

Additional File 5

Clinical data on 137 +11 deaths neonates with Apgar scores of 5 or 6 at 5 minutes including 81 patients with FHR changes

Additional file 5A Martha Tubman Memorial Hospital 67 Infants with Apgar scores at 5 or 6 at 5 minutes. Grey rows are those 51 patients where a FHR change was identified before birth by mother or staff prior to delivery.

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	5-6	39y	5c no change	CS	Retained 2 nd twin Meconium	Yes	10	0	SBA
	4-6	17y	3c 117-119 on arrive clinic	CS LLT, IVF, D50	2.6Kg Long stay in clinic says Mum	2	6	0	SBA
	4-6	32y	5c then 3c 113-115	CS LLT, IVF, D50	Placenta praevia 2.4Kg	1	0	0	SBA
	3-5	24y	1c 102-119 on arrival	VD , LLT, IVF, D50	Fully dilated birthing chair 2.5Kg	10	5	0	SBA
	4-6	21y	2c no change	VD Push rapid	Fully dilated head visible 1.9Kg	5	5	0	SBA
	5-6	41y	3c 116-119	CS LLT, IVF, D50	Transverse lie, polyhydramnios 2.0Kg	NR	3	0	SBA
	5-6	18y	11c no change	VD	Breech CS planned but delay in materials thus VD 2.0Kg	5	4	0	SBA

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	4-5	24y	6c no change	VD	3.5Kg	15	5	1 -2 min	HIE
	3-5	16y	3c then 5c 114-119	CS LLT, IVF, D50	2.8Kg Eclampsia, obstructed labour	6	8	1-3min	HIE
	4-5	28y	2c then 4c 117-119	IVF VD	3.3Kg	20	11	1-5min	HIE
	3-5	34y	5c then 6c 116-119	IVF, CS refused at 5cm VD	3.8Kg	15	7	0	SBA
	2-5	18y	2c then 4c 115-119	Fully dilated, IVF VD	Stayed long at home Birthing chair 3.4Kg	5	4	0	SBA
	5-6	37y	c 112-119	Fully dilated, IVF VD	Stayed long at home. 3.4Kg	15	5	1-2min	HIE
	3-5	19y	c 115-119 on arrive	IVF, LLT, CS DELAY 3.5Kg	Major delay CS as family trying to obtain materials	NR	2	0	SBA
	3-5	30y	5c no change	VD	Meconium 2.9Kg	10	9	0	SBA
	4-5	41y	C118-119 on arrive	IVF VD	3.6Kg	5	7	0	SBA
	3-6	22y	2c no change	VD severe exhaustion	2.9Kg	NR	0	0	SBA
	4-6	25y	8c no change	VD		6	Yes	0	SBA
	3-5	NR	6c No change	VD	2.8Kg	4	8	1-3min	HIE
	3-5	19y	5c no change then contractions 100-189	IVF D50 VD	2.7Kg	NR	3	0	SBA
	5-6	36y	2c no change	VD	1.8Kg	3	8	0	SBA
	4-6	38y	4c 116-119 on arrival	IVF D50 VD	2.1Kg	3	4	0	SBA

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	3-6	22y	5c no change	VD	3.1Kg	5	8	0	SBA
	4-6	26y	3c no change then 4c 110-118	IVF D50 CS	3.2Kg	7	16	Every 25 min for 4hr	HIE
	4-6	19y	3c no change then 4c 160-176	Fully dilated on arrive VD	2.7Kg preterm	2	4	0	SBA
	4-6	21y	c115-119 on arrival from home	LLT, IVF. CS	3.2Kg	NR	5	0	SBA
	4-6	25y	1 c no change then 2c118-119 on arrival	Fully dilated on arrival IVF D50 VD	3.1Kg	6	5	1-2min	HIE
	4-5	16y	4c 117-119 on arrive	IVF, birthing chair VD	3.3Kg	3	6	0	SBA
	4-6	39y	3c no change then c114-119	Arrive from home LLT, IVF, D50 CS	APH, placenta praevia Grade 4 1.6Kg	4	9	1-1min	HIE
	4-5	27y	2c no change then c 110	IVF,D50 VD	Cord entangled	5	7	0	SBA
	5-6	18	8c no change	VD		6	Yes	NR	SBA
	3-5	21	12c no change then 2c 116-121	IVF D50 VD	2.6Kg	5	8	0	SBA
	4-6	20	10c no change	VD	2.5Kg	3	6	0	SBA
	5-6	24	3c 105-119 on arrive long time home	LLT, IVF, D50 VD	2.5Kg	3	7	0	SBA

