

Supplementary Table 6: Neurodevelopmental outcomes associated with Intrapartum-Related Neonatal Encephalopathy			USUAL CARE						INTERVENTION						Denominator		
Author (ref)	Grades reported	Outcomes reported	Events	N	%	Gr I N	Gr I events	Gr II-III N	Gr II-III events	Events	N	%	Gr I N	Gr I events		Gr II-III N	Gr II-III events
Aker 2021	Grades II and III combined	i) death or CP with GMFCS level 3-5 or BSID-III cognitive and/or motor score <85 or blindness or deafness	12	23	52			23	12	5	24	21			24	5	denominator = children with known outcome
		ii) death	6	23	26			23	6	2	24	8			24	2	denominator = children with known outcome
		iii) GMFCS level 3-5 or BSID-III cognitive and/or motor score <85 or blindness or deafness	6	17	35			17	6	3	22	14			22	3	Denominator = children with known outcome who did not die
		iv) BSID-III cognitive score <70	3	17	18			17	3	0	22	0			22	0	denominator = children evaluated with BSID-III, Griffiths (n=1) or phone (n=1)
		v) BSID-III cognitive score 70-84	3	17	18			17	3	2	22	9			22	2	denominator = children evaluated with BSID-III, Griffiths (n=1) or phone (n=1)
		vi) BSID-III motor score <70	3	17	18			17	3	0	22	0			22	0	denominator = children evaluated with BSID-III, Griffiths (n=1) or phone (n=1)
		vii) BSID-III motor score 70-84	1	17	6			17	1	2	22	9			22	2	denominator = children evaluated with BSID-III, Griffiths (n=1) or phone (n=1)
		viii) CP (any grade) - data also available for divided grades	3	17	18			17	3	1	22	5			22	1	denominator = children evaluated with BSID-III, Griffiths (n=1) or phone (n=1)
Ballot 2020	Excluded from Figure 3 as only examined survivors -> mortality data not available presuming that TH = grade II-III combined, CP data available disaggregated by grades but grades are not disaggregated by TH	i) death or any adverse outcome as below	NA							NA	NA						
		ii) death	NA							NA	NA						
		iii) any developmental delay (BSID-III motor, cognitive or language <70)	NA							NA	NA						denominator = children evaluated with BSID-III
		iv) BSID-III motor <70	8	35	23					5	49	10			49	5	denominator = children evaluated with BSID-III
		v) BSID-III cognitive <70	7	35	20					5	49	10			49	5	denominator = children evaluated with BSID-III
		vi) BSID-III language <70	6	35	17					2	49	4			49	2	denominator = children evaluated with BSID-III
		vii) CP	8	35	23	14	1	21	7	5	49	10			49	5	denominator = children evaluated with BSID-III
		i) combined death or moderate to severe disability	46	79	58			79	46	27	76	36			76	27	Denominator = children with known outcome
		ii) death	29	79	37			79	29	22	76	29			76	22	Denominator = children with known outcome

Catherine 2021	Grades II and III combined	iii) any moderate or severe delay (as below)	17	50	34	50	17	5	54	9	54	5	Denominator = children with known outcome who did not die
		i) combined death or moderate to severe disability	NA	NA	NA			NA	NA	NA	NA	NA	Denominator = children with known outcome
		ii) death	29	79	37	79	29	22	76	29	76	22	Denominator = children with known outcome
		iii) any moderate or severe delay	NA	NA	NA			NA	NA	NA	NA	NA	Denominator = children with known outcome who did not die
		Excluded from Figure 3 due to lack of combined outcome, which was presented in the above report with same patients.											
		iii) DASII mental <70%	14	50	28	50	14	4	54	7	54	4	Denominator = children with known outcome who did not die
		iii) DASII motor <70%	17	50	34	50	17	5	54	9	54	5	Denominator = children with known outcome who did not die
		iv) hearing (abnormal BERA)	1	50	2	50	1	0	54	0	54	0	Denominator = children with known outcome who did not die
		v) vision	1	50	2	50	1	0	54	0	54	0	Denominator = children with known outcome who did not die
Catherine 2020	Grades II and III combined	vi) speech	12	50	24	50	12	2	54	4	54	2	Denominator = children with known outcome who did not die
		i) combined death or moderate to severe disability as below						21	29	72	29	21	Denominator = children with known outcome
		ii) death						11	29	38	29	11	Denominator = children with known outcome
		iii) Severe disability = BSID-III cognitive, language, or motor combined score <- 2 SD, total loss of vision, or cerebral palsy						10	18	56	18	19	Denominator = children with known outcome who did not die
		iv) Neuromotor retardation (=mild disability) = BSID-III cognitive, language, or motor combined score											Denominator = children with known outcome who did not die
Celik * 2016	Grades II and III combined	-1 SD...-2 SD						1	18	6	18	1	Denominator = children with known outcome who did not die
		i) combined death or severe disability as below	0	7	0	7	0						Denominator = children with known outcome
		ii) death	0	7	0	7	0						Denominator = children with known outcome
		iii) Severe disability = BSID-III cognitive, language, or motor combined score <- 2 SD, total loss of vision, or cerebral palsy	0	7	0	7	0						Denominator = children with known outcome who did not die
		iv) Neuromotor retardation (=mild disability) = BSID-III cognitive, language, or motor combined score											Denominator = children with known outcome who did not die
Celik * 2015	Grade I in usual care. Grades II-III were same patients as above	-1 SD...-2 SD	0	7	0	7	0						Denominator = children with known outcome who did not die

		disability	NA	NA			NA	NA							
		ii) death	NA	NA			NA	NA							
	Excluded from Figure 3 as only death or DAMA available	iii) psychomotor delay by DASII-III Grades I to III combined	16	84	19	Control group included 15 % Grade I NE, but outcomes are not detailed by grade	13	72	18			72	13	Denominator = children with known outcome who did not die	
Charki 2020		iv) sensorineural disorder	24	84	29		11	72	15			72	11	Denominator = children with known outcome who did not die	
		i) combined death or neurodevelopmental disability	18	30	60		6	30	20	na	na	30	6	Denominator = children with known outcome	
		ii) death	9	30	30		3	30	10			30	3	Denominator = children with known outcome	
		iii) DASII motor or mental development quotient <80%	9	21	43		3	27	11			27	3	Denominator = children with known outcome who did not die	
		iv) Blindness = < 20/200 in both eyes	7	21	33		2	27	7			27	2	Denominator = children with known outcome who did not die	
	II and III combined (has also segregated grade II and III)	v) Deafness = need of amplification	8	21	38		3	27	11			27	3	Denominator = children with known outcome who did not die	
Das 2017		vi) Seizures = abnormal EEG or need of AED	18	21	86		10	27	37			27	10	Denominator = children with known outcome who did not die	
		i) death or moderate to severe developmental disability					2	5				5	2	Denominator = children with known outcome at > 12m	
		ii) death													
Gucuyener 2012	Grades II and III combined	iii) Cerebral Palsy					2	5				5	2	Denominator = children with known outcome at > 12 m	
		i) death or severe disability (unclear definition)	NA			only reports neonatal death	NA								
		ii) death	NA				NA								
Jia 2018	All grades combined	iii) severe disability (unclear definition)	35	82	43		16	61	26					Denominator = children with known outcome who did not die neonatally	
		severe disability	NA				17	20	85	children		20	17	(including 1 child with CP who was lost between 1-	
		ii) death	NA				6	19	32			19	6	Denominator = children with known outcome at 2 yrs	
		i) death or severe disability (BSID-III (any domain) <70, GMFCS 3...5, severe visual impairment and profound hearing impairment)	NA				16	17	94			19	16	Denominator = children with known outcome at 2 yrs	

	iii) Any neurological impairment	NA				8	13	62			13	8	Denominator = children with known outcome at 2 yrs incl 2 whose parents refused BSID but were reportedly healthy	
	iv) BSID-III cognitive <70	NA				4	11	36			11	4	Denominator = children evaluated with BSID-III 2 yrs	
	ix) BSID-III language < 70	NA				4	11	36			11	4	Denominator = children evaluated with BSID-III 2 yrs	
	x) BSID-III motor <70	NA				3	11	27			11	3	Denominator = children evaluated with BSID-III 2 yrs	
	iv) CP any grade	NA				4	12	33			12	4	Denominator = children evaluated with BSID-III 2 yrs + 1 known case of CP who was lost between 1 and 2 yrs	
	v) blindness	NA				3	11	27			11	3	Denominator = children evaluated with BSID-III 2 yrs	
Khuwuthyako rn 2021	vi) profound hearing impairment (OAE or ABR test)	NA				0	11	0					Denominator = children evaluated with BSID-III 2 yrs	
	i) combined death or moderate to severe disability					3	15	20			15	3	Denominator = children with known outcome	
	ii) death					2	15	13			15	2	Denominator = children with known outcome	
	iii) neurodevelopmental disability (Griffiths and Vineland, unclear cut-offs)					1	13	8			13	1	Denominator = children with known outcome who did not die	
Koshy 2011	iv) CP	NA				1	13	8			13	1	Denominator = children with known outcome who did not die	
	Outcomes i-iii reported separate for NT and TH					8	37	22	37	8	6	16	38	as these children were cooled, we presume they were in Grade II-III
	ii) death					2	28	7	28	2	4	17	24	Denominator = children with known outcome. 2 additional cases had microcephaly
	Outcomes iv-vii all reported all in usual care group					1	26	4	38	3	2	16	13	Denominator = children with known outcome
	iii) cerebral palsy					1	26	4	38	3	2	16	13	Denominator = children with known outcome who did not die
	iv) visual (not correctable by glasses) or hearing impairment					1	26	4	38	1				Denominator = children with known outcome who did not die
	v) seizures and/or use of AED					3	26	12	38	3				Denominator = children with known outcome who did not die
	vi) head growth < -2 SD					9	26	35	38	9				Denominator = children with known outcome who did not die

Lally 2014	Grade II-III based on Thompson >5 within 6 hrs. Also has data on each Sarnat grade Day 3.	vii) composite motor score <82 or composite cognitive score <85 on BSID-III	3	26	12	38	3						Denominator = children with known outcome who did not die
		Severe disability: GMFCS grade 3 to 5, hearing impairment requiring hearing aids, bilateral cortical visual impairment with no useful vision or BSID- i) death or moderate or severe II Mental Development <70. disability**	35	50	70	50	35	20	50	40	50	20	Denominator = children with known outcome
		**Moderate disability: BSID-II Mental Developmental 70...84 and any one of the following: GMFCS grade 2, hearing impairment with no amplification, or persistent seizure disorder											
		ii) death	8	50	16	50	8	8	50	16	50	8	Denominator = children with known outcome
		iii) any disability	15	42	36	42	15	12	42	29	42	12	Denominator = children with known outcome who did not die
		iv) CP	19	42	45	42	19	10	42	24	42	10	Denominator = children with known outcome who did not die
		v) hearing impairment requiring amplification	2	42	5	42	2	2	42	5	42	2	Denominator = children with known outcome who did not die
		vii) seizures requiring AED	17	42	40	42	17	8	42	19	42	8	Denominator = children with known outcome who did not die
		vii) BSID-II mental <70	15	40	38	40	15	8	40	20	40	8	Denominator = children who completed BSID-II
		iiiv) BSID-II mental 70-84	6	40	15	40	6	5	40	13	40	5	Denominator = children who completed BSID-II
		ix) BSID-II psychomotor <70	15	40	38	40	15	9	40	23	40	9	Denominator = children who completed BSID-II
Malla 2017	Grade II-III combined, separate for outcome i)	x) BSID-II psychomotor 70-84	5	40	13	40	5	4	40	10	40	4	Denominator = children who completed BSID-II
		i) death or any neurodevelopmental disorder	13	18	72	18	13	7	16	44	16	7	Denominator = children with known outcome

Maoulainine 2017 †	Grades II and III combined	Excluded from Figure 3 because of non-standard outcome definition	ii) death	7	18	39	18	7	4	16	25	16	4	Denominator = children with known outcome		
		iii) psychomotor delay	2	11	18	11	2	3	6	50	6	3	Denominator = children with known outcome who did not die			
		iv) epilepsy	1	11	9	11	1	1	6	17	6	1	Denominator = children with known outcome who did not die			
		v) neurosensory problem	3	11	27	11	3	1	6	17	6	1	Denominator = children with known outcome who did not die			
Mbatha 2020	Grades II and III combined	Excluded from Figure 3 due to lack of mortality data	i) death or moderate to severe disability						NA							
		ii) death							NA							
		iii) Moderate to severe disability by GMDS							18	56				Denominator = children with known outcome at 18-24m who did not die. Reports also outcome at 12 m.		
Perez 2018	Grades II and III combined	i) death or severe developmental disability (CP, BSID-II mental development index ≤ 70, blindness, hearing impairment requiring a hearing aid and a persistent seizure disorder)							22	53	42	53	22	denominator = children with known outcome		
			ii) death						15	53	28	53	15	denominator = children with known outcome		
		iii) severe developmental disability (CP, BSID-II mental development index ≤ 70, blindness, hearing impairment requiring a hearing aid and a persistent seizure disorder)									7	38	18	38	7	Denominator = children with known outcome at 18 months who did not die
			iv) CP								4	38	11	38	4	Denominator = children with known outcome at 18 months who did not die
			v) hearing impairment requiring hearing aid								3	38	8	38	3	Denominator = children with known outcome at 18 months who did not die
		vi) Blindness								2	38	5	38	2	Denominator = children with known outcome at 18 months who did not die	
		vii) persistent seizures								1	38	3	38	1	Denominator = children with known outcome at 18 months who did not die	

Procianoy 2019	Grade II-III combined (reports separate grade II and III)	i) death or moderate to severe neurodevelopmental delay (BSID-III <85 or hearing impairment or visual impairment)									numerator = 16 deaths + 18 abnormal BSID + 3 blind/deaf. Denominator = children with known outcome = 72-13 lost to follow-up			
		ii) death									denominator = children with known outcome			
		iii) any neurodevelopmental delay (as defined above)										who attended could not be evaluated because of blindness or deafness)		
		iv) motor score <85										denominator = those with BSID-III done (3 children who attended could not be evaluated because of blindness or deafness)		
		v) language score <85										denominator = those with BSID-III done (3 children who attended could not be evaluated because of blindness or deafness)		
		vi) cognitive score <85										denominator = those with BSID-III done (3 children who attended could not be evaluated because of blindness or deafness)		
		iv) microcephaly										Denominator = children with known outcome who did not die		
Procianoy 2019	Grade II-III combined (reports separate grade II and III)	v) hearing impairment									Denominator = children with known outcome who did not die			
		vi) visual impaired									Denominator = children with known outcome who did not die			
Sun 2012	Grade II-III combined, but 20% Grade I	Excluded from Figure 3 and 4 due to mixing grade I and II-III, also only severe disability reported.	i) death or severe developmental delay BSID-III mental or physical development index <70	18	28	64	na	na	7	23	30	na	na	denominator = children with known outcome
			ii) death	1	28	4			0	23	0			denominator = children with known outcome
			iii) developmental delay BSID-III mental or physical development index <70	17	27	63			7	23	30			Denominator = children with known outcome who did not die
			iv) BSID-III mental development index <70	13	27	48			5	23	22			Denominator = children with known outcome who did not die
			v) BSID-III physical development index <70	12	27	44			5	23	22			Denominator = children with known outcome who did not die
			vi) CP	3	27	11			2	23	9			Denominator = children with known outcome who did not die

(Severe disability: BSID-III cognitive score <70, GMFCS 3...5, profound hearing impairment requiring hearing aids or a cochlear implant, or blindness.)	i) death or moderate to severe disability	94	199	47	na	na	199	94	98	195	50	195	98	denominator = children with known outcome	
	ii) death	63	201	31			201	63	84	198	42	198	84	denominator = children with known outcome	
	iii) Severe disability	28	136	21			136	28	14	112	13	112	14	Denominator = children with known outcome who did not die	
	Moderate disability	3	135	2			135	3	0	111	0	111	0	Denominator = children with known outcome who did not die	
	BSID-III cognitive score 70-84 and one or more of the following: GMFCS 2, a hearing impairment with no amplification, or a persistent seizure disorder)	23	135	17			135	23	19	110	17	110	19	Denominator = children with known outcome who did not die	
	vi) BSID-III cognitive score 70-84	22	133	17			133	22	25	108	23	108	25	Denominator = children with known outcome who did not die	
	vii) BSID-III cognitive score <70	24	133	18			133	24	11	108	10	108	11	Denominator = children with known outcome who did not die	
	viii) BSID-III motor score 70-84	7	133	5			133	7	6	108	6	108	6	Denominator = children with known outcome who did not die	
	ix) BSID-III motor score <70	26	133	20			133	26	11	108	10	108	11	Denominator = children with known outcome who did not die	
	x) BSID-III language score 70-84	47	133	35			133	47	29	108	27	108	29	Denominator = children with known outcome who did not die	
	xi) BSID-III language score <70	27	133	20			133	27	18	108	17	108	18	Denominator = children with known outcome who did not die	
	xii) persistent seizures	9	133	7			133	9	3	111	3	111	3	Denominator = children with known outcome who did not die	
	Microcephaly removed	xiii) CP (GMFCS 2..5)	28	136	21			136	28	12	111	11	111	12	Denominator = children with known outcome who did not die
	xiv) Blindness	10	135	7			135	10	5	111	5	111	5	Denominator = children with known outcome who did not die	
	Grades II and III combined	xv) Hearing impairment	6	136	4			136	6	3	112	3	112	3	Denominator = children with known outcome who did not die
Thayil 2021	i) death or severe neurodevelopmental disorder (any BSID-III < 70)								6	19	32	19	6	denominator = children with known outcome	
	ii) death								3	19	16	19	3	denominator = children with known outcome	
	iii) severe motor disorder BSID-III <70								1	13	8			denominator = children >1yr with known outcome who did not die	

	iv) moderate motor disorder BSID 70-84								1	13	8					denominator = children >1yr with known outcome who did not die
	v) severe language develop								2	13	15					denominator = children >1yr with known outcome who did not die
	vi) moderate language dev								3	13	23					denominator = children >1yr with known outcome who did not die
	vii) severe cognitive								0	13	0					denominator = children >1yr with known outcome who did not die
Valera 2017	Grades II and III combined viii) moderate cognitive	NA							1	13	8		16	3		denominator = children >1yr with known outcome who did not die
Zhou 2010	All NE grades. (has data on separate)															
	i) death or severe disability (GMFCS 3-5 or GCDAS <70)	46	94	49	18	0	76	46	31	100	31	21	0	79	31	denominator = children with known outcome
	ii) death	27	94	29	18	0	76	27	20	100	20	21	0	79	20	denominator = children with known outcome
	iii) severe disability (GMFCS 3-5 or GCDAS <70)	19	67	28	18	0	49	19	11	80	14	21	0	59	11	Denominator = children with known outcome who did not die
	iv) GCDAS <70	13	63	21	15	0	48	13	4	75	5	19	0	56	4	Denominator = children with known outcome who did not die
	v) GCDAS 70-84	17	63	27	15	7	48	10	23	75	31	19	6	56	17	Denominator = children with known outcome who did not die
	vi) cerebral palsy	19	67	28			NA	NA	10	80	13			NA	NA	Denominator = children with known outcome who did not die. NE grade of cases unknown.
Zhu 2009	Grades II and III combined and separated															
	i) death or moderate to severe disability (CP GMFCS 3...5, severe hearing loss, blindness, and BSID-II MDI < 70)	35	80	44			80	35	18	73	25			73	18	denominator = children with known outcome
	ii) death	4	80	5			80	4	3	73	4			73	3	denominator = children with known outcome
	iii) CP	14	76	18			76	14	5	70	7			70	5	Denominator = children with known outcome who did not die
	iv) MDI <70	17	76	22			70	7	7	70	10			70	7	Denominator = children with known outcome who did not die
Zou 2019	Excluded from Figures 3 and 4 because of 16% mild NE															
	i) death or abnormal neurodevelopmental outcome (BSID-III cognitive or motor score <85)	26	42	62			na	na	16	44	36			na	na	denominator = children with known outcome
	ii) death	6	42	14					6	44	14					denominator = children with known outcome
	iii) abnormal neurodevelopment (BSID-III cognitive or motor score <85)	20	36	56					10	38	26					Denominator = children with known outcome who did not die

	i) death or severe disability (BSID-II MDI < 70, GMFCS 3 to 5, hearing impairment requiring hearing aids, or blindness)	10	25	40	25	10	2	36	6	36	2	denominator = children with known outcome
	ii) death	4	25	16	25	4	0	36	0	36	0	denominator = children with known outcome
Weng 2021	Grades II and III combined iii) severe disability	6	21	29	21	6	2	36	6	36	2	Denominator = children with known outcome who did not die
	SUM Combined Outcome:	361	712	51			351	883	40			
	SUM CP:	95	426	22			56	476	12			
	BSID = Bayley Scales of Infant Development											
	CP = Cerebral Palsy											
	DAMA = discharge against medical advice											
	DASII = Developmental Assessment Scale for Indian Infants											
	EEG = electroencephalography											
	GCDAS = Griffiths Scales of Developmental Assessment											
	MDI = Mental Development Index											
	GMFCS = Gross Motor Function Classification Scale											
	GMDS = Griffiths Mental Development Scale											
	SD = Standard Deviation											
	Additional notes:											
	Number of abnormal cases were calculated based on percentages provided in the article and are not the same as reported in Table 5 of the article, which does not consider loss to follow-up.											
† Maoulaine	3 children were lost to follow-up and outcome for 5 was not included as they were not 1 year at time of report											
‡ Valera												
	Usual care group group N=18, 7 died hospital, 11 were followed, 5 were normal = 6 were abnormal. Total N= 7+6+5 = 18, abnormal = 7+6 = 13											
	Intervention 19, 3 died in hospital and 1 after hospital, 13 Were followed, 9 were normal = 4 were abnormal. Total N = 3+13=16, abnormal = 3+4=7											