

# **Annex 1**

**Tables of sensitivity and specificity of  
verbal autopsy algorithms for Bangladesh, Nicaragua and  
Uganda validation studies**

**Table 3 Acute diarrhoea – neonates  
(Deaths and survivors combined)**

**Hospital Reference Diagnosis:**

Caregiver's history of liquid, watery, loose or soft stools for <14 days  
and  
either medically noted liquid/semi-liquid or watery stools or medically noted dehydration  
and  
no medically noted blood in stools.

Verbal autopsy algorithm	Nicaragua	
	N1=23	N2=314
	Sensitivity (N3)	Specificity (N4)
<u>Acute diarrhoea</u>		
1. Frequent liquid/watery/loose or soft stools <14 days <u>and no blood in stools</u>	52% (21)	96% (270)
2. Local term for diarrhoea <14 days <u>and no blood in stools</u>	57% (21)	95% (266)
3. Frequent liquid/watery/or loose or soft stools <u>or</u> local term for diarrhoea for <14 days and no blood in stools	57% (21)	94% (270)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 4 Acute diarrhoea – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Nicaragua and Bangladesh:

Caregiver's history of liquid, watery, loose, or soft stools for <14 days  
and  
either medically noted liquid/semