

## APPENDIX I: NEONATAL ADMISSION DATA REGISTRATION

To be completed for all infants <29 days of age at admission

A) Informed consent by family Y/N/not asked Date \_\_\_/\_\_\_/200\_\_

### B) Basic data

- 1) Completed by doctor: \_\_\_\_\_, OBS/NICU/PED
- 2) Mothers name: \_\_\_\_\_
- 3) Filed out with: mother/other/none/orphan Contact (name/tel): \_\_\_\_\_
- 4) Admission day: \_\_\_/\_\_\_/200\_\_ and hour: \_\_\_\_\_ (administration time)
- 5) Birth date: \_\_\_/\_\_\_/200\_\_ and hour: \_\_\_\_\_
- 6) Birth weight: \_\_\_\_\_ (g) Gender: M/F GA: \_\_\_ (weeks) Term/preterm/post term

### C) Neonatal period (prior to present admission to DTH)

- 1) Feeding: Breast milk/formula/not started Breast feeding/bottle/NG-tube
- 2) If birth weight < 2000 g; kangaroo-mother-care performed: Y/N
- 3) Vaccinations: BCG Y/N Enderix Y/N
- 4) Duration of symptoms \_\_\_\_\_ (days from first symptom, according to family or referral letter)
- 5) Specification of symptoms (more options can be tagged):  
Floppy/difficult to wake up/movement only when stimulated/fever/difficulties  
breathing/difficulties eating/convulsions/skin colour yellow or blue or pale/  
cord surroundings wet or red/abnormal stool/distended belly/ other: \_\_\_\_\_
- 6) Discharged after delivery: Y/N
- 7) Seen at HCF prior to present admission: Y/N If Y; No of contacts: \_\_\_; for each specify:  

Level	OPD/adm	Date(s)	Diagnoses	Treatment
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### D) DTH reception (present admission)

- 1) Admitted from: home/OBS/HCF If HCF; Referral report: Y/N HCF Name: \_\_\_\_\_  
Level: Health centre/district hospital/province hospital/private hospital
- 2) If from home/HCF; Transport; Duration: \_\_\_ (h) Distance: \_\_\_ (km)  
Mode: walking/motor/car/amb  
*Only if ambulance, fill out; Accompanied by: family/nurse/doctor/none*  
Evaluation by: accompanying staff/family/DTH;  
Equipment in use: incubator/air/oxygen/bag ventilation/ET tube/NG  
tube/suction/iv/infusion pump/monitor (spO2/HR)/none/others: \_\_\_\_\_  
Equipment failure/incorrect use/displace: Y/N If Y; Specify: \_\_\_\_\_  
Deterioration of patient: Y/N If Y; Specify: \_\_\_\_\_  
Stabilisation attempt: Y/N If Y; Specify: \_\_\_\_\_
- 3) Admission (from home/other HCF/obstetrics) to: NICU/PED
- 4) Evaluation at admission (by first doctor receiving the patient), time: \_\_\_\_\_  
Weight: \_\_\_\_\_ (g) T<sup>0</sup> \_\_\_ RR: \_\_\_ HR: \_\_\_ SpO2: \_\_\_/FiO2  
Pink/blue/pale/jaundice Irritable Y/N Alert/lethargy/coma Grunting: Y/N  
Chest indrawing: no/moderate/severe Fontanel: normal/bulging/sunken  
Pulse: normal/weak CRT: normal/prolonged Other signs: \_\_\_\_\_  
Diagnoses: \_\_\_\_\_

Treatment: Respiratory support Y/N, If Y oxy/CPAP/ENT/bagging Vitamin K Y/N  
Circulation support Y/N, If Y: volume/pressor/chest compression  
Antibiotics: Y/N Other: \_\_\_\_\_

**E) Demography**

- 1) Mother's age: \_\_\_\_\_ (year of birth)
- 2) Mother's education (completed): ≤5 gr/6-12 gr/> 12 gr
- 3) Father's education (completed): ≤5 gr/6-12 gr/> 12 gr
- 4) Both parents and newborn living together: Y/N
- 5) Current address (according to family): village/town/city Province: \_\_\_\_\_
- 6) Ethnic minority (father/mother non Kinh): Y/N If Y, specify: \_\_\_\_\_

