rate up to 48 HOL of all preterm infants in the subgroups before and after 2007

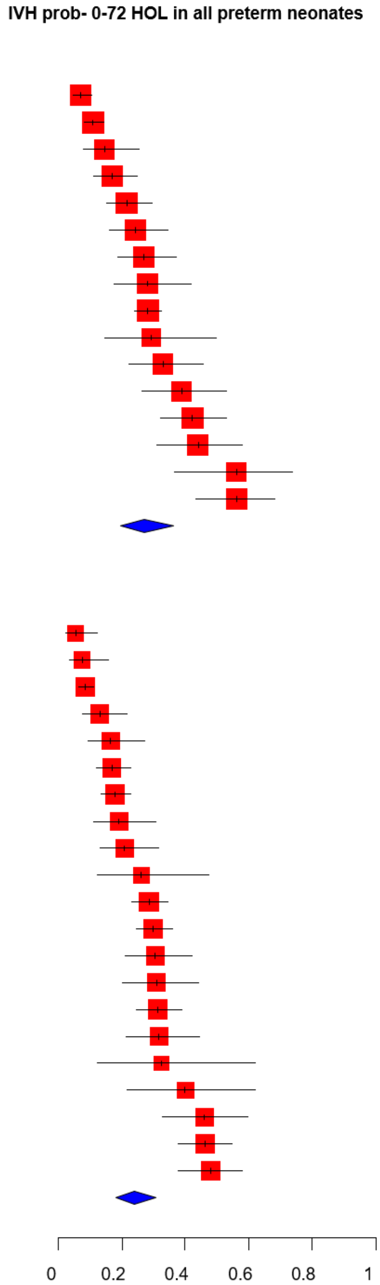
study	logit	se	Proportion	CI	w.random
subgroup1 = before 2007					
Amato et al., 1989	-2.1972	0.4711	0.10	[0.04; 0.22]	5.9%
Krediet et al., 2006	-1.6020	0.2515	0.17	[0.11; 0.25]	7.6%
Thorburn et al., 1982	-1.5177	0.2760	0.18	[0.11; 0.27]	7.4%
Van Bel et al., 2002	-1.3566	0.2720	0.20	[0.13; 0.31]	7.5%
Weindling et al., 1985	-1.3267	0.3120	0.21	[0.13; 0.33]	7.2%
Kluckow et al., 2000	-1.2992	0.2174	0.21	[0.15; 0.29]	7.8%
Meek et al., 1998	-1.0986	0.4715	0.25	[0.12; 0.46]	5.9%
Dolfin et al., 1983	-0.9474	0.2861	0.28	[0.18; 0.40]	7.4%
Rumack et al., 1985	-0.8184	0.3098	0.31	[0.19; 0.45]	7.2%
Dani et al., 2005	-0.7277	0.1612	0.33	[0.26; 0.40]	8.2%
McDonald et al., 1984	-0.5754	0.2947	0.36	[0.24; 0.50]	7.3%
Ment et al., 1984	-0.1942	0.3610	0.45	[0.29; 0.63]	6.8%
Perlman et al., 1983	0.0352	0.2649	0.51	[0.38; 0.64]	7.5%
Iyer et al., 2015	0.2412	0.4030	0.56	[0.37; 0.74]	6.4%
Random effects model (HK)			**0.28**	**[0.21; 0.36]**	**100.0%**
Heterogeneity: $I^2 = 76\%$ [60%; 86%], $\tau^2 = 0.2995$, $p < 0.01$					
subgroup2 = after 2007					
Galderisi et al., 2019	-5.2933	2.0050	0.00	[0.00; 0.20]	0.8%
Ikeda et al., 2014	-3.2507	0.5904	0.04	[0.01; 0.11]	4.1%
Schreiner et al., 2021	-2.8248	0.1873	0.06	[0.04; 0.08]	6.6%
Ishiguro et al., 2014	-2.2219	0.4386	0.10	[0.04; 0.20]	5.1%
Katheria et al., 2018	-2.1708	0.2927	0.10	[0.06; 0.17]	6.0%
Duppré et al., 2015	-1.9924	0.1951	0.12	[0.09; 0.17]	6.6%
Tanaka et al., 2022	-1.9277	0.3779	0.13	[0.06; 0.23]	5.5%
Lampe et al., 2019	-1.8012	0.1801	0.14	[0.10; 0.19]	6.6%
Martini et al., 2022	-1.7914	0.3919	0.14	[0.07; 0.26]	5.4%
Zanelli et al., 2021	-1.3285	0.1667	0.21	[0.16; 0.27]	6.7%
Alderliesten et al., 2013	-1.2610	0.1006	0.22	[0.19; 0.26]	6.9%
Vesoulis et al., 2019	-1.1764	0.1882	0.24	[0.18; 0.31]	6.6%
Rojas et al, 2021	-1.0986	0.2720	0.25	[0.16; 0.36]	6.1%
Da Costa et al., 2018	-0.8043	0.2917	0.31	[0.20; 0.44]	6.0%
Juul et al., 2020	-0.7345	0.6267	0.32	[0.12; 0.62]	3.9%
Cimatti et al., 2020	-0.6190	0.4690	0.35	[0.18; 0.57]	4.9%
Deshpande et al., 2020	-0.4055	0.2887	0.40	[0.27; 0.54]	6.0%
El-Dib et al., 2022	-0.3921	0.2739	0.40	[0.28; 0.54]	6.1%
Random effects model (HK)			**0.18**	**[0.12; 0.25]**	**100.0%**
Heterogeneity: $I^2 = 87\%$ [82%; 91%], $\tau^2 = 0.5175$, $p < 0.01$					
Test for subgroup differences: $\chi^2_1 = 4.77$, df = 1 ($p = 0.03$)					



IVH: intraventricular haemorrhage; HOL: hours of life

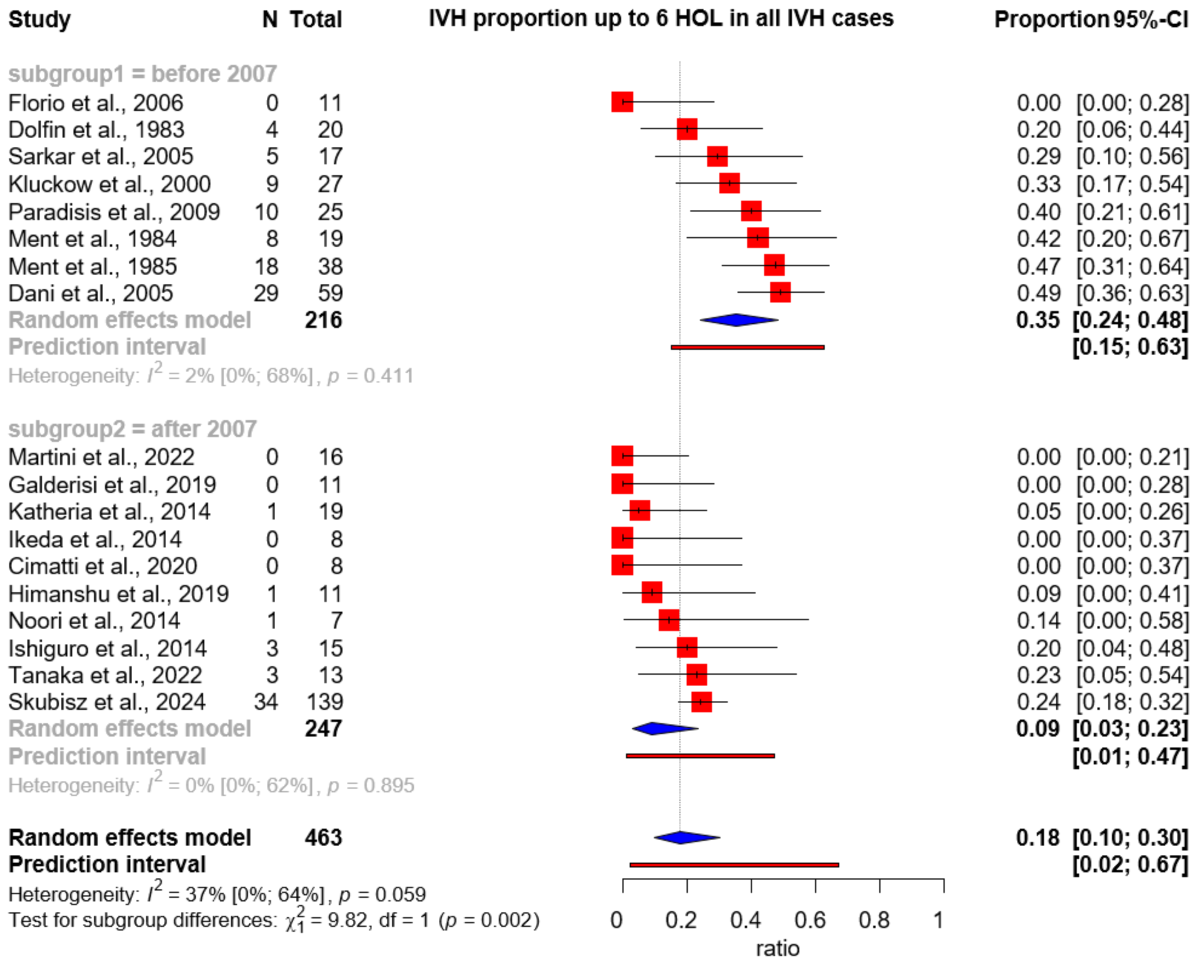
eFigure 9. IVH rate up to 72 HOL of all preterm infants in the subgroups before and after 2007

study	logit	se	proportion	CI	w.random
subgroup1 = before 2007					
Zanardo et al., 2008	-2.5915	0.2318	0.07	[0.05; 0.11]	6.5%
Salafia et al., 1995	-2.1072	0.1593	0.11	[0.08; 0.14]	6.9%
Sarkar et al., 2005	-1.7728	0.3601	0.15	[0.08; 0.26]	5.7%
Krediet et al., 2006	-1.6020	0.2515	0.17	[0.11; 0.25]	6.4%
Kluckow et al., 2000	-1.2992	0.2174	0.21	[0.15; 0.29]	6.6%
Van Bel et al., 2002	-1.1472	0.2564	0.24	[0.16; 0.34]	6.4%
Thorburn et al., 1982	-0.9961	0.2386	0.27	[0.19; 0.37]	6.5%
Amato et al., 1989	-0.9445	0.3150	0.28	[0.17; 0.42]	6.0%
Perlman et al., 1986	-0.9430	0.1086	0.28	[0.24; 0.33]	7.0%
Meek et al., 1998	-0.8871	0.4492	0.29	[0.15; 0.50]	5.1%
Dolfin et al., 1983	-0.7095	0.2738	0.33	[0.22; 0.46]	6.3%
Rumack et al., 1985	-0.4566	0.2932	0.39	[0.26; 0.53]	6.1%
Yang et al., 1990	-0.3158	0.2223	0.42	[0.32; 0.53]	6.6%
McDonald et al., 1984	-0.2412	0.2849	0.44	[0.31; 0.58]	6.2%
Iyer et al., 2015	0.2412	0.4029	0.56	[0.37; 0.74]	5.4%
Perlman et al., 1983	0.2468	0.2668	0.56	[0.43; 0.68]	6.3%
Random effects model (HK)			**0.27**	**[0.20; 0.36]**	**100.0%**
Heterogeneity: $I^2 = 90\%$ [86%; 93%], $\tau^2 = 0.5525$, $p < 0.01$					
subgroup2 = after 2007					
Kalani et al., 2016	-2.8672	0.4597	0.05	[0.02; 0.12]	4.0%
Ikeda et al., 2014	-2.5137	0.4243	0.07	[0.03; 0.16]	4.1%
Schreiner et al., 2021	-2.3892	0.1560	0.08	[0.06; 0.11]	5.4%
Ishiguro et al., 2014	-1.8974	0.3122	0.13	[0.08; 0.22]	4.7%
Najib et al., 2018	-1.6273	0.3301	0.16	[0.09; 0.27]	4.6%
Vesoulis et al., 2020	-1.6030	0.1969	0.17	[0.12; 0.23]	5.2%
Duppré et al., 2015	-1.5437	0.1662	0.18	[0.13; 0.23]	5.3%
Tanaka et al., 2022	-1.4468	0.3210	0.19	[0.11; 0.31]	4.7%
Martini et al., 2022	-1.3382	0.2892	0.21	[0.13; 0.32]	4.8%
Noori et al., 2014	-1.0413	0.4750	0.26	[0.12; 0.47]	3.9%
Shan et al., 2023	-0.9164	0.1436	0.29	[0.23; 0.35]	5.4%
Lampe et al., 2019	-0.8511	0.1369	0.30	[0.25; 0.36]	5.4%
Rojas et al, 2021	-0.8208	0.2559	0.31	[0.21; 0.42]	5.0%
Da Costa et al., 2018	-0.8043	0.2917	0.31	[0.20; 0.44]	4.8%
Vesoulis et al., 2019	-0.7903	0.1723	0.31	[0.24; 0.39]	5.3%
Katheria et al., 2014	-0.7690	0.2777	0.32	[0.21; 0.44]	4.9%
Juul et al., 2020	-0.7345	0.6267	0.32	[0.12; 0.62]	3.2%
Cimatti et al., 2020	-0.4055	0.4562	0.40	[0.21; 0.62]	4.0%
Deshpande et al., 2020	-0.1603	0.2838	0.46	[0.33; 0.60]	4.8%
Farag et al., 2022	-0.1519	0.1746	0.46	[0.38; 0.55]	5.3%
Jiang et al., 2023	-0.0869	0.2088	0.48	[0.38; 0.58]	5.2%
Random effects model (HK)			**0.24**	**[0.18; 0.31]**	**100.0%**
Heterogeneity: $I^2 = 90\%$ [86%; 93%], $\tau^2 = 0.4852$, $p < 0.01$					
Test for subgroup differences: $\chi^2_1 = 0.46$, df = 1 ($p = 0.50$)					