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	3-6	31	5c no change then 9c 116-120	LLT, IVF, Birth chair VD		2	4	0	SBA
	3-5	19	6c no change then 2c 107	LLT, IVF, D50 VD	2.7Kg	4	7	0	SBA
	1-5	16	5c 105-108 on arrival	LLT, IVF, CS	Obstructed labour 3.3Kg	10	7	0	SBA
	1-6	28	3c no change then 4c 106-112	LLT, IVF, D50 CS MgSO4	Convulsion at clinic after unconscious at home Preterm 1.5Kg	6	18	1-4min	HIE
	4-6	34	106-108	VD	2.4Kg	2	23	1-3min	HIE
	4-6	17	11c no change then 6c changes but no values	IVF VD	3.0Kg	1	Yes NR	0	SBA
	2-5	29	8c no change then 6c 170-161 then normal for 5c then 3c 117-120	LLT, IVF, CS	3.0Kg	6	6	0	SBA
	5-6	17	11c no change then 7c 108-120	Push as fully dilated. IVF. VD	2.8Kg	3	6	0	SBA
	4-6	17	4c 107-110 on arrival	LLT, IVF, D50 VD	Stayed long at home Fully dilated on arrival.	5	6	0	SBA

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	5-6	14	2c 102-107 165 to 198 during CS	LLT, IVF, CS	Delay CS 1030hr - 1125hr Cord prolapse.	10	12	1-2min	HIE
	4-5	22	7c no change then 4c 109-120	VD	3.0Kg	3	6	0	SBA
	4-6	43	3c no change then 2c with changes but no values.	CS	Previous CS x 1 Arrest descent 3.6Kg	3	6	0	SBA
	3-5	17	3c no change then 4c 98-106	VD	3.0kg	2	3	0	SBA
	2-5	16	On arrival from clinic 4c 90-107	Fully dilated and push VD	Breech 2.9 Kg	3	7	0	SBA
	3-6	NR	On arrival 5c 100-110	VD	3.8Kg	15	5	1-4min	HIE
	3-5	27	On arrival 5c 100-109	IVF VD	3.0Kg	2	5	0	SBA
	5-6	37	On arrival from home 3c 101-114	LLT, IVF, D50 VD	4Kg	5	6	0	SBA
	2-6	24	17c no change then 5c 106-114	IVF Push VD	3.4Kg	10	7	0	SBA
	5-6	NR	17c no change then 5c 187-195	CS	Preeclampsia and twins	7	5	0	SBA
	3-6	18	5c no change then 4c 118-120	Unable push Vacuum	2.8Kg	4	3	0	SBA

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	2-6	33	13c no change then 6c changes no values.	VD	3.6Kg	3	8	0	SBA
	2-6	32	18c no change then 4c 108-117	IVF Push VD	Meconium 2.9Kg	10	7	0	SBA
	3-5	19	10c no change then 11c 103-117	IVF Oxytocin. Unable to push VD	3.0Kg	20	9	1-5min	HIE
	3-6	30	18c no change then 101-111	IVF Oxytocin. Unable to push VD	3.1KG	12	6	0	SBA
	4-6	16	15c no change then 3c 168-197	IVF Refused push Vacuum	Meconium 2.7Kg	6	6	0	SBA
	2-6	26	6c no change then 5c 106-111	IVF VD	2.9Kg	5	6	0	SBA
	3-5	16	1c no change then 2c 100-110	IVF LLT Fully Dilated Pushing VD	3.3Kg	8	9	0	SBA
	2-5	22	4c no changes	Fully dilated from home IVF Birth chair VD	Meconium 3.1Kg	6	4	0	SBA
	2-6	20	11c no changes	VD	Prolonged labour refuse push 2Kg	3	8	0	SBA
	1-5	20	4c no changes	VD	3kg	3	6	0	SBA

MTMH	Apgar scores at 1 and 5 minutes	Age yrs	Fetal Heart Rate FHR changes C = contractions	ACTIONS Mode of Delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus min?	NICU Admit days	Seizures in NICU	Presence of Birth Asphyxia
	2-5	15	2c 107-109 on arrival	LLT, IVF, D50 VD	Long stay at home 2.9Kg	7	8	0	SBA
	3-5	15	6c no change then 2c at 109-100	VD	Fully dilated Refuse push Meconium	5	7	0	SBA
	4-6	30	5c no changes.	Refuse push VD	3.4Kg	7	3	0	SBA

Additional file 5B CB Dunbar Hospital 43 infants with Apgar scores 5-6 at 5 minutes. Grey rows are those 21 patients where a FHR change was identified before birth by mother or staff prior to delivery. Plus INR 43 + 11 deaths (in Table 2 as well) = 54

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
CBD Died aged 3 days	2-6	18	1c = normal then mother did not want to continue monitoring		2.4Kg VD	Yes	15	Yes	Yes	HIE
CBD Died aged 1 day	3-5	17	2c at 120 bpm		Fully dilated ruptured membranes VD	Yes	3	No	No	SBA
CBD Died aged 1 day	5-6	36	37c with no changes		Delay 2 nd stage VD	Yes	9	No	No	SBA
CBD Died aged 2 days	3-6	31	1c no abnormality		Obstructed labour PROM >18hrs Emergency CS	Yes	5	No	No	SBA
CBD Died aged 2 days	5-6	17	23 c no change then 24 th c onwards 90,100,110 bpm	LLT, IVF, D50	Delay in CS for 2.5 hour due to lack of materials CS	Yes	10	No	NO	SBA
CBD Died aged 9 days	4-5	17	24 c no change then 25 th c 116-100 bpm	IVF, D50, oxygen,	Fully dilated at 24th contraction. VD	Yes	10	No	No	CBD SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
CBD Died aged 4 days	3-5	22	28c no change then 3c to 110-90 bpm	IVF, D50, oxygen	Prolonged 2 nd stage Vacuum	Yes	3	No	No	SBA
CBD Died aged 4-10 days	4-6	23	1 st c = 116 bpm		Twins- cord prolapse. First twin resus. 2nd twin no resus CS	Yes	6	No	No	SBA
CBD Died aged 1 day	3-5	16	43c no change then 44 th c = 105 bpm	Episiotomy fast delivery	Fully dilated. VD	Yes	11	No	Died aged 1 day	SBA
CBD Died aged 1 day	5-6	35	1 st c = 115 bpm		Arrived fully dilated VD	Yes	15	No	No	SBA
CBD Died aged 2 days	3-5	17	1 st c = 120 bpm		Vacuum	Yes	5	No		SBA
	4 and 6	25	1 c no abnormality.	VD 2.8Kg	No data found	Yes	NR	Yes NR	No	SBA
	5 and 6	19	19 c no change then mother noted slowing FHR at 20th	D 50% 30cc and OBC did assisted delivery by Vacuum.	At 10cm dilated had poor maternal efforts. No meconium. 2.4Kg	Yes. Bag & mask	5-10	Yes Neonate recovered quickly on CPAP	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
			contraction. MW confirmed-105 b/m							
	4 and 6	21	44c no changes	Episiotomy VD	Fully dilated refused to push as exhausted.	Yes Resus	5-10	Yes NR	No	SBA
	4 and 6	26	33c showed no changes	CS	Obstructed labour CS	Yes	4	Yes NR	No	SBA
	4 and 6	17	35c showed no changes then 36th contraction 102bpm	IVF. Oxygen, Vacuum delivery		Yes. Bag & mask	5	Yes. 5days	No	SBA
	3 and 6	28	25c showed no changes then 26th contraction 100bpm	IVF. Fully dilated. Head +3 with 2= caput OB Clin Episiotomy done VD		Yes. Bag & mask	2	Yes NR	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
	3 and 5	15	30c showed no changes, then 31st contraction 116bpm	D50% and Oxygen set up. Fully dilated. Episiotomy VD		Yes. Bag & mask	3	Yes NR	No	SBA
	3 and 5	21	26c showed no changes then 27th contraction 100bpm	IVF. D50%. oxygen, Episiotomy and fast delivery. Fully dilated VD	No	Yes	10	Yes How long NR	No	SBA
	3 and 5	18	26 showed no changes then 27th contraction 100bpm	IVF. Fast delivery done as fully dilated VD	No	Yes	10	Yes How long NR	No	SBA
	5 and 6	17	26c showed no changes Reassessed when on delivery bed.	Episiotomy done for quick delivery as fully dilated		Yes	8	Yes. 7days	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
			fully dilated 100bpm. head visible	VD						
	3 and 5	NR	37c showed no changes 38th contraction 90bpm	IVF. D50%. Oxygen therapy. Vacuum delivery	prolonged 2 nd stage	Yes bag & mask	3	Yes. 5days	No	SBA
	3 and 6	23	42c showed no changes	CS	Previous CS & failure to progress	Yes	2	Yes. 10days	No	SBA
	3 and 5	28	35c showed no changes then 36th contraction 109bpm.	D50% NS500 ml set up oxygen therapy. patient 10cm dilated. quick delivery ordered VD	No	Yes	5	Yes. 14days Mild birth asphyxia	No	SBA
	3 and 5	35	38c showed no changes then 39th contraction	D50% NS500 ml set up oxygen therapy.	No Difficult VD by OBC	Yes	15	Yes. Severe birth asphyxia	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
			100bpm, 90bpm	patient 10cm dilated. quick delivery VD				7days		
	4 and 6	34	Yes- 109 bpm on admission by OBC	Referral 110 bpm on ultrasound. Patient prepared for C-section. --- IVF served and oxygen therapy initiated. CS	Breech	Yes	3	Yes. 5days	No	SBA
	4 and 6	17	Semi-conscious and monitored only by nurse aid	CS	Eclampsia	Yes bag & mask	7	Yes. 5days	No	SBA
	2 and 6	17	15 c no changes then 16th contraction starting to	NS500ml D50% set up. Oxygen therapy. Patient	Obstructed labour.	Yes bag and mask	19	Yes. 2days	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
			fluctuate. 17th 171bpm	prepared for CS but theatre was busy for about 1hr 30mins Delay						
	3 and 5	15	Not monitored as immediate CS	CS	Eclampsia	Yes bag & mask	3	Yes. 10days	No	SBA
	3 and 6	20	27c no change	OBC reassessed as very poor pushing Given bag of water. D50 and IVF Episiotomy VD		Yes bag & mask	10	Yes	No	SBA
	3 and 5	21	Mum did not want to monitor MW	VD	Nil	Yes bag & mask	3	Yes. 2days	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
			undertook monitoring							
	3 and 5	17	33c no change then Yes- X placed on 34th contraction. No values	The fetal heart rate dropped on the delivery bed while pushing. VD		Yes bag & mask	5	Yes. 7days	No	SBA
	3 and 6	24		Mother did not want to monitor Arrived 8cm dilated with strong cons VD		Yes bag & mask	8	Yes	No	SBA
	5 and 6	22	43c showed no changes	VD	Nil	Yes. Bag & mask	6	Yes	No	SBA
	4 and 6	30	37 c no showed no changes then from 38th	LLT, cx fully dilated, taken to del. table for quick del.	Nil	Yes bag & mask	2	Yes. 9days	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
			contraction 100 bpm	VD						
	4 and 6	23	43c no changes.	VD	Preterm 1.4Kg	Yes	2	Yes. 9days	No	SBA
	4 and 6	26	30c no change then 31st contraction 116bpm	OBC was informed and reassessed and order that patient taken to deliver bed VD	Nil	Yes bag & mask	7	Yes 7 days	No	SBA
	8 and 10 3 and 5	33	No abnormality	Arrive fully dilated. Twins 129 and 144 VD	2 nd twin needed resus First twin Apgar 8 and 10 2.4Kg	Yes. Bag & mask	15	Yes. 6days	No	SBA
	4 and 6	19	34c no changes then 35th contraction 106bpm	OBC reassessed patient FHR 100bpm. LLT. IVF. D50%	Quick delivery	Yes Bag and mask	4	Yes. 8days	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
				Oxygen therapy VD						
	4 and 6	18	1 Fully dilated 105 bpm	Nil VD	Quick delivery	Yes bag & mask	5	Yes. 5days	No	SBA
	3 and 6	17	1c no abnormality	Came in fully dilated. VD	Bwt 1.1 Kg	Yes bag & mask 11min	6	Yes.	No	SBA
	4 and 6	19	33c no changes showed then 34 con 115 during delivery	Episiotomy VD	OBC	Yes. Bag & mask	5	Yes. 1day	No	SBA
	3 and 5	17	Not monitored	Referral from Phebe Hospital Emergency CS	Obstructed labour. NRFS Mal presentation, breech	Yes bag & mask	4	Yes. 6days	No	SBA
	4 and 6	15	Not monitored	Nil Vacuum	Arrived fully dilated Eclampsia Unable to push. Vacuum	Yes bag & mask	8	Yes. 14 days 2.4Kg	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
	3 and 5	23	55c no changes shown but then while on the delivery bed FHR done by nurse 113bpm.	OBC informed and came to help with delivery VD	OBC	Yes. Bag & mask	4	Yes. 6days	No	SBA
	5 and 6	22	49c no changes shown then 50c 105 during delivery OBC quick delivery	Nil VD	Nil	Yes. Bag & mask	2	Yes	No	SBA
	3 and 6	15	1 c abnormal on admission fully dilated at 179bpm	Nil VD	OBC quick delivery	Yes Bag and mask	11	Yes. 8days	No	SBA and risk of sepsis
	4 and 6	13	1c on admission no change but 120bpm	VD	Fully dilated Preterm 1.8Kg	Yes bag & mask	6	Yes. 18days	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
	3 and 5	24	56c no changes shown.	VD		Yes bag and mask	22	Yes BA	Yes	HIE
	4 and 6	18	1 c abnormal at 166 bpm	NS 500ml was setup IV VD	Referred from clinic, Fully dilated with prolonged labour.	Bag and mask		Yes 7 days	Yes	HIE
	4 and 6	23	50c with no changes shown	VD		Yes bag and mask	5	Yes BA	No	SBA
	4 and 5	30	1c 139bpm on arrival	VD	Fully dilated on arrival	Yes bag and mask	4	Yes ? BA	No	SBA
	5 and 6	31	1c on arrival 138 bpm	Born by emergency CS 2.5Kg	2 previous CS	Yes bag and mask	6	Yes ? BA	No	SBA
	2 and 6	17	1c 130 bpm on arrival	Emergency CS	Obstructed labour due to CPD Bandl's ring 8cm	Yes bag and mask	9	Yes BA	No	SBA

CBD	Apgar scores at 1 and 5 minutes	Age yr	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Apgar Neonatal resus? Yes/No If yes what used?	How long minutes neo resus?	NICU admit Yes/No How long?	Seizures in NICU Yes/No	Presence of Birth Asphyxia
	4 and 6	25	1c 147 bpm on arrival	Emergency CS	Fully dilated in Obstructed labour due to CPD	Yes bag and mask	8	Yes BA	No	SBA

Additional File 6C Sinje CEmOC facility 13 infants with Apgar scores 5-6 at 5 minutes. Grey rows are those 6 patients where a FHR change was identified before birth by mother or staff prior to delivery.

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
	3 and 6	NR	43c no changes then 44c HR 119 bpm	VD	6cm dilated CS discussed, declined, so VD	Bag+Mask	10	Yes. 6d	No	SBA

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
	3 and 5	NR	1c only 120 bpm	VD	Fully dilated Delivered within 5 mins of admission	Bag+Mask	6	Yes 13d omphacele	No	SBA
	3 and 6	NR	1c abnormal at 116bpm	CS	Prolonged labour referred clinic 4 cm dilated. Meconium Dex 50% IVF NS CS	Bag+Mask	10	Yes 5d	No	SBA
	3 and 6	NR	39c no changes then 40c decreased to 112 bpm	Oxygen, IVF Adrenaline 2 further FHR recorded – no changes Vacuum	Patient to labour ward from home with the history of a convulsion and in labour. MgSO ⁴ loading	Bag+Mask	5	Yes. 14d	No	SBA

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
					dose, Ampicillin, D50 20cc, N/S 500ml, hydralazine served. Later live delivery depressed neonate, WT 3.6kg					
	4 and 6	NR	44c no changes shown	Vacuum	Vacuum as unable to push. Primigravida	Bag+Mask	7	Yes 6d	No	SBA
	4 and 5	NR	Yes bradycardia and irregular fetal heart	CS	Preterm, malaria in pregnancy	First twin 1.7Kg Bag+Mask	5	Yes. 8d	No	SBA

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
	6 and 10		rate on ultrasound scan		Twins – IUGR and fetal distress CS	2 nd twin 2.2Kg Bag+Mask		2 nd twin mild BA clinically		
	4 and 6	17	44c no changes shown	Primigravida, in severe pain, scared to push, gave birth to a depressed female neonate. 2.5Kg VD	Referred from clinic for anaemia, malaria in pregnancy	Bag+Mask	7	Yes. 8d	No	SBA
	3 and 5	15	33c no changes shown	Episiotomy unable to push. VD	Malaria in pregnancy	Bag+Mask	5	Yes. 2d	No	SBA

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
	5 and 6	NR	45c no changes shown	VD	Referred from clinic for prolonged obstructed labour	Bag+Mask	3	Yes. 6d Mild BA	No	SBA
	3 and 6	NR	28 c no changes shown then In labour ward FHR abnormal 172bpm	MgSO4, D50%, N/S 500ml served, Oxygen therapy initiated, quickly prepared for emergency VD . Delivered depressed	Pre-Eclampsia,	No resus given	0	Y – asphyxia. 5d	No	SBA
	4 and 5	NR	10c no changes then change	CS	Face presentation	Bag+Mask	3	Y – asphyxia. 5d	No	SBA

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
			identified during CS							
	2 and 6	NR	1c no abnormality	CS	Previous C/S x 1. Patient planned for Elective but entered labour before elective's date. Patient was quickly prepared for emergency C/S, taken to OR and there were difficulties in abstraction of neonate from	Bag+Mask	4	Y – asphyxia risk of sepsis. 5d	No	SBA

Sinje	Apgar scores at 1 and 5 minutes	Age Yr	FHR changes	ACTIONS and modes of delivery	Any obstetric disorder. Yes/No If yes describe Describe any treatment for FHR abnormal given	Apgar Neonatal resus? Yes/No If Yes what used?	How long in minutes neo resus?	NICU admit Yes/No If YES for how long in days?	Seizures in NICU Yes/No	Birth asphyxia
					uterus that resulted in fetal distress and birth asphyxia.					
	4 and 6	NR	30c no changes shown	2nd stage of labour problem?? VD		Bag+Mask	5	Y – asphyxia, risk of sepsis. 5d	No	SBA

Additional file 6D Tellewoyan Hospital 14 infants with Apgar scores 5-6 at 5 minutes. Grey rows are those 3 patients where a FHR change was identified before birth by mother or staff prior to delivery.

Patient Number	Apgar scores 1 and 5 minutes	Age year	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus? Yes/No	How long resus in minutes?	NICU admit Yes/No For how long in days	Seizures in NICU Yes/No	Birth asphyxia status
243	3 and 5	18	28c no changes	VD	Poor maternal efforts to push. Prolonged 2 nd stage	Yes	12	6 days	No	SBA
304	4 and 6	16	1c no abnormality	CS	Referred from local clinic prolonged labour, CPD	Yes Bag and Mask	5	Yes 9 days birth asphyxia and sepsis risk	No	SBA
305	3 and 6	19	yes baseline – 130 c26 138 c37 116 abnormal	Oxygen, quick delivery VD		Yes Bag and Mask	10	Yes 6 days Sepsis birth asphyxia	No	SBA
308	2 and 6	25	1c no abnormality.	CS	Antepartum Haemorrhage	Yes Bag and Mask	15	Yes 7 days sepsis birth asphyxia	No	SBA

Patient Number	Apgar scores 1 and 5 minutes	Age year	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus? Yes/No	How long resus in minutes?	NICU admit Yes/No For how long in days	Seizures in NICU Yes/No	Birth asphyxia status
352	4 and 6	38	15c no change	VD	Prolonged 2 nd stage.	Yes Bag and Mask	5	Yes 6 days sepsis risk mild birth asphyxia	No	SBA
447	3 and 6	25	1c no abnormality.	CS	CPD suspected.	Yes Bag and Mask	7	Yes 7days	No	SBA
492	3 and 5	18	35c no changes seen	Difficult VD by OBC.	Mum scared to push. Anaemia	Yes Bag and Mask	30	Yes 10 days	No	SBA
569	3 and 5	21	34c no changes seen	Vacuum	Unable to push out baby	Yes Bag and Mask	15	yes sepsis risk birth asphyxia	No	SBA
571	2 and 6	30	1c no abnormality.	Oxygen CS	Previous CS, Prolonged labour	Yes Bag and Mask	30	Yes 5 days	No	SBA

Patient Number	Apgar scores 1 and 5 minutes	Age year	FHR changes	ACTIONS and mode of delivery	Any obstetric disorder. Yes/No If yes describe	Neonatal resus? Yes/No	How long resus in minutes?	NICU admit Yes/No For how long in days	Seizures in NICU Yes/No	Birth asphyxia status
596	NR	35	3c with abnormalities FH 119,122	Given Oxygen and IVF CS	CPD, previous CS x 1	Yes Bag and Mask	2	Yes 5 days	No	SBA
634	4 and 6	19	41c no changes	VD		Yes Bag and Mask	10	Yes 5 days sepsis risk birth asphyxia	No	SBA
747	4 and 5	35	1c 138 bpm	CS	3.8KG	Yes Bag and Mask and chest compressions	10	Yes 5 days birth asphyxia	No	SBA
789	9 and 10 4 and 5	NR	54c no changes shown	VD	Twins	No Yes 2 nd twin	10	Yes	No	SBA
857	4 and 5	28	46c no changes shown.	VD	3.3 Kg Anaemia in pregnancy	Yes Bag and Mask	8	Yes 7 days sepsis risk birth asphyxia	No	SBA

Findings in 138 neonates in which Apgar scores at 5 minutes were 5 or 6. 82 of 138 had FHR changes. See [Additional file 6 for further information](#).

13 suffered [HIE](#) (3 with HIE did not have FHR changes). 122 had [SBA](#) (70 with and 52 without FHR changes)

CS issues: 1 patient refused CS and in one patient difficulty extracting baby at CS (no changes FHR) in either.

Obstetric problems were similar to other groups: 4 breech, 1 transverse malpresentation, 1 face, 2 cord prolapse (1 with delay), 1 cord entanglement, 2 placenta praevia, 6 Eclampsia/severe pre-eclampsia; 5 twin pregnancies two with FHR change and 1 retained 2nd twin, 5 obstructed labour (1 with Bandl's ring), 1 antepartum haemorrhage.

Three patients refused FHR monitoring and underwent vaginal delivery. All 3 SBA. No record collected on project-related FHR form.

Three mothers refused CS, two with FHR changes and one without. Two were VD and one was vacuum (the one with no changes at FHR).

In 4 cases CS was delayed. First by lack of materials resulting in 1 case by VD. This was a breech malpresentation and no changes in FHR. The second was with a change in FHR on arrival but delay in CS as family tried to buy materials. The third had cord prolapse the FHR showed changes (165 to 198 bpm) and after CS the baby suffered HIE. The fourth had FHR changes with obstructed labour and had SBA; the operating theatre was not available for 1.5 hours.

9 vacuum deliveries were undertaken including 7 with FHR changes. 6 of 9 had poor maternal efforts (pushing) including two mothers with eclampsia.

48 mothers with FHR changes (+3NR) and 15 without FHR changes (+1NR) underwent resuscitation. 21 with FHR changes and 12 without changes had Apgar scores at 5 minutes of 10 minutes or more in duration.

24 mothers were aged <18 years.

Eleven patients with Apgar scores of 5 and 6 at 5 minutes died and are included in Table 4.

Comments on 67 patients from Martha Tubman Memorial Hospital (MTMH)

51 of 67 had FHR changes identified.

8 mothers were <17 years of age (1=NR)

13 suffered **HIE**, 54 **SBA**

In 3 cases CS was delayed by lack of materials resulting in 1 case by VD. One delay in CS had cord prolapse. In one case CS was refused.

4 patients stayed long at home + 1 patient long in clinic.

62 were resuscitated (5 = NR)

2 breech 1 transverse malpresentation

1 cord tanglement.

2 placenta praevia.

4 unable to or refused to push (only 1 was vacuum). One had severe exhaustion.

16 CS (but 1 refused and VD performed), 2 vacuum (both had FHR changes), 50 were VD

3 Eclampsia/pre-eclampsia.

2 twin pregnancies: 1 retained 2nd twin.

1 cord prolapse.

6 with meconium.

Need much more vacuum assistance rather than relying on maternal pushing because by this stage the mother may be exhausted.

Also need earlier referral and FHR monitoring at clinics

Comments on 44 patients from CB Dunbar Hospital

22 had FHR changes: 22 no FHR changes including 1 who refused monitoring 9 of 22 with FHR changes given additional inspired oxygen
13 < 18 years: 8 = 17yr, 4=15yr. 1 = 13yr, 1 = NR
30 VD, 10 CS, 4 vacuum deliveries

2 HIE, 42 SBA

1 with eclampsia unable to push (FHR = no change)

2 breech malpresentation.

1 twin

5 obstructed labour; 1 with Bandl's ring

7 given episiotomy.

Comments on 13 patients from Sinje CEmOC facility

All 13 SBA

1 aged 17yr, 1 aged 15yr Remainder NR

6 had FHR changes. 7 no FHR changes

7 VD; 2 vacuum and 4 CS (1 patient refused CS)

In one patient difficulty extracting baby at CS (no changes FHR)

1 Face malpresentation

1 eclampsia and 1 severe preeclampsia.

3 unable to push; both normal FHRs. 1 treated with vacuum and 1 episiotomy

12 of 13 received resuscitation.

Comments on 14 patients from Tellewoyan Hospital

3 had FHR changes.
1 aged 16 years.
1 twin.
1 antepartum haemorrhage

All 14 [SBA](#)

7VD, 6CS and 1 vacuum delivery
All resuscitated : 2 for 30 minutes
Maternal oxygen treatment in 2 with FHR changes and in 1 without FHR changes.
No mention of lateral 4lt.
3 without FHR changes had problems pushing; one born by with vacuum delivery