**F) Mother**

- 1) Weight (prior to pregnancy): \_\_\_\_\_ (kg)
- 2) Chronic diseases: Y/N If Y; specify \_\_\_\_\_
- 3) *Other* pregnancies; abortions (spontaneous): \_\_\_\_ (no) Stillbirths: \_\_\_\_ (no)  
Livebirths: \_\_ Dead (after birth): Y/N If Y; age and cause: \_\_\_\_\_

**G) Pregnancy**

- 1) ANC visits: <3/≥ 3; trimester I \_\_\_\_ / II \_\_\_\_ / III \_\_\_\_ (no)  
Tetanus booster: 1 / 2 / no Iron supplement: Y/N Ultrasound: Y/N If Y;  
Abnormal findings: Y/N If Y; specify \_\_\_\_\_
- 2) Illness/complication: Y/N If Y: fever/UTI/vaginal bleeding/pre-eclampsia/others  
If others, specify: \_\_\_\_\_
- 3) Treatment (during pregnancy, besides iron): Y/N If Y; specify: \_\_\_\_\_

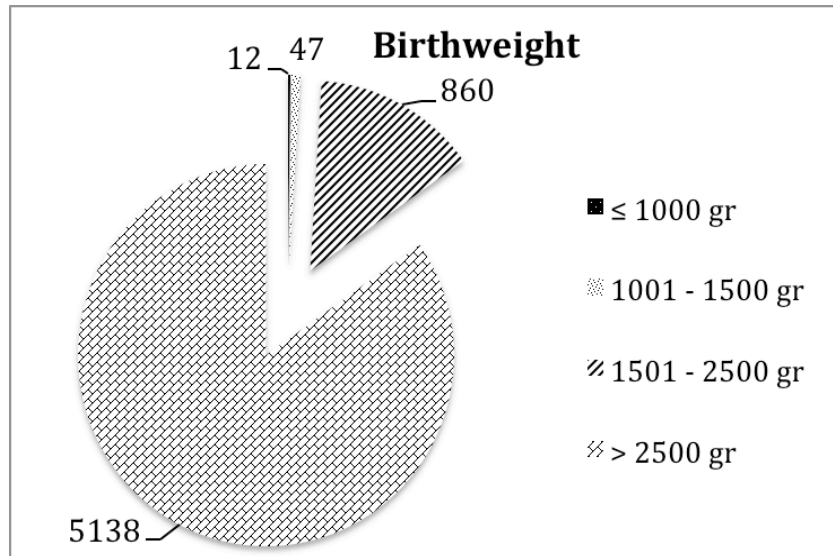
**H) Delivery**

- 1) Birth place: home/public HCF/private HCF  
If public HCF: health centre/district hospital/province hospital/regional hospital
- 2) Birth assistance: No professional assistance/TBA/midwife/doctor
- 3) Normal delivery: Y/N (according to family and file) *Only if N, fill out*;  
Prolonged labour (>18h): Y/N  
Meconium stained amniotic fluid: Y/N  
Premature membrane rupture (>18h): Y/N If Y; antibiotics Y/N  
Premature labour: Y/N If Y corticosteroid: Y/N  
Breech: Y/N  
Multiple: Y/N  
Delivery mode: normal/vacuum extraction/forceps/caesarean section  
If Caesarean; Planned/acute +/% contractions Indication: \_\_\_\_\_
- 4) Resuscitation (immediately after delivery): Y/N, if Y;  
Bag-ventilation: Y/N Intubation: Y/N Chest compression: Y/N
- 5) Cry after birth Y/N Apgar score: \_\_ /1 min, \_\_ /5 min, \_\_ / \_\_ min, \_\_ / \_\_ min
- 6) Vitamin K (im): Y/N Other treatment (at delivery ) Y/N  
If Y, specify: \_\_\_\_\_
- 7) Maternal complication: Y/N If Y; Abnormal bleeding intra/post partum/others  
If others; Specify: \_\_\_\_\_ Treatment: \_\_\_\_\_

**APPENDIX II: POTENTIAL RISK FACTORS REGISTERED IN THE STUDY**

<b>1.Socio-demographic</b>	<b>2.Pregnancy-delivery</b>	<b>3.Neonatal period</b>
Ethnic minority	Number of antenatal care visits	Discharge after birth
Mother's education	Delivery place	Admitted from
Father's education	Twin pregnancy	Symptom duration
Number of siblings	Normal delivery	Type of feeding
<b>4.Admission status</b>	Mode of delivery	Difficulties eating
Ambulance transport	Cry after birth	Difficult to wake up
Admission ward	Resuscitation	Movement only when stimulated
Age at admission	Vitamin K	Convulsions
Skin color	BCG	Difficulties breathing
Temperature	Engerix B	Skin color change
Severe respiratory failure	Gender	Abnormal stool
Shock	Birth weight	
CNS trouble	Gestational age	

**APPENDIX III: DELIVERIES IN OBSTETRIC DEPARTMENT OF DONG THAP HOSPITAL**



During the study period, the Obstetrics department had 6057 live births, approximately a quarter of total live births in Dong Thap province: 15.2% LBW and 1% VLBW.

## APPENDIX IV: DESCRIPTION OF POTENTIAL RISK FACTORS

<b>Characteristics of socio - demographics</b>		<b>No of cases (%)</b>
Ethnic minority	Yes	17 (1.6)
	No	1055 (96.4)
	UK / miss	22 (2.0)
Mother's education	≤ class 5	293 (26.8)
	Class 6 – 12	661 (60.4)
	> Class 12	115 (10.5)
	UK / miss	25 (2.3)
Father's education	≤ Class 5	255 (23.3)
	Class 6 – 12	671 (61.3)
	> Class 12	142 (13.0)
	UK / miss	26 (2.4)
Number of siblings	0	630 (57.7)
	1	332 (30.3)
	2 – 4	92 (8.4)
	UK / miss	40 (3.6)

<b>Characteristics of pregnancy- delivery</b>		<b>No of cases (%)</b>
Number of antenatal care visits	< 3	145 (13.3)
	≥ 3	906 (82.8)
	UK / miss	43 (3.9)
Delivery place	Public HCF	1051 (96.1)
	Private HCF	20 (1.8)
	Home	9 (0.8)
	UK / Miss	14 (1.3)
Twin pregnancy	Yes	30 (2.7)
	No	923 (84.4)
	UK / miss	141 (12.9)
Normal delivery	Yes	521 (47.6)
	No	542 (49.5)
	UK / miss	30 (2.7)
Mode of delivery	Normal	780 (71.3)
	Cesarean	277 (25.3)
	UK / miss	37 (3.4)
Cry after birth	Yes	949 (86.7)
	No	124 (11.3)
	UK / miss	21 (2.0)
Resuscitation	Yes	41 (3.7)
	No	1028 (94.0)
	UK / miss	25 (2.3)
Vitamin K	Yes	1034 (94.5)
	No	39 (3.6)
	UK / miss	21 (1.9)

BCG	Yes	516 (47.2)
	No	572 (52.3)
	UK / miss	6 (0.6)
Engerix	Yes	339 (31.0)
	No	736 (67.3)
	UK / miss	19 (1.7)
Gender	Male	606 (55.4)
	Female	488 (44.6)
Birth weight	≤ 1000 g	15 (1.4)
	< 1500 g	41 (3.7)
	< 2500 g	277 (25.3)
	≥ 2500 g	755 (69.0)
	UK / miss	6 (0.6)
Gestational age	< 28 weeks	16 (1.5)
	28 – 31 weeks	59 (5.4)
	32 – 36 weeks	196 (17.9)
	≥ 37 weeks	771 (70.5)
	UK / miss	52 (4.8)

<b>Characteristics of neonatal period</b>		<b>No of cases (%)</b>
Discharge after birth	Yes	426 (38.9)
	No	654 (59.8)
	UK / miss	14 (1.3)
Admitted from	Home	412 (37.7)
	HCF	152 (13.9)
	OBS	527 (48.2)
	UK / miss	3 (0.3)
Symptoms duration	≤ 1 day	669 (61.2)
	> 1 day	418 (38.2)
	UK / miss	7 (0.6)
Type of feeding	Breast milk	484 (44.2)
	Formula milk	85 (7.8)
	Mix	223 (20.4)
	Not start	285 (26.1)
	UK / miss	17 (1.6)
Difficulties feeding		123 (11.2)
Difficult to wake up		3 (0.3)
Movement only when stimulated		6 (0.5)
Convulsions		9 (0.8)
Difficulties breathing		190 (17.4)
Skin color change	Yellow	297 (27.1)
	Blue	56 (5.1)
	Pale	2 (0.2)
Abnormal stool		9 (0.8)

Characteristics of admission status		No of cases (%)
Ambulance transport	Yes	136 (12.4)
	No	935 (85.5)
	UK / miss	23 (2.1)
Admission ward	PICU	660 (60.3)
	Pediatric Dep.	416 (38.1)
	UK / miss	18 (1.6)
Age at admission	1 day	327 (29.9)
	2 – 7 days	376 (34.4)
	8 – 28 days	369 (33.7)
	UK / miss	22 (2.0)
Skin color	Pink	474 (43.3)
	Yellow	454 (41.5)
	Cyanosis	113 (10.3)
	Pale	45 (4.1)
	UK / miss	8 (0.7)
Temperature	34 – 35.9°C	6 (0.5)
	36 – 38°C	986 (90.1)
	> 38°C	93 (8.5)
	UK / miss	9 (0.8)
Severe respiratory failure	Yes	22 (2.0)
	No	1072 (98.0)
Shock	Yes	26 (2.4)
	No	1068 (97.6)
CNS trouble	Lethargy / coma	59 (5.4)
	No	1035 (94.6)

Characteristics of socio-demographics	Cases (%) N = 1094	Death (%) N = 50	OR (95% CI)
Ethnic minority			
Kinh	1055 (96,4)	50 (100)	1.0 (NA)
Others	17 (1,6)	0 (0)	-
Mother's education			
≤ Class 5	293 (26,8)	17 (34,0)	1.25 (0.68-2.30)
Class 6 – 12	661 (60,4)	31 (62,0)	1.0 (NA)
> Class 12	115 (10,5)	0 (0)	-
Father's education			
≤ Class 5	167 (15,3)	20 (40,0)	<b>3.52</b> (1.90-6.49)
Class 6 – 12	646 (59,0)	25 (50,0)	1.0 (NA)
> Class 12	142 (13,0)	2 (4,0)	0.37 (0.09-1.58)
Number of siblings			
< 2 childs	962 (87,9)	42 (84,0)	1.0 (NA)
≥ 2 childs	92 (8,4)	6 (12,0)	1.53 (0.63-3.70)

<b>Characteristics of pregnancy-delivery</b>	<b>Cases (%) N = 1094</b>	<b>Death (%) N = 50</b>	<b>OR (95% CI)</b>
ANC visits			
< 3	145 (13.3)	16 (32.0)	<b>3.50</b> (1.86-6.57)
≥ 3	906 (82.8)	31 (62.0)	1.0 (NA)
Normal delivery			
Yes	521 (47.6)	8 (16.0)	1.0 (NA)
No	542 (49.5)	42 (84.0)	<b>5.38</b> (2.51-11.63)
Multiple pregnancy			
Yes	30 (2.7)	1 (2.0)	0.63 (0.84-4.71)
No	923 (84.4)	48 (96.0)	1.0 (NA)
Delivery place			
Health care facility	1071 (97.9)	47 (94.0)	1.0 (NA)
Home	9 (0.8)	3 (6.0)	<b>10.89</b> (2.64-44.91)
Delivery mode			
Normal delivery	780 (71.3)	37 (74.0)	1.0 (NA)
Assisted delivery	25 (2.3)	2 (4.0)	1.75 (0.40-7.69)
Cesarean delivery	277 (25.3)	11 (22.0)	0.83 (0.42-1.65)
Cry after birth			
Yes	949 (86.7)	19 (38.0)	1.0 (NA)
No	124 (11.3)	31 (62.0)	<b>16.32</b> (8.87-30.01)
GA			
< 28 weeks	16 (1.5)	6 (12.0)	<b>65.96</b> (21.74-200.00)
28 – 31 weeks	59 (5.4)	13 (26.0)	<b>11.19</b> (5.21-23.81)
32 – 36 weeks	196 (17.9)	4 (8.0)	0.82 (0.28-2.45)
≥ 37 weeks	771 (70.5)	19 (38.0)	1.0 (NA)
BW			
≤ 1000 gr	15 (1.4)	11 (22.0)	<b>145.55</b> (41.67-500.00)
1001 - 1499 gr	41 (3.7)	11 (22.0)	<b>19.40</b> (8.13-45.45)
1500 - 2499 gr	277 (25.3)	13 (26.0)	<b>2.61</b> (1.21-5.62)
≥ 2500gr	755 (69.0)	14 (28.0)	1.0 (NA)
Gender			
Male	606 (55.4)	29 (58.0)	1.0 (NA)
Female	488 (44.6)	21 (42.0)	0.89 (0.50-1.59)



Characteristics of neonatal period	Cases (%) N = 1094	Death (%) N = 50	OR (95% CI)
Engerix B			
Yes	339 (31.0)	1 (2.0)	1.0 (NA)
No	736 (67.3)	49 (98.0)	<b>24.11</b> (3.31-175.33)
BCG			
Yes	516 (47.2)	1 (2.0)	1.0 (NA)
No	572 (52.3)	49 (98.0)	<b>48.25</b> (6.64-350.73)
Vitamin K1			
Yes	1034 (94.5)	42 (84.0)	1.0 (NA)
No	39 (3.6)	8 (16.0)	<b>6.10</b> (2.64-14.07)
Feeding			
Mother milk	484 (44.2)	9 (18.0)	1.0 (NA)
Formula milk	85 (7.8)	2 (4.0)	1.27 (0.27-5.99)
Mix	223 (20.4)	0 (0)	-
Not started	285 (26.1)	39 (78.0)	<b>8.37</b> (3.98-17.54)
Discharge after birth			
Yes	426 (38.9)	3 (6.0)	1.0 (NA)
No	654 (59.8)	47 (94.0)	<b>10.92</b> (3.38-35.31)
Symptoms duration			
≤ 1 days	669 (61.2)	49 (98.0)	1.0 (NA)
> 1 day	418 (38.2)	1 (2.0)	<b>0.03</b> (0.00-0.22)
Difficult to wake up			
Yes	3 (0.3)	2 (4.0)	<b>43.46</b> (3.87-487.67)
No	1091 (99.7)	48 (96.0)	1.0 (NA)
Difficulties eating			
Yes	123 (11.2)	7 (14.0)	1.30 (0.57-2.96)
No	971 (88.8)	43 (86.0)	1.0 (NA)
Movement when stimulated			
Yes	6 (0.5)	1 (2.0)	4.24 (0.49-37.00)
No	1088 (99.5)	49 (98.0)	1.0 (NA)
Convulsions			
Yes	9 (0.8)	1 (2.0)	2.64 (0.32-21.55)
No	1085 (99.2)	49 (98.0)	1.0 (NA)
Difficulties breathing			
Yes	190 (17.4)	32 (64.0)	<b>9.97</b> (5.46-18.20)
No	904 (82.6)	18 (36.0)	1.0 (NA)
Skin color changed			
Yes	351 (32.1)	18 (36.0)	1.20 (0.66-2.17)
No	743 (67.9)	32 (64.0)	1.0 (NA)
Abnormal stools			
Yes	9 (0.8)	0 (0)	-
No	1085 (99.2)	50 (100)	1.0 (NA)
Transport time			
Internal	527 (48.2)	34 (68.0)	1.0 (NA)
External	567 (51.8)	16 (32.0)	<b>0.42</b> (0.23-0.77)

<b>Characteristics of admission status</b>	<b>Cases (%) N = 1094</b>	<b>Death (%) N = 50</b>	<b>OR (95% CI)</b>
Age at admission			
0 – 1 day	424 (38.8)	45 (90.0)	1.0 (NA)
2 – 6 days	279 (34.6)	4 (8.0)	<b>0.12</b> (0.04-0.35)
8 – 28 days	369 (33.7)	1 (2.0)	0.023 (0.003-0.17)
Skin color			
Pink	474 (43.3)	12 (24.0)	1.0 (NA)
Yellow	454 (41.5)	1 (2.0)	<b>0.09</b> (0.01-0.66)
Cyanosis	113 (10.3)	30 (60.0)	<b>13.92</b> (6.85-28.29)
Pale	45 (4.1)	6 (12.0)	<b>5.92</b> (2.11-16.64)
Temperature			
34 – 35.9°C	6 (0.5)	2 (4.0)	<b>10.70</b> (1.91-58.82)
36 – 38°C	986 (90.1)	44 (88.0)	1.0 (NA)
> 38°C	93 (8.5)	4 (8.0)	0.96 (0.34-2.74)
Severe respiratory failure			
Yes	22 (2.0)	10 (20.0)	<b>21.50</b> (8.77-52.71)
No	1072 (98.0)	40 (80.0)	1.0 (NA)
Shock			
Yes	26 (2.4)	14 (28.0)	<b>33.44</b> (14.44-77.44)
No	1068 (97.6)	36 (72.0)	1.0 (NA)
CNS trouble			
Lethargy or coma	59 (5.4)	23 (46.0)	<b>23.85</b> (12.48-45.60)
No	1035 (94.6)	27 (54.0)	1.0 (NA)