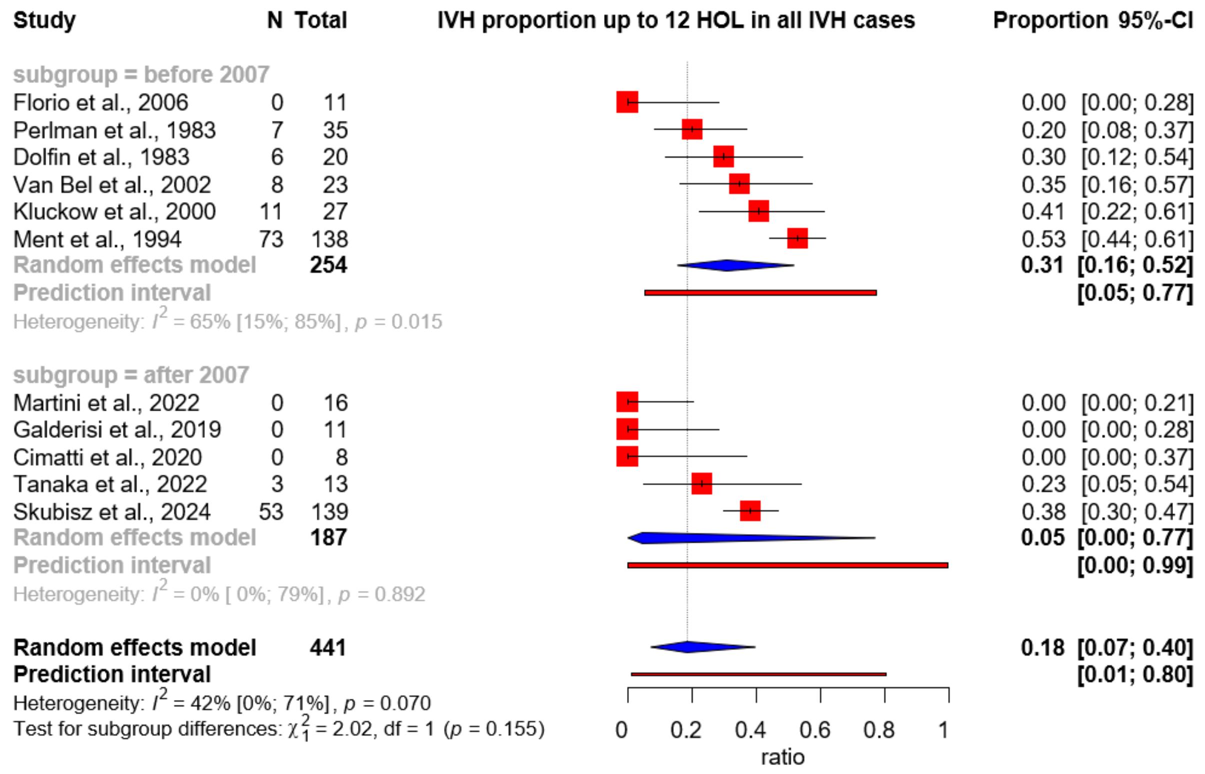
IVH: intraventricular haemorrhage; HOL: hours of life

eFigure 10: IVH rate up to 6 HOL in all IVH cases in the subgroups before and after 2007



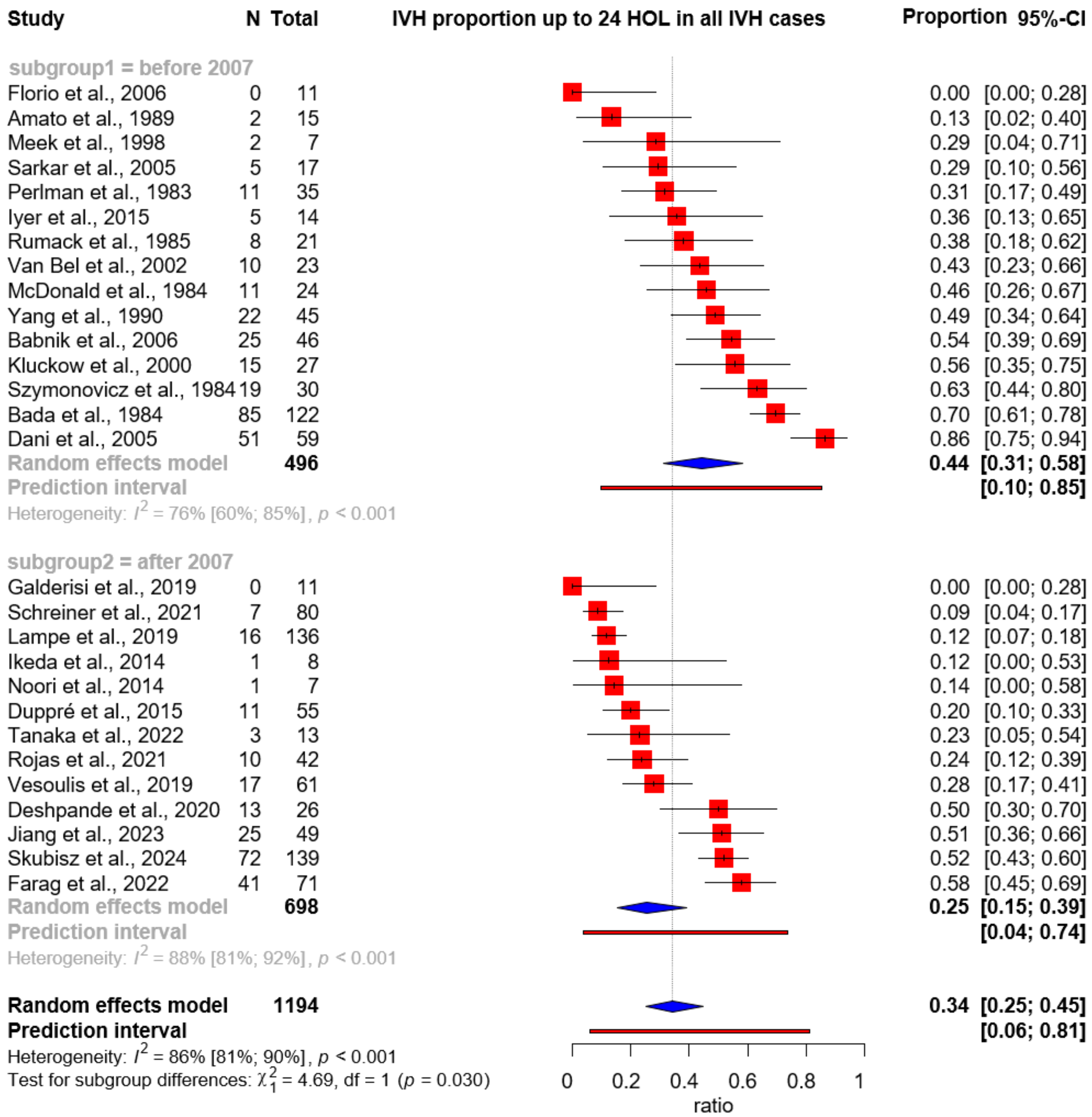
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 11: IVH rate up to 12 HOL in all IVH cases in the subgroups before and after 2007



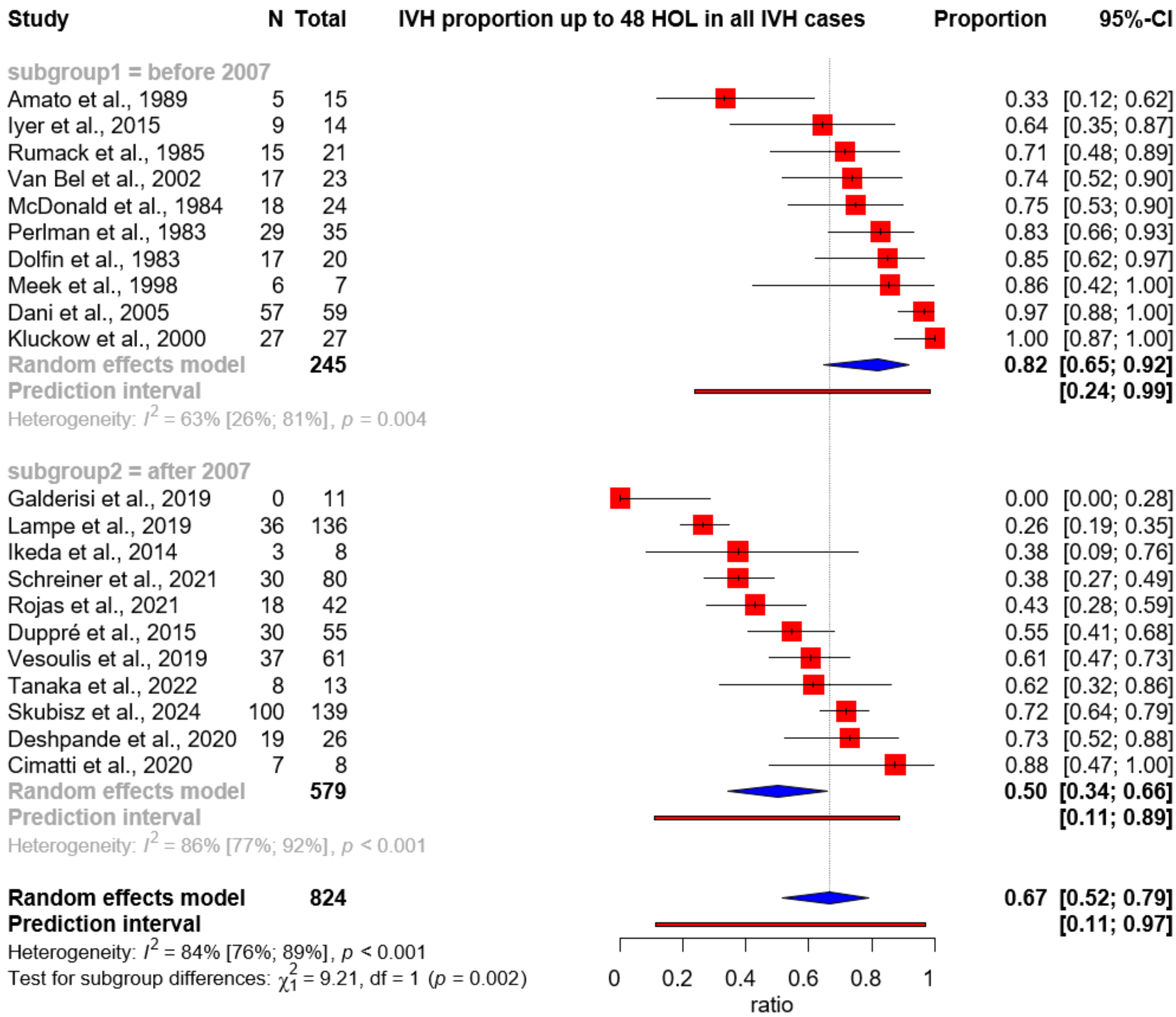
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 12: IVH rate up to 24 HOL in all IVH cases in the subgroups before and after 2007



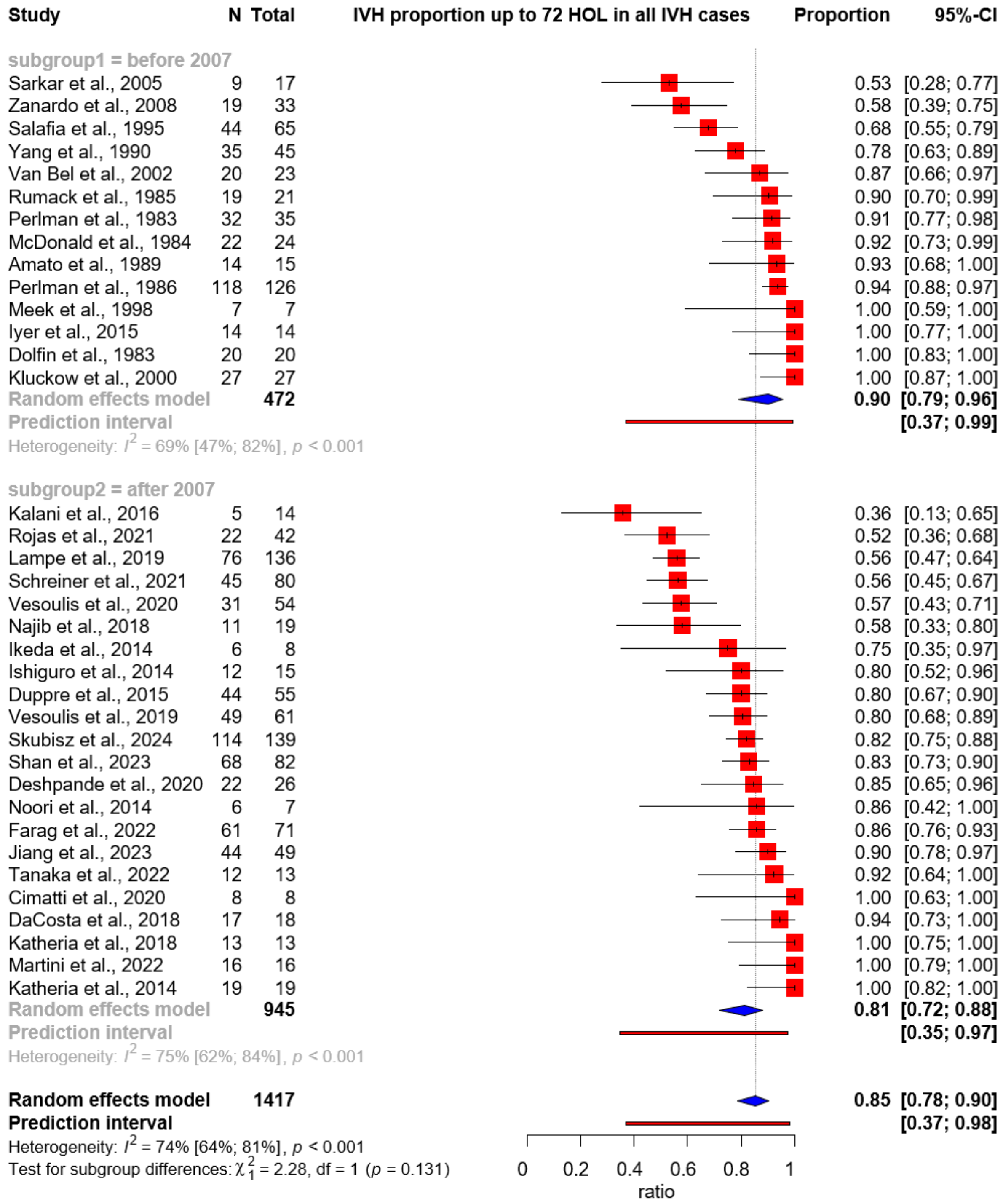
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 13.: IVH rate up to 48 HOL in all IVH cases in the subgroups before and after 2007



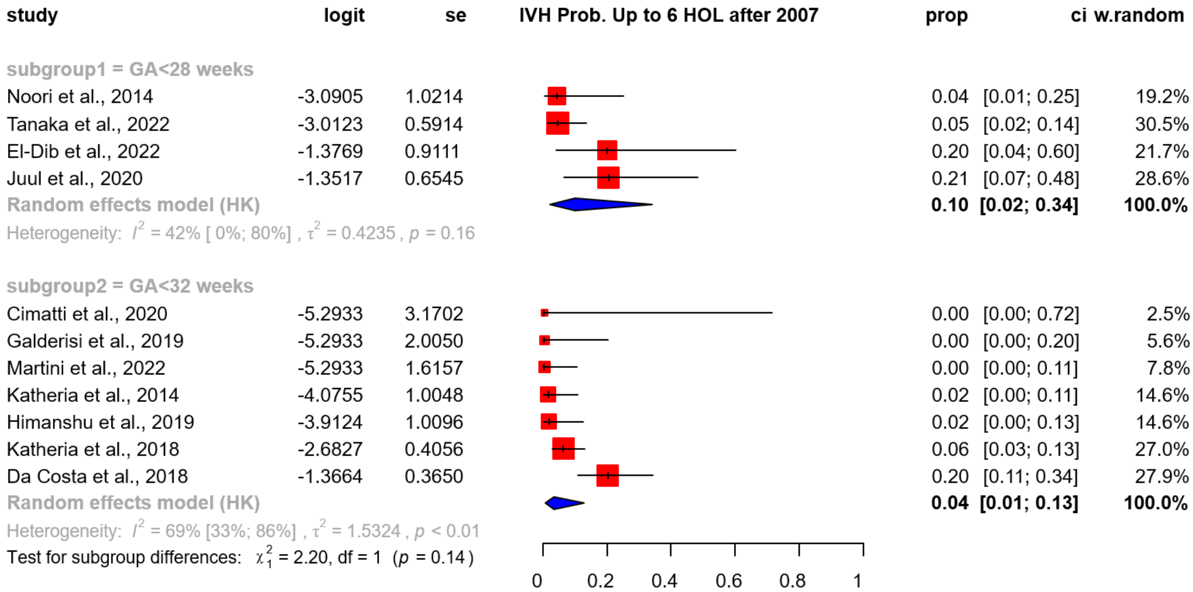
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 14.: IVH rate up to 72 HOL in all IVH cases in the subgroups before and after 2007



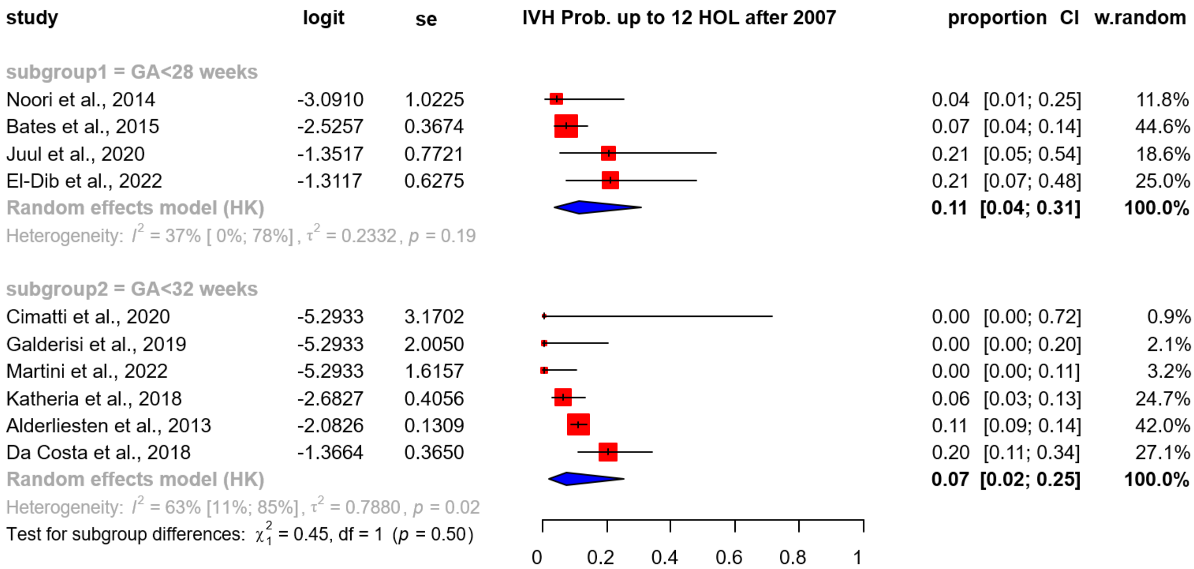
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 15. IVH rate up to 6 HOL by GA limits in GA<28, GA<32 in the subgroup after 2007



IVH: intraventricular hemorrhage; HOL: hours of life; GA: gestational age

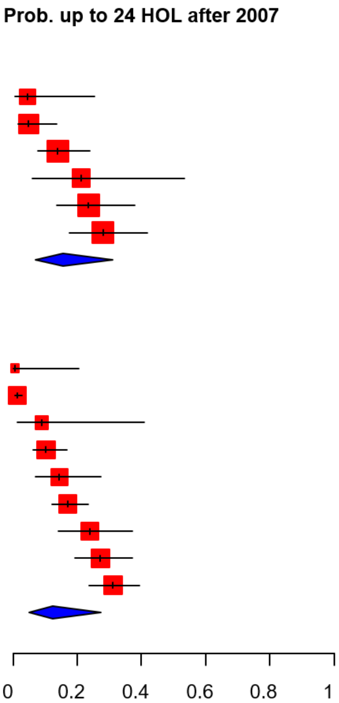
eFigure 16. IVH rate up to 12 HOL by GA limits in GA<28, GA<32 in the subgroup after 2007



IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 17. IVH rate up to 24 HOL by GA limits in GA<28, GA<32 in the subgroup after 2007

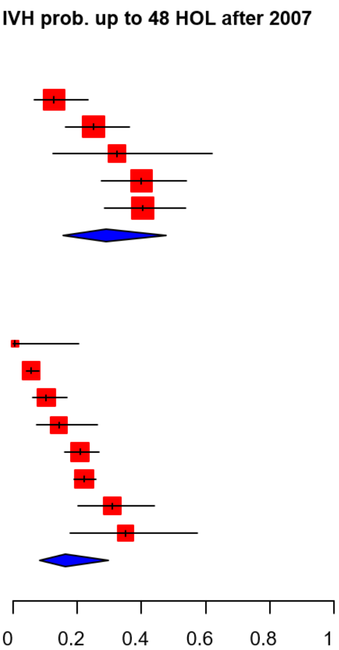
study	logit	se	proportion	CI	w.random
subgroup1 = GA<28 weeks					
Noori et al., 2014	-3.0910	1.0225	0.04	[0.01; 0.25]	10.3%
Tanaka et al., 2022	-3.0123	0.5914	0.05	[0.02; 0.14]	16.1%
Rojas et al, 2021	-1.8245	0.3411	0.14	[0.08; 0.24]	19.8%
El-Dib et al., 2022	-1.3117	0.7370	0.21	[0.06; 0.53]	13.9%
Juul et al., 2020	-1.1808	0.3478	0.23	[0.13; 0.38]	19.8%
Deshpande et al., 2020	-0.9445	0.3150	0.28	[0.17; 0.42]	20.2%
Random effects model (HK)			**0.15**	**[0.07; 0.31]**	**100.0%**
Heterogeneity: $I^2 = 64\%$ [13%; 85%], $\tau^2 = 0.4231$, $p = 0.02$					
subgroup2 = GA<32 weeks					
Galderisi et al., 2019	-5.2933	2.0050	0.00	[0.00; 0.20]	2.6%
Schreiner et al., 2021	-4.3220	0.3790	0.01	[0.01; 0.03]	12.3%
Cimatti et al., 2020	-2.3445	1.0057	0.09	[0.01; 0.41]	6.6%
Katheria et al., 2018	-2.1708	0.2927	0.10	[0.06; 0.17]	13.0%
Martini et al., 2022	-1.7914	0.4180	0.14	[0.07; 0.27]	11.9%
Alderliesten et al., 2013	-1.5856	0.2062	0.17	[0.12; 0.23]	13.6%
Da Costa et al., 2018	-1.1637	0.3286	0.24	[0.14; 0.37]	12.7%
Jiang et al., 2023	-0.9860	0.2345	0.27	[0.19; 0.37]	13.5%
Farag et al., 2022	-0.7973	0.1882	0.31	[0.24; 0.39]	13.7%
Random effects model (HK)			**0.12**	**[0.05; 0.27]**	**100.0%**
Heterogeneity: $I^2 = 91\%$ [84%; 94%], $\tau^2 = 1.2490$, $p < 0.01$					
Test for subgroup differences: $\chi^2_1 = 0.21$, df = 1 ($p = 0.65$)					



IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

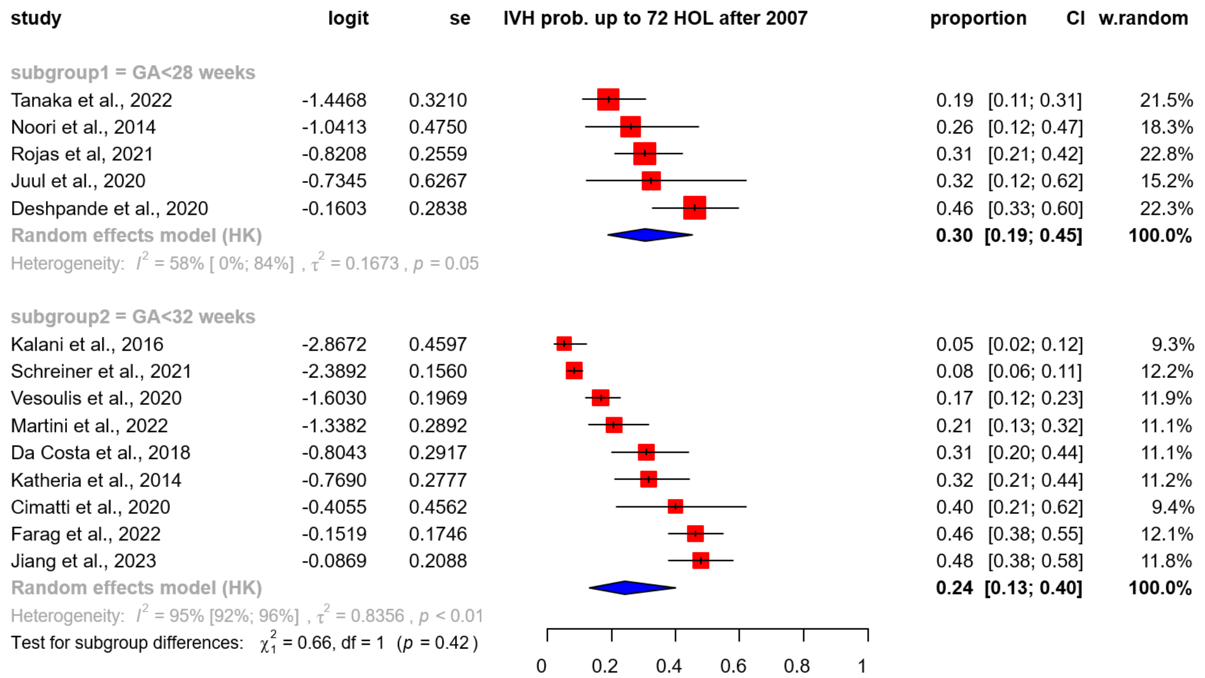
eFigure 18. IVH rate up to 48 HOL by GA limits in GA<28, GA<32 in the subgroup after 2007

study	logit	se	proportion	CI	w.random
subgroup1 = GA<28 weeks					
Tanaka et al., 2022	-1.9277	0.3779	0.13	[0.06; 0.23]	19.8%
Rojas et al, 2021	-1.0986	0.2720	0.25	[0.16; 0.36]	22.0%
Juul et al., 2020	-0.7345	0.6267	0.32	[0.12; 0.62]	14.5%
Deshpande et al., 2020	-0.4055	0.2887	0.40	[0.27; 0.54]	21.7%
El-Dib et al., 2022	-0.3921	0.2739	0.40	[0.28; 0.54]	22.0%
Random effects model (HK)			**0.29**	**[0.15; 0.48]**	**100.0%**
Heterogeneity: $I^2 = 72\%$ [29%; 89%], $\tau^2 = 0.2997$, $p < 0.01$					
subgroup2 = GA<32 weeks					
Galderisi et al., 2019	-5.2933	2.0050	0.00	[0.00; 0.20]	1.9%
Schreiner et al., 2021	-2.8248	0.1873	0.06	[0.04; 0.08]	15.1%
Katheria et al., 2018	-2.1708	0.2927	0.10	[0.06; 0.17]	13.9%
Martini et al., 2022	-1.7914	0.3919	0.14	[0.07; 0.26]	12.5%
Zanelli et al., 2021	-1.3285	0.1667	0.21	[0.16; 0.27]	15.3%
Alderliesten et al., 2013	-1.2610	0.1006	0.22	[0.19; 0.26]	15.8%
Da Costa et al., 2018	-0.8043	0.2917	0.31	[0.20; 0.44]	13.9%
Cimatti et al., 2020	-0.6190	0.4690	0.35	[0.18; 0.57]	11.4%
Random effects model (HK)			**0.16**	**[0.08; 0.30]**	**100.0%**
Heterogeneity: $I^2 = 91\%$ [84%; 95%], $\tau^2 = 0.5490$, $p < 0.01$					
Test for subgroup differences: $\chi^2_1 = 2.88$, df = 1 ($p = 0.09$)					



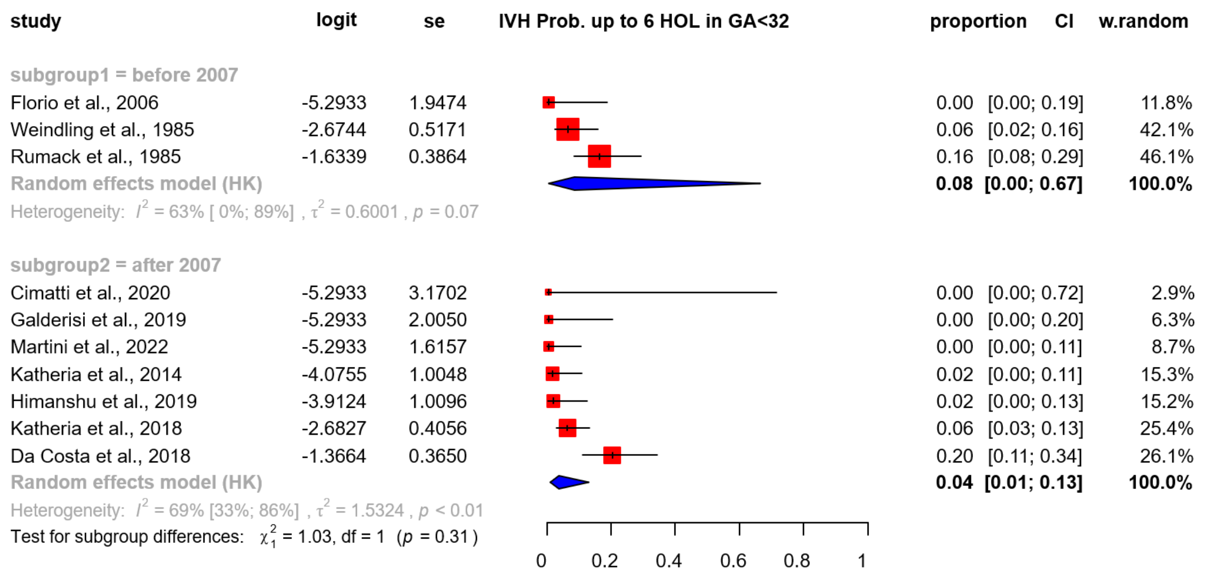
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 19. IVH rate up to 72 HOL by GA limits in GA<28, GA<32 in the subgroup after 2007



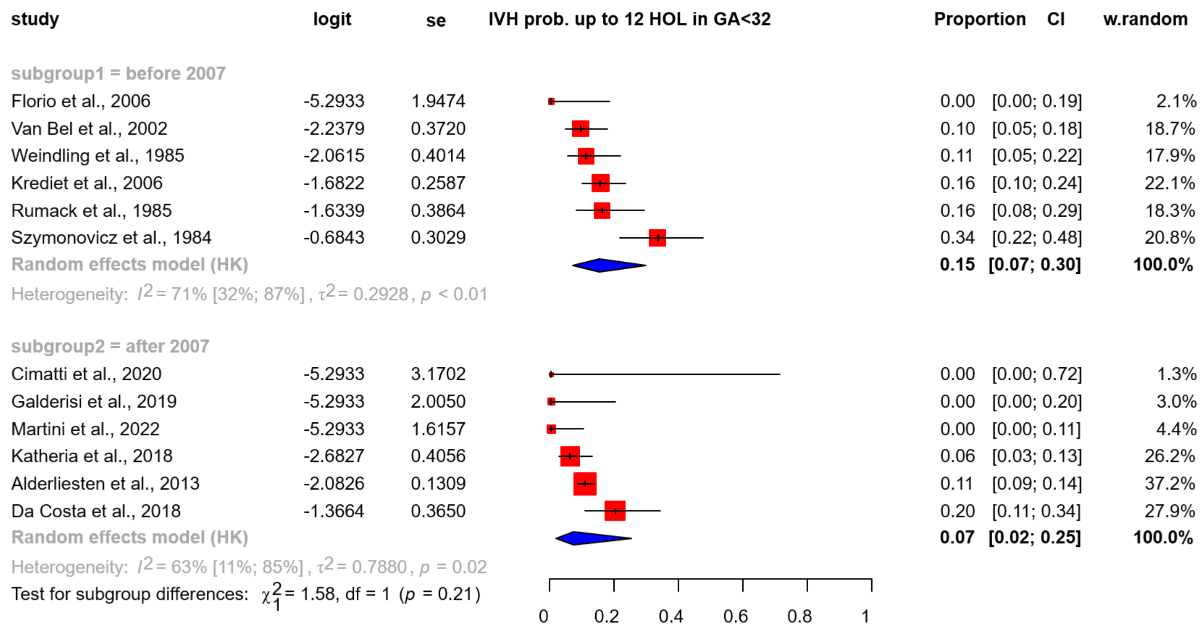
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 20. IVH rate up to 6 HOL in GA<32 in the subgroups before and after 2007



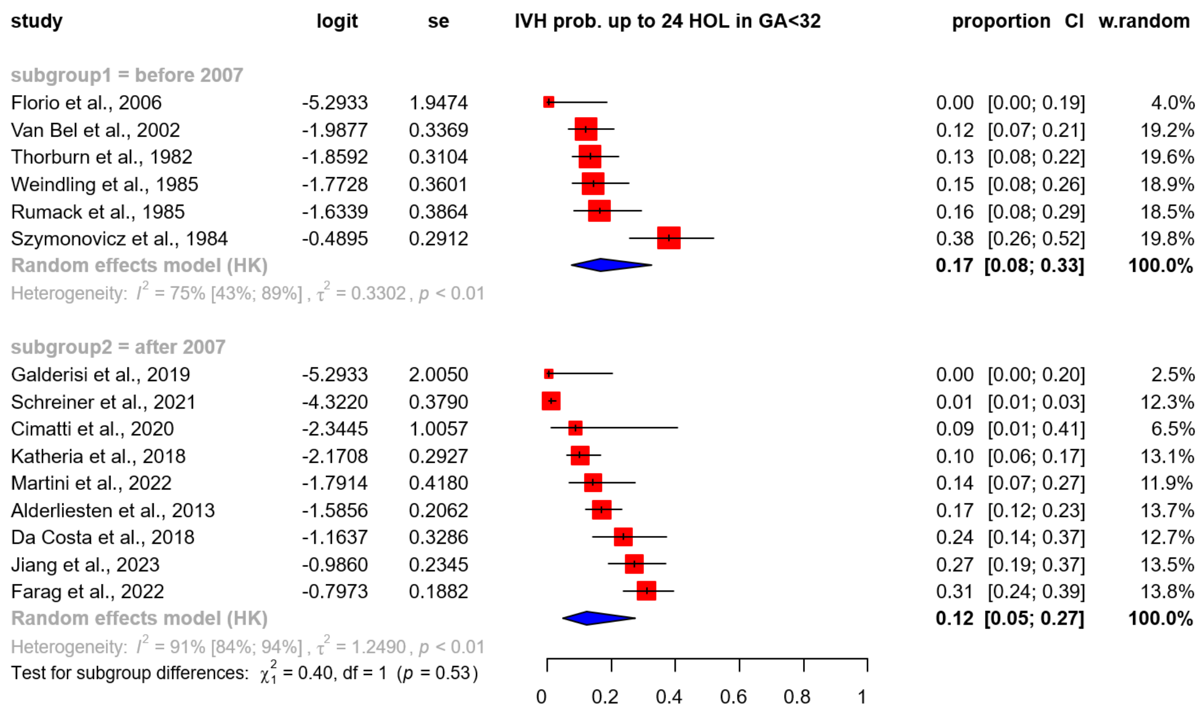
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 21. IVH rate up to 12 HOL in GA<32 in the subgroups before and after 2007



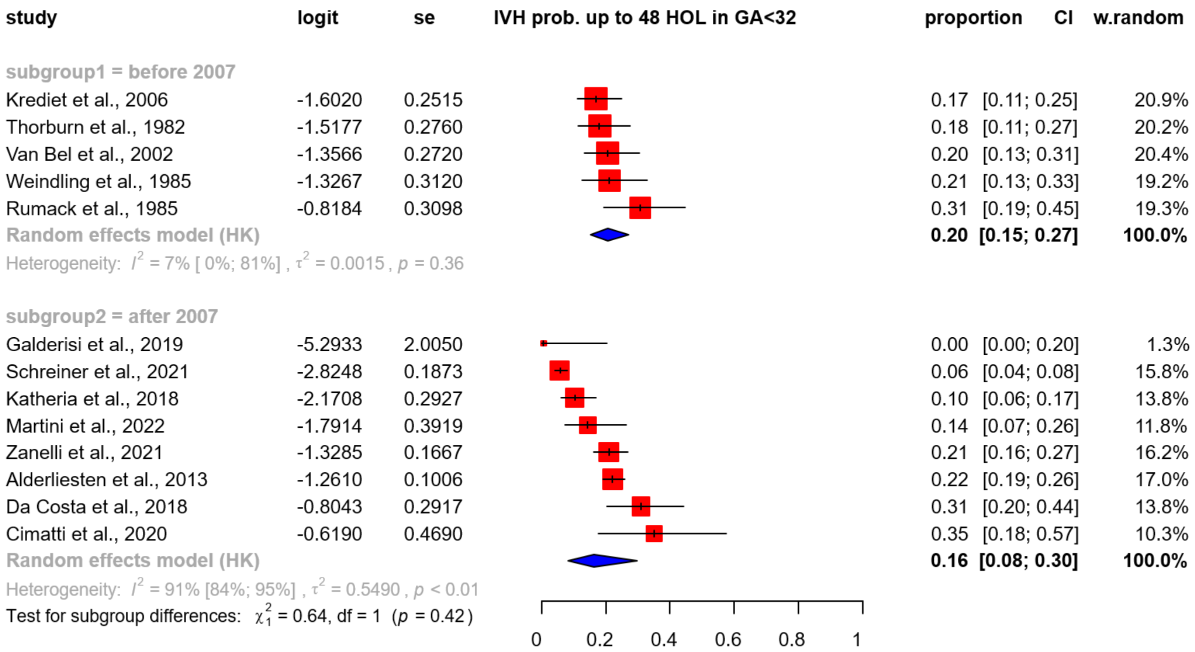
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 22. IVH rate up to 24 HOL in GA<32 in the subgroups before and after 2007



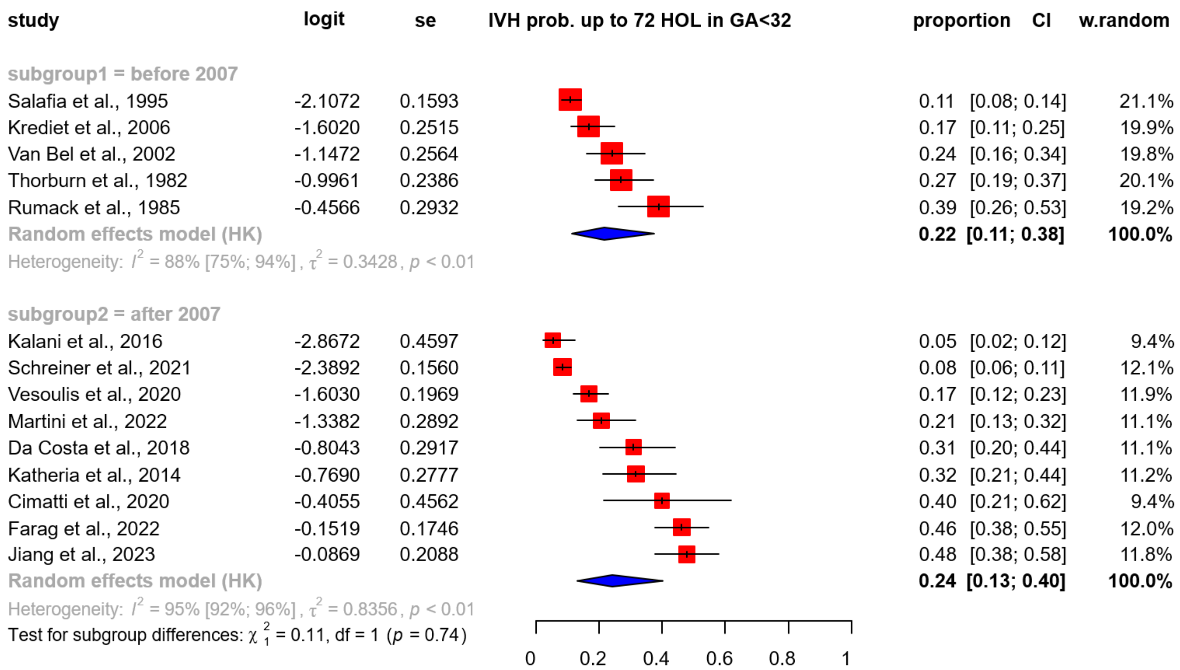
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 23. IVH rate up to 48 HOL in GA<32 in the subgroups before and after 2007



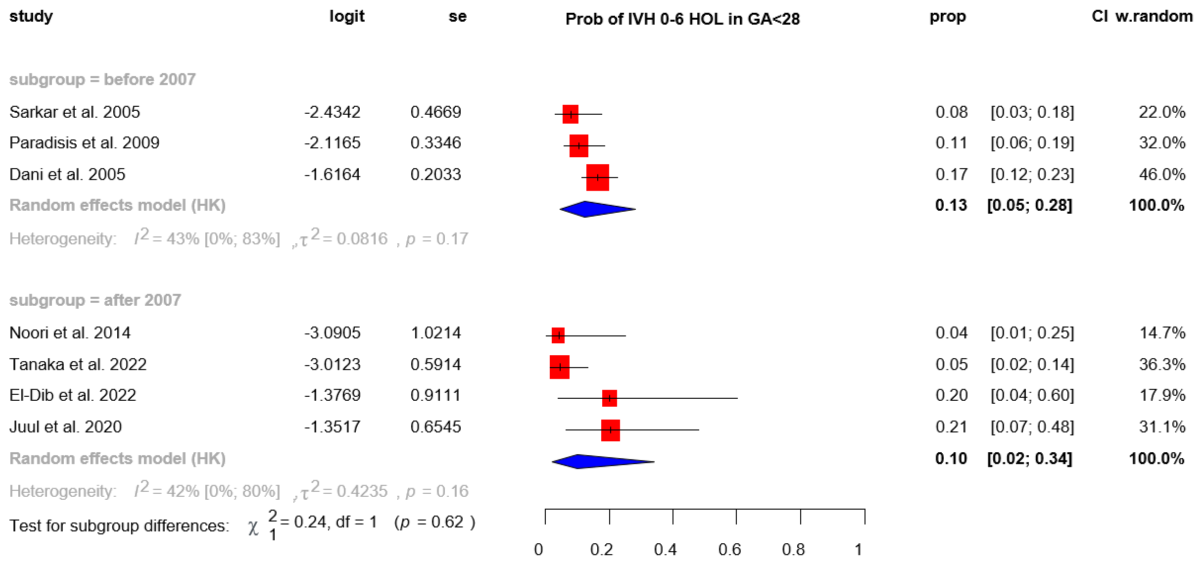
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 24. IVH rate up to 72 HOL in GA<32 in the subgroups before and after 2007



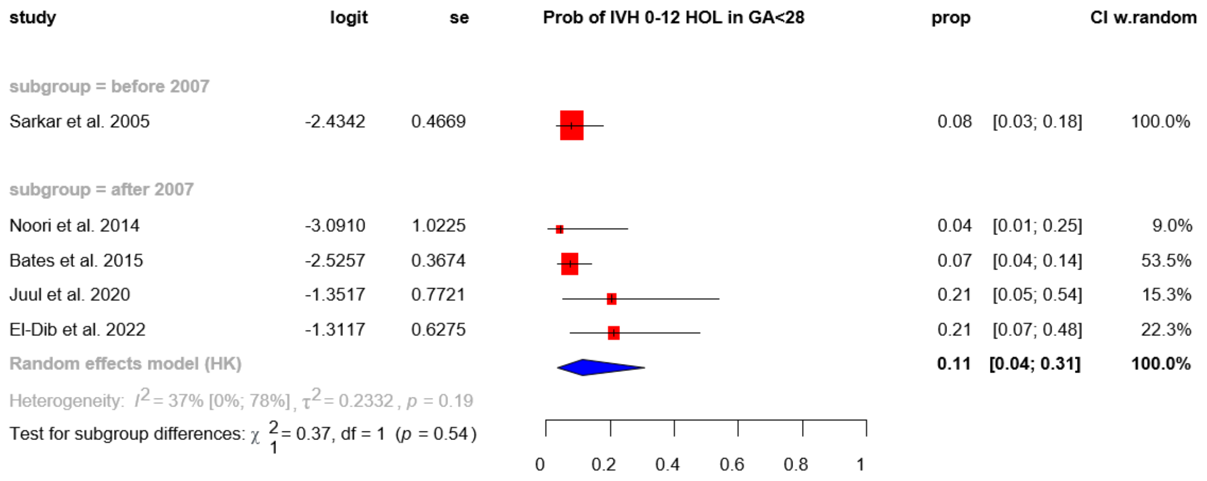
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 25. IVH rate up to 6 HOL in GA<28 in the subgroups before and after 2007



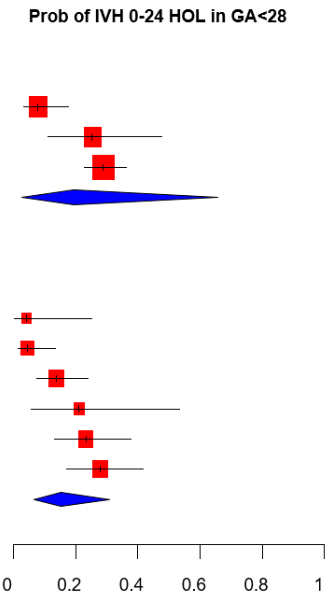
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 26. Overall IVH rate up to 12 HOL in GA<28 in the subgroups before and after 2007



IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

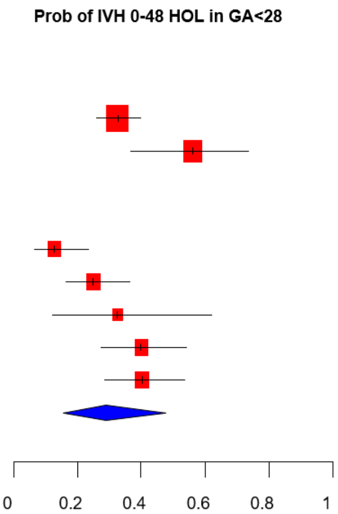
eFigure 27. IVH rate up to 24 HOL in GA<28 in the subgroups before and after 2007



study	logit	se	prop	CI	w.random
subgroup = before 2007					
Sarkar et al. 2005	-2.4342	0.4669	0.08	[0.03; 0.18]	29.4%
Iyer et al. 2015	-1.0748	0.5028	0.25	[0.11; 0.48]	27.8%
Dani et al. 2005	-0.8886	0.1666	0.29	[0.23; 0.36]	42.9%
Random effects model (HK)			**0.20**	**[0.03; 0.66]**	**100.0%**
Heterogeneity: $I^2 = 79\%$ [35%; 94%], $\tau^2 = 0.5374$, $p < 0.01$					
subgroup = after 2007					
Noori et al. 2014	-3.0910	1.0225	0.04	[0.01; 0.25]	7.6%
Tanaka et al. 2022	-3.0123	0.5914	0.05	[0.02; 0.14]	14.8%
Rojas et al. 2021	-1.8245	0.3411	0.14	[0.08; 0.24]	21.7%
El-Dib et al. 2022	-1.3117	0.7370	0.21	[0.06; 0.53]	11.8%
Juul et al. 2020	-1.1808	0.3478	0.23	[0.13; 0.38]	21.5%
Deshpande et al. 2020	-0.9445	0.3150	0.28	[0.17; 0.42]	22.5%
Random effects model (HK)			**0.15**	**[0.07; 0.31]**	**100.0%**
Heterogeneity: $I^2 = 64\%$ [13%; 85%], $\tau^2 = 0.4231$, $p = 0.02$					
Test for subgroup differences: $\chi^2_1 = 0.25$, df = 1 ($p = 0.62$)					

IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 28. Overall IVH rate up to 48 HOL in GA<28 in the subgroups before and after 2007



study	logit	se	prop	CI	w.random
subgroup = before 2007					
Dani et al. 2005	-0.7277	0.1612	0.33	[0.26; 0.40]	58.8%
Iyer et al. 2015	0.2412	0.4030	0.56	[0.37; 0.74]	41.2%
subgroup = after 2007					
Tanaka et al. 2022	-1.9277	0.3779	0.13	[0.06; 0.23]	19.4%
Rojas et al. 2021	-1.0986	0.2720	0.25	[0.16; 0.36]	23.0%
Juul et al. 2020	-0.7345	0.6267	0.32	[0.12; 0.62]	12.3%
Deshpande et al. 2020	-0.4055	0.2887	0.40	[0.27; 0.54]	22.4%
El-Dib et al. 2022	-0.3921	0.2739	0.40	[0.28; 0.54]	22.9%
Random effects model (HK)			**0.29**	**[0.15; 0.48]**	**100.0%**
Heterogeneity: $I^2 = 72\%$ [29%; 89%], $\tau^2 = 0.2997$, $p < 0.01$					
Test for subgroup differences: $\chi^2_1 = 1.09$, df = 1 ($p = 0.30$)					

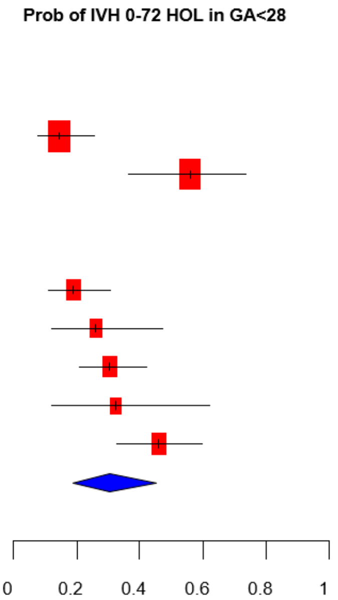
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 29. Overall IVH rate up to 72 HOL in GA<28 in the subgroups before and after 2007

study	logit	se	prop	CI	w.random
subgroup = before 2007					
Sarkar et al. 2005	-1.7728	0.3601	0.15	[0.08; 0.26]	51.6%
Iyer et al. 2015	0.2412	0.4029	0.56	[0.37; 0.74]	48.4%
subgroup = after 2007					
Tanaka et al. 2022	-1.4468	0.3210	0.19	[0.11; 0.31]	22.0%
Noori et al. 2014	-1.0413	0.4750	0.26	[0.12; 0.47]	17.5%
Rojas et al. 2021	-0.8208	0.2559	0.31	[0.21; 0.42]	23.8%
Juul et al. 2020	-0.7345	0.6267	0.32	[0.12; 0.62]	13.7%
Deshpande et al. 2020	-0.1603	0.2838	0.46	[0.33; 0.60]	23.0%
Random effects model (HK)			**0.30**	**[0.19; 0.45]**	**100.0%**

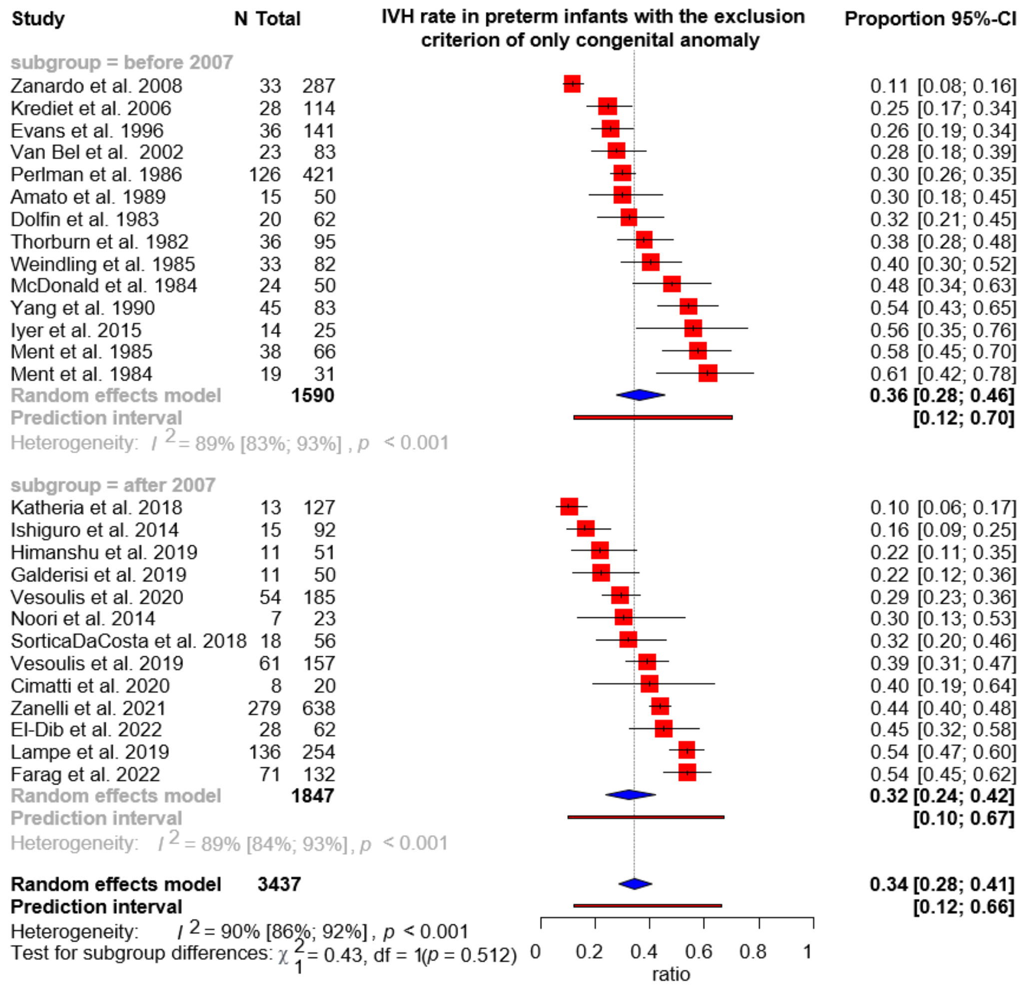
Heterogeneity: $I^2 = 58\%$ [0%; 84%], $\tau^2 = 0.1673$, $p = 0.05$

Test for subgroup differences: $\chi^2_1 = 0.00$, df = 1 ($p = 0.96$)



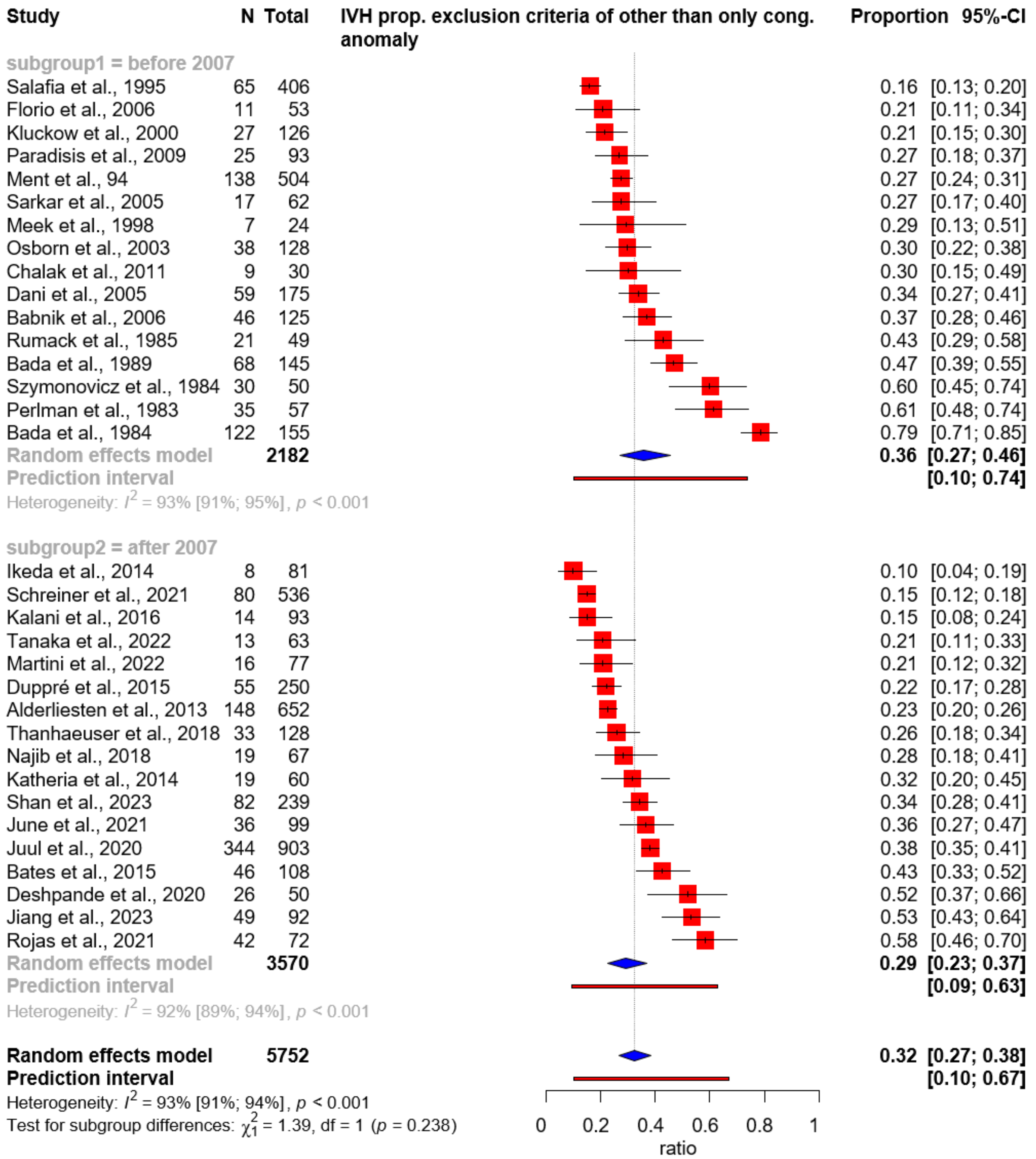
IVH, intraventricular hemorrhage; HOL, hours of life; GA: gestational age

eFigure 30. IVH rate by before and after 2007 exclusion criteria of only congenital anomaly among preterm neonates



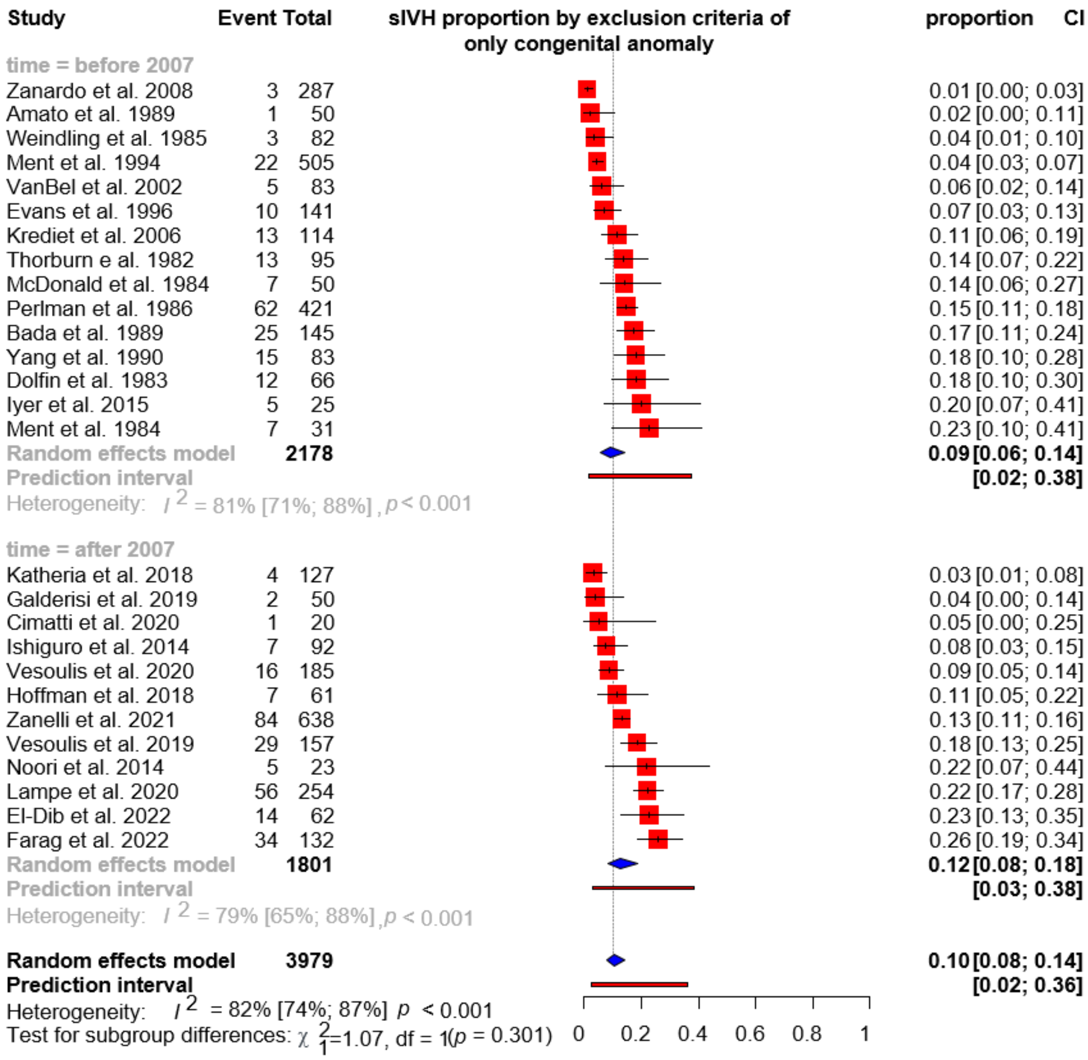
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 31. IVH rate by before and after 2007 exclusion criteria of other than only congenital anomaly among preterm neonates



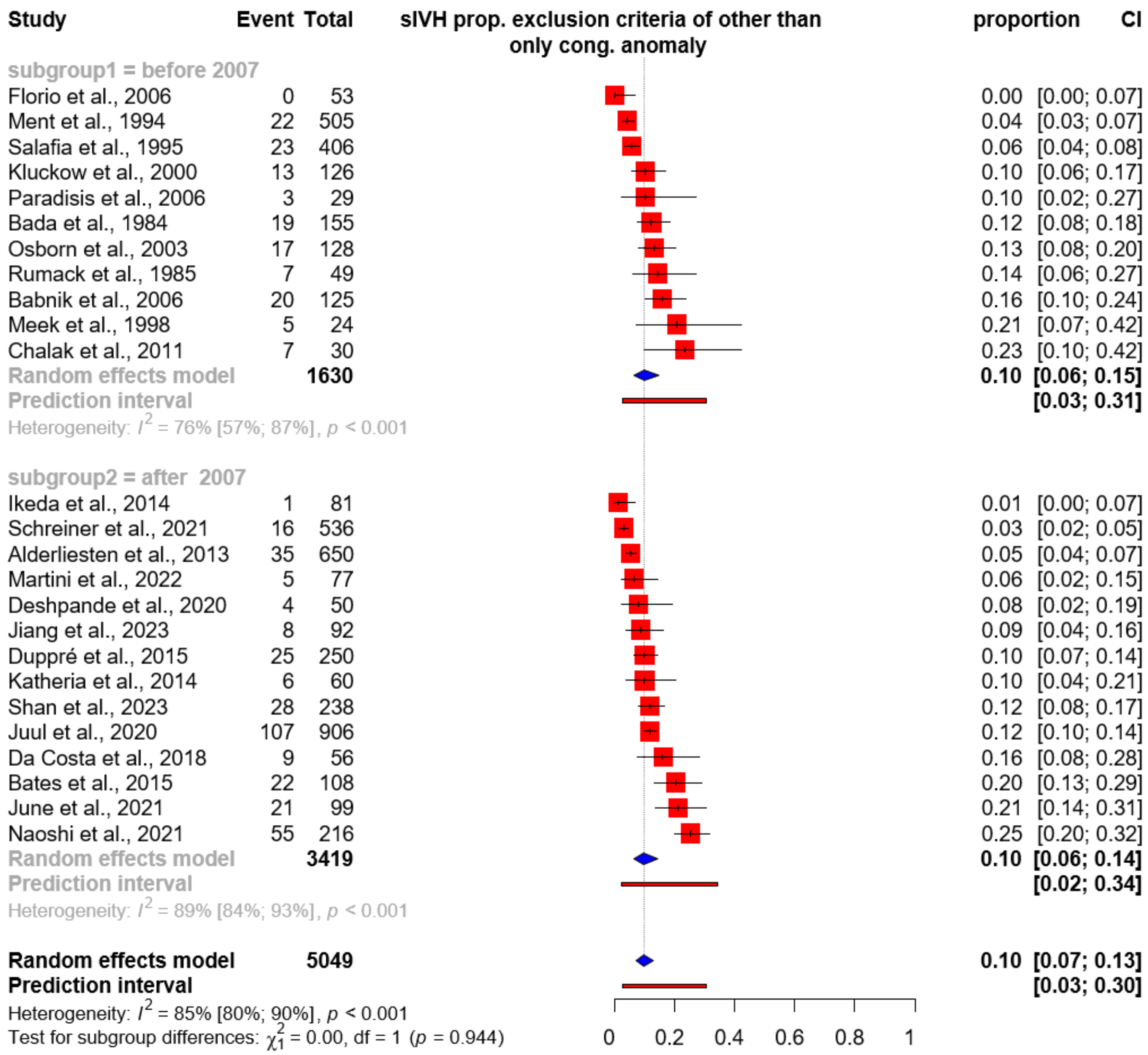
IVH, intraventricular hemorrhage; HOL, hours of life

eFigure 32. sIVH rate by exclusion criteria of only congenital anomaly among preterm neonates in the subgroups before and after 2007



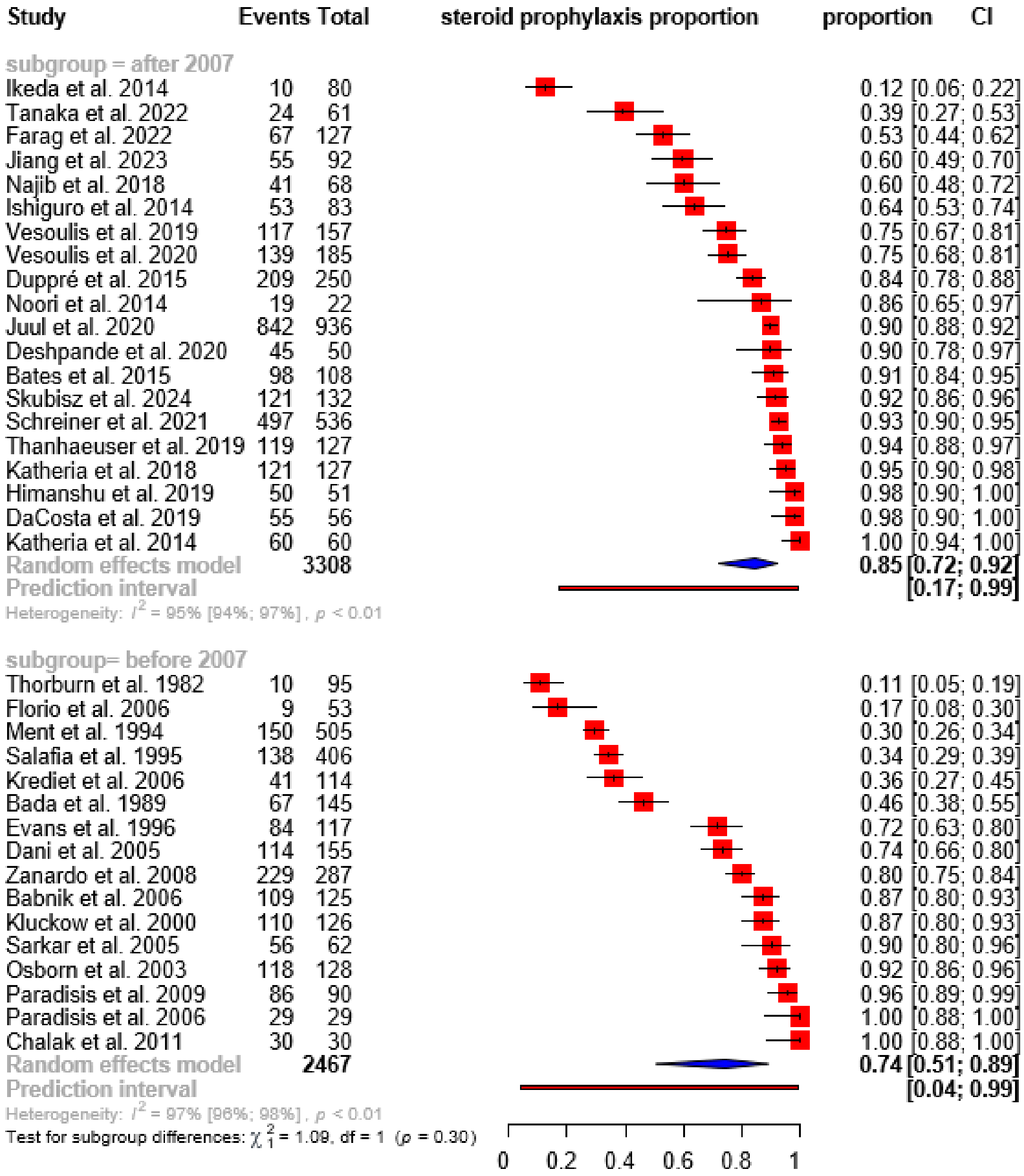
sIVH, severe intraventricular hemorrhage; HOL, hours of life, CI: Confidence Intervals

eFigure 33. sIVH rate by exclusion criteria of other than only congenital anomaly among preterm neonates in the subgroups before and after 2007



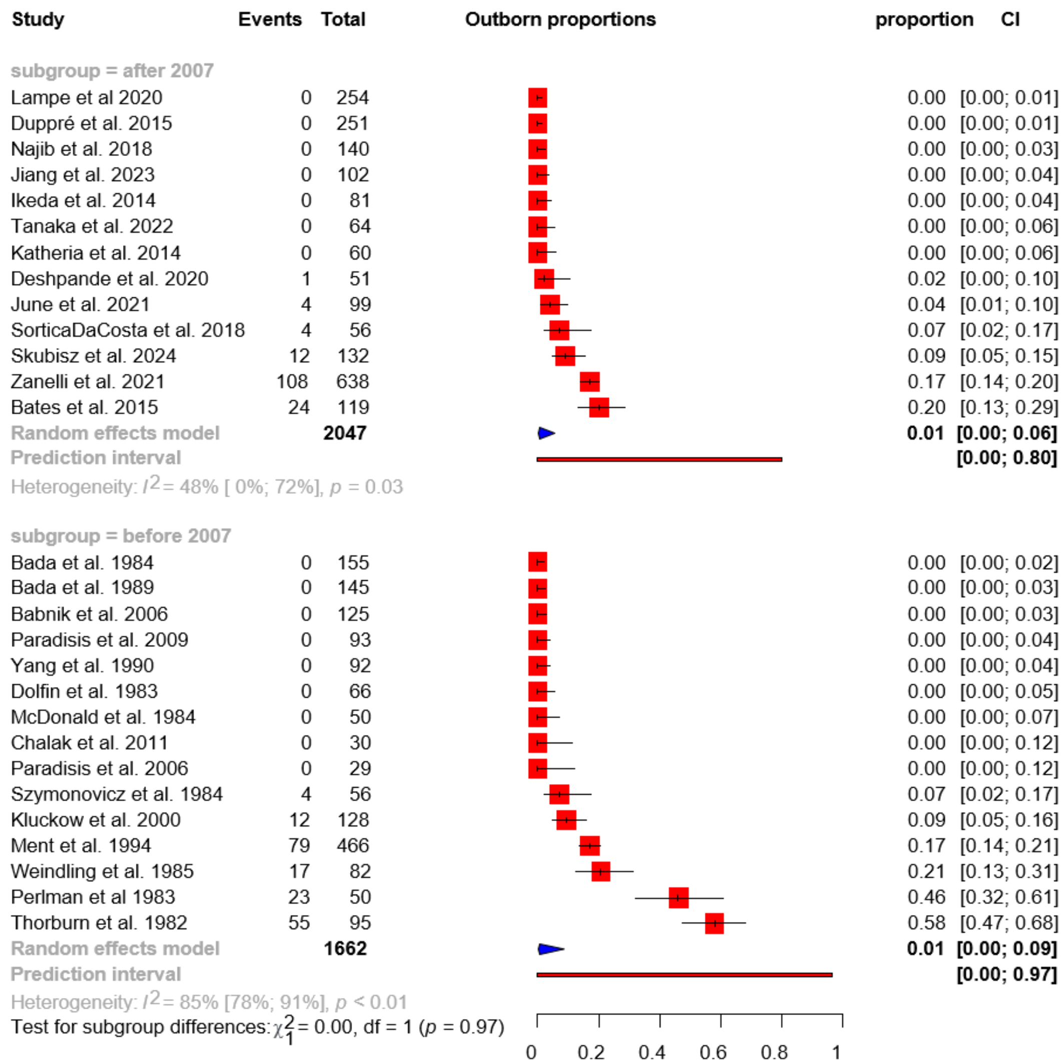
sIVH, severe intraventricular hemorrhage; HOL, hours of life, CI: Confidence Intervals

eFigure 34. Antenatal steroid rate in the subgroups before and after 2007



CI: Confidence Intervals

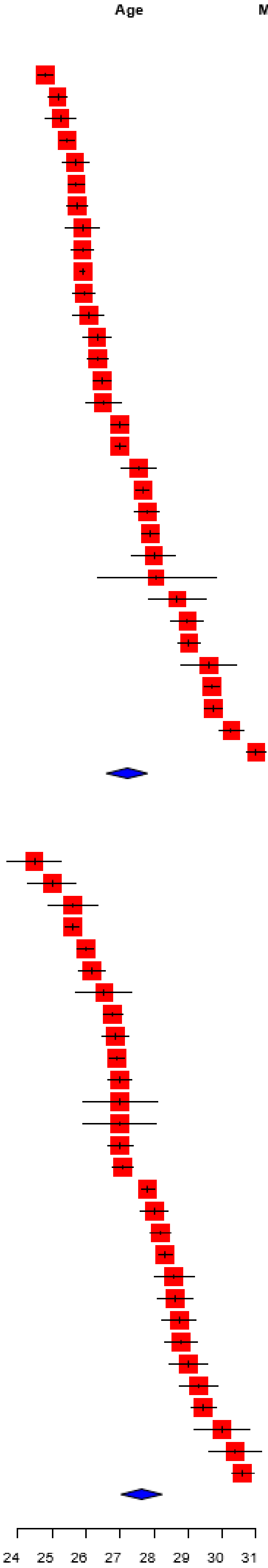
eFigure 35. Outborn rate in the subgroups before and after 2007



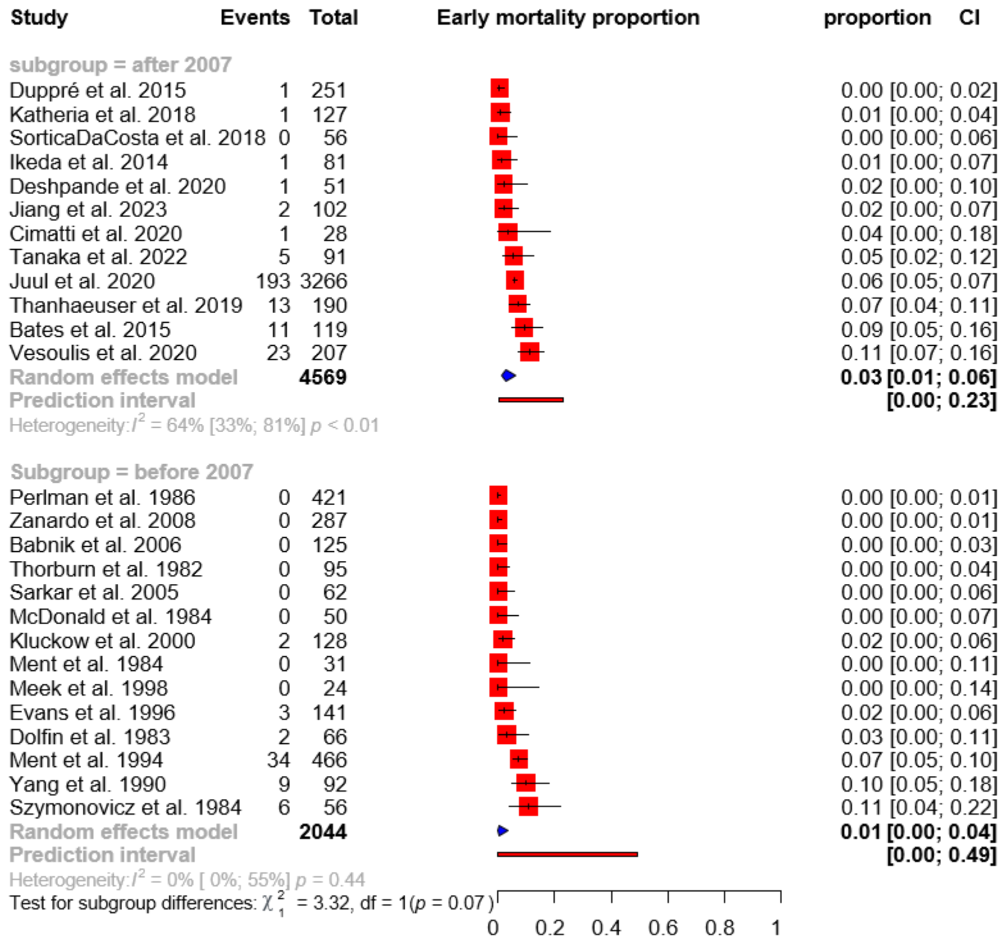
CI: Confidence Intervals

eFigure 36. The pooled mean gestational age within subgroups with study data periods before and after 2007.

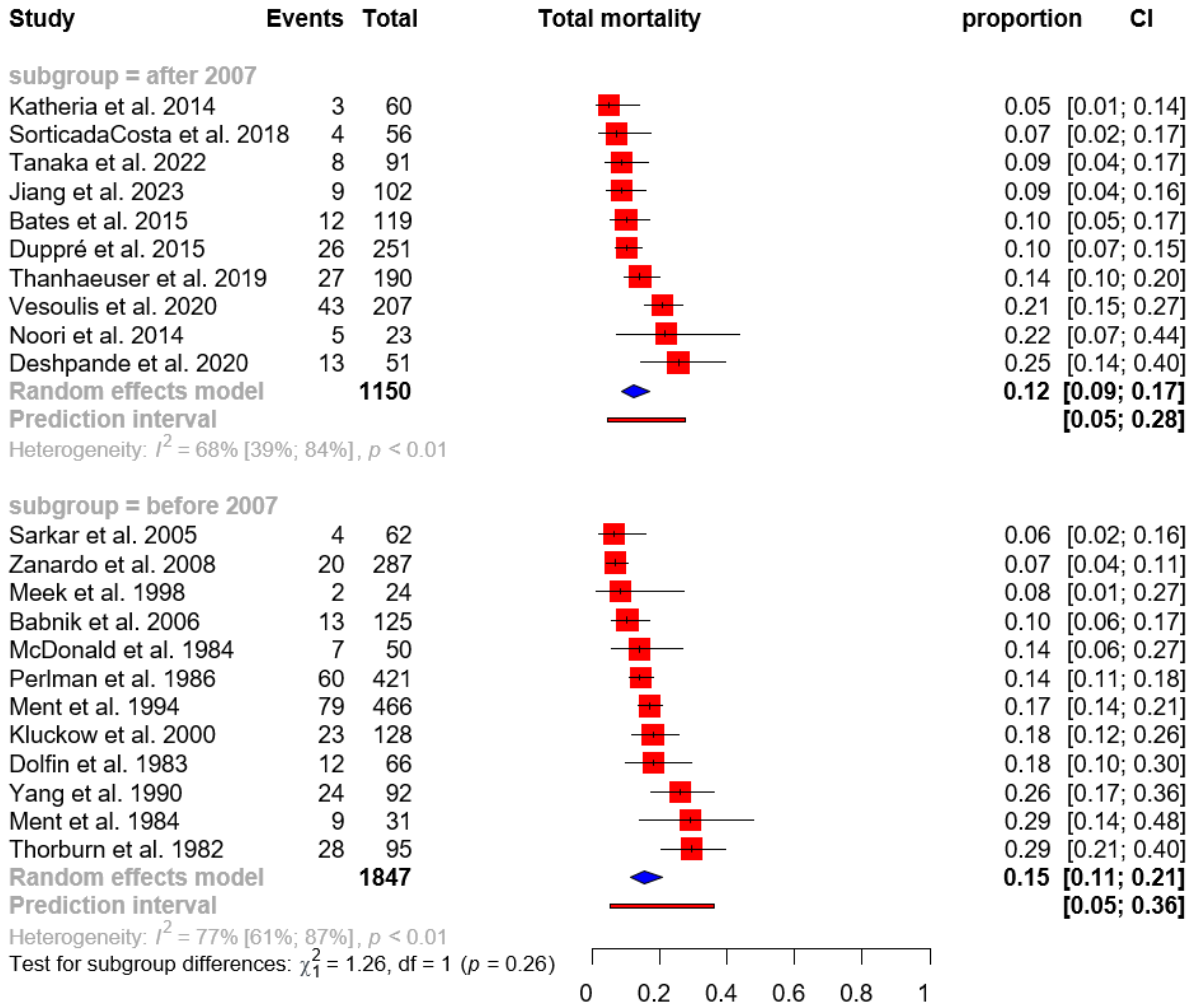
Study	Total	Mean	SD	MRAW	95%-CI
subgroup = after 2007					
Naoshi et al. 2021	216	24.80	1.47	24.80	[24.60; 25.00]
Vesoulis et al. 2019	157	25.18	1.83	25.18	[24.90; 25.47]
Tanaka et al. 2022	61	25.26	1.85	25.26	[24.79; 25.72]
Bates et al. 2015	108	25.44	1.17	25.44	[25.22; 25.67]
El-Dib et al. 2022	62	25.69	1.55	25.69	[25.30; 26.07]
Rojas et al. 2021	72	25.72	1.00	25.72	[25.49; 25.95]
Deshpande et al. 2020	50	25.75	1.07	25.75	[25.45; 26.04]
Noori et al. 2014	22	25.90	1.18	25.90	[25.40; 26.39]
June et al. 2021	99	25.90	1.60	25.90	[25.58; 26.22]
Juul et al. 2020	936	25.90	1.16	25.90	[25.83; 25.98]
Thanhaeuser et al. 2019	127	25.95	1.94	25.95	[25.61; 26.28]
SorticaDaCosta et al. 2018	56	26.08	1.68	26.08	[25.64; 26.52]
Hoffman et al. 2018	61	26.32	1.63	26.32	[25.91; 26.73]
Vesoulis et al. 2020	185	26.35	2.00	26.35	[26.06; 26.64]
Lampe et al. 2020	254	26.49	2.10	26.49	[26.23; 26.74]
Ikeda et al. 2014	80	26.51	2.36	26.51	[25.99; 27.03]
Himanshu et al. 2019	51	27.00	0.99	27.00	[26.73; 27.27]
Zanelli et al. 2021	638	27.00	2.00	27.00	[26.84; 27.16]
Ishiguro et al. 2014	83	27.55	2.30	27.55	[27.06; 28.05]
Shan et al. 2023	238	27.66	1.51	27.66	[27.47; 27.85]
Katheria et al. 2018	127	27.80	2.08	27.80	[27.43; 28.16]
Alderliesten et al. 2013	90	27.89	1.29	27.89	[27.62; 28.15]
Katheria et al. 2014	60	28.00	2.53	28.00	[27.36; 28.64]
Cimatti et al. 2020	20	28.06	3.97	28.06	[26.32; 29.80]
Martini et al. 2022	77	28.68	3.70	28.68	[27.86; 29.51]
Jiang et al. 2023	92	28.97	2.29	28.97	[28.51; 29.44]
Duppré et al. 2015	250	29.02	2.60	29.02	[28.69; 29.34]
Galderisi et al. 2019	50	29.60	2.87	29.60	[28.81; 30.40]
Schreiner et al. 2021	536	29.70	2.31	29.70	[29.50; 29.89]
Farag et al. 2022	127	29.74	1.59	29.74	[29.46; 30.02]
Kalani et al. 2016	93	30.27	1.70	30.27	[29.92; 30.62]
Najib et al.2018	68	31.00	1.27	31.00	[30.70; 31.30]
Random effects model	5146			**27.21**	**[26.61; 27.82]**
Heterogeneity: $I^2 = 99\%$ [99%; 99%], $\tau^2 = 2.7871$, $p = 0$					
subgroup = before 2007					
Iyer et al. 2015	25	24.48	2.00	24.48	[23.70; 25.26]
Chalak et al. 2011	30	25.00	2.00	25.00	[24.28; 25.72]
Paradisis et al. 2006	29	25.60	2.00	25.60	[24.87; 26.33]
Dani et al. 2005	155	25.60	1.19	25.60	[25.41; 25.79]
Paradisis et al. 2009	90	26.00	1.16	26.00	[25.76; 26.24]
Sarkar et al. 2005	62	26.17	1.62	26.17	[25.76; 26.57]
Meek et al. 1998	24	26.54	2.04	26.54	[25.72; 27.36]
Zanardo et al. 2008	287	26.80	2.50	26.80	[26.51; 27.09]
Osborn et al. 2003	128	26.85	2.23	26.85	[26.47; 27.24]
Salafia et al. 1995	406	26.90	2.30	26.90	[26.68; 27.12]
Kluckow et al. 2000	126	27.00	2.00	27.00	[26.65; 27.35]
Szymonovicz et al. 1984	50	27.00	4.00	27.00	[25.89; 28.11]
Thorburn et al. 1982	95	27.00	5.29	27.00	[25.94; 28.06]
Evans et al. 1996	117	27.00	2.00	27.00	[26.64; 27.36]
Babnik et al. 2006	125	27.08	1.63	27.08	[26.79; 27.36]
Ment et al. 1994	505	27.81	2.07	27.81	[27.63; 27.99]
Bada et al. 1989	145	28.00	2.40	28.00	[27.61; 28.39]
VanBel et al. 2002	83	28.20	1.40	28.20	[27.90; 28.50]
Florio et al. 2006	53	28.33	0.67	28.33	[28.15; 28.51]
Ment et al. 1985	48	28.60	2.05	28.60	[28.02; 29.18]
McDonald et al. 1984	50	28.62	1.85	28.62	[28.11; 29.13]
Weindling et al. 1985	82	28.73	2.30	28.73	[28.23; 29.23]
Dolfin et al. 1983	60	28.80	1.79	28.80	[28.35; 29.25]
Rumack et al. 1985	49	29.00	2.00	29.00	[28.44; 29.56]
Yang et al. 1990	83	29.30	2.55	29.30	[28.75; 29.85]
Krediet et al. 2006	114	29.45	1.89	29.45	[29.11; 29.80]
Perlman et al. 1983	50	30.00	3.00	30.00	[29.17; 30.83]
Amato et al. 1989	50	30.37	2.83	30.37	[29.59; 31.15]
Bada et al. 1984	155	30.60	2.00	30.60	[30.29; 30.91]
Random effects model	3276			**27.62**	**[27.02; 28.22]**
Heterogeneity: $I^2 = 98\%$ [98%; 99%], $\tau^2 = 2.3918$, $p = 0$					
Test for subgroup differences: $\chi^2_1 = 0.95$, df = 1 ($p = 0.33$)					



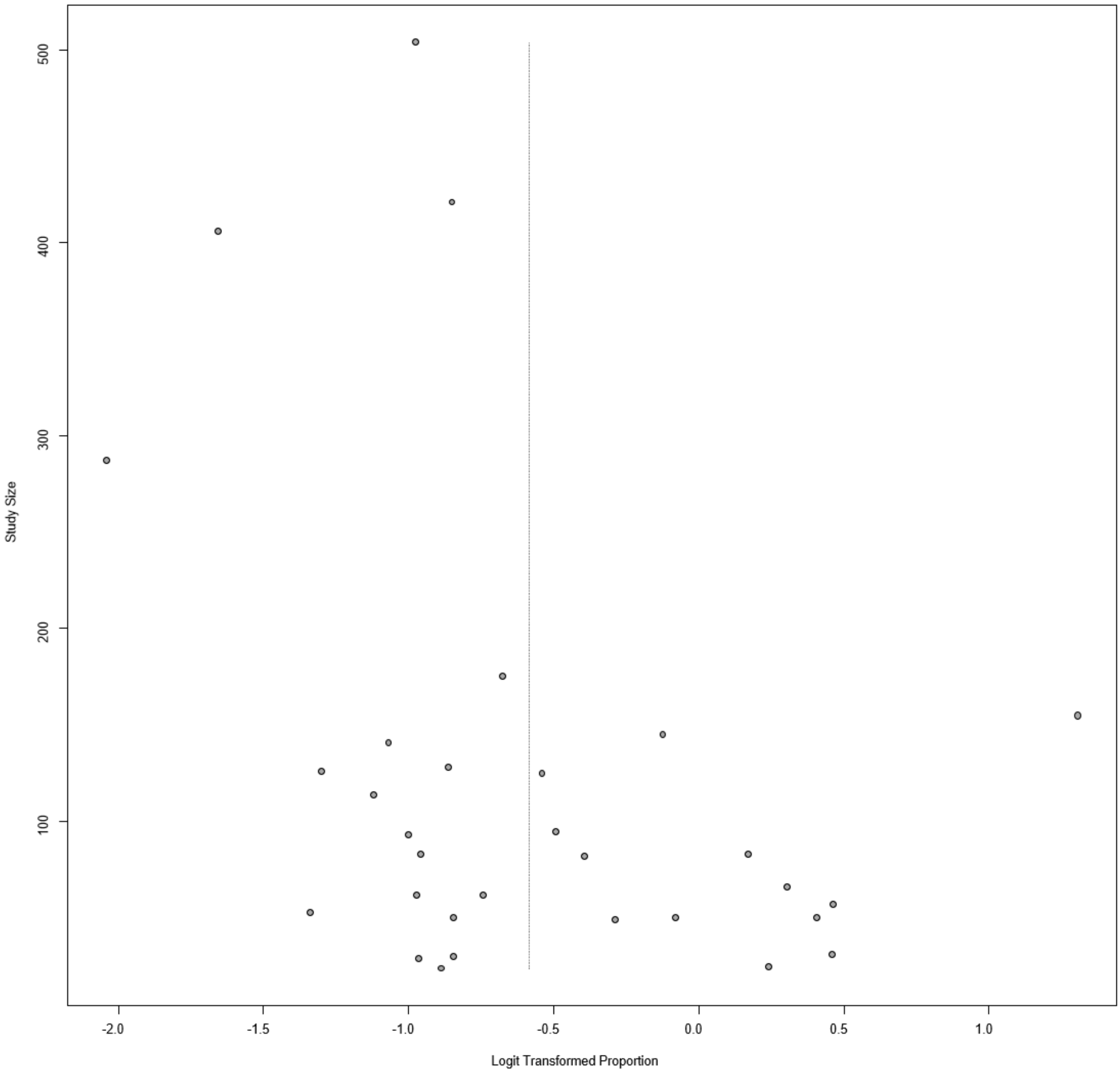
eFigure 37. Early study mortality in the subgroups before and after 2007



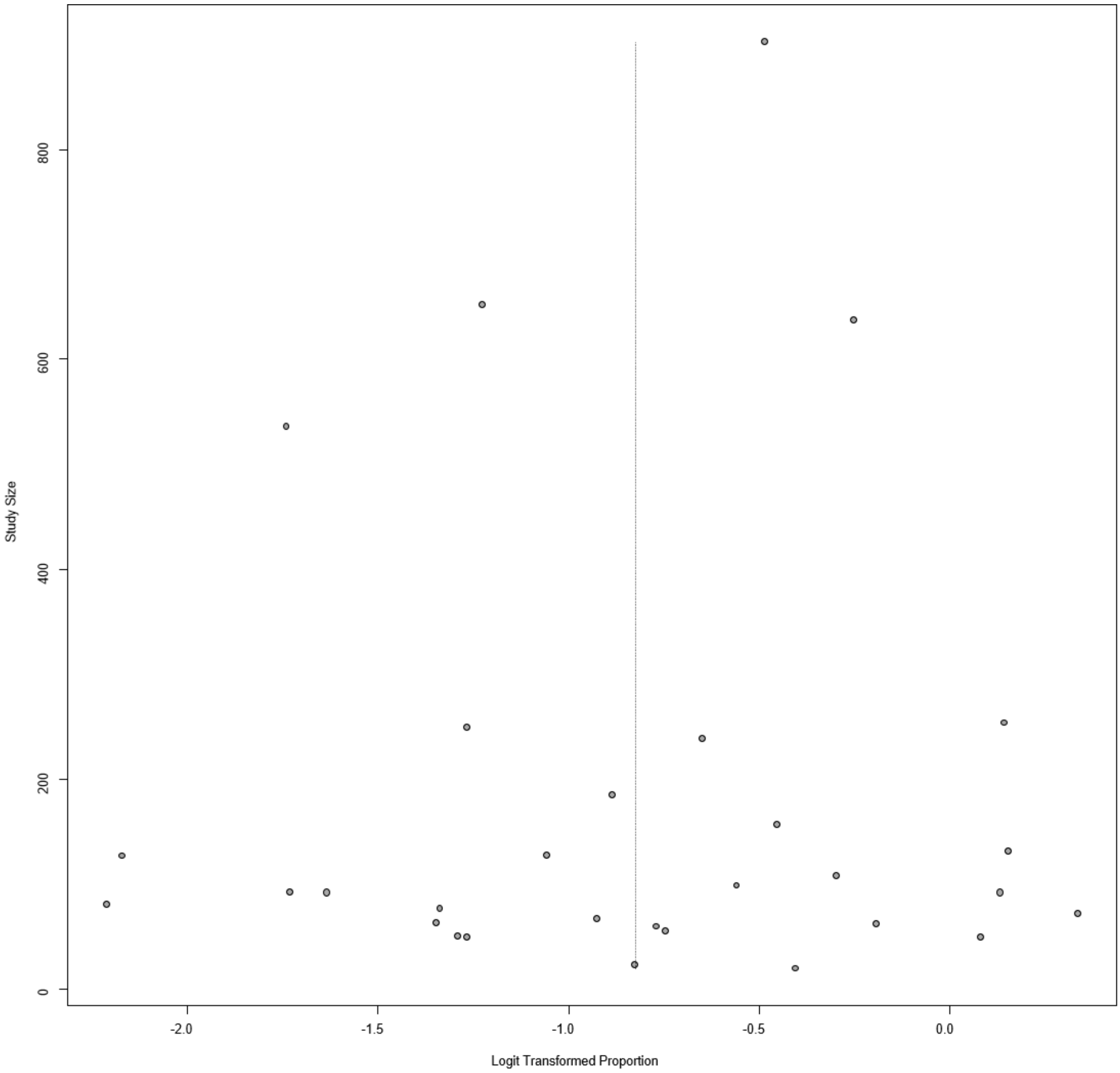
eFigure 38. Total mortality in the subgroups before and after 2007



eFigure 39. Funnel plot of the overall IVH in the subgroup before 2007



eFigure 40. Funnel plot of the overall IVH in the subgroup after 2007



eFigure 41. Peter's test in the subgroup before 2007:

Linear regression test of funnel plot asymmetry

Test result: t = 2.13, df = 29, p-value = 0.0419

eFigure 42. Peter's test in the subgroup after 2007:

Linear regression test of funnel plot asymmetry

Test result: t = 0.03, df = 28, p-value = 0.9725

Sample estimates:

```
   bias se.bias intercept se.intercept
 0.5960 17.1528   -0.6796       0.1442
```

Details:

- multiplicative residual heterogeneity variance (tau^2 = 13.1356)
- predictor: inverse of total sample size
- weight: inverse variance of average event probability
- reference: Peters et al. (2006), JAMA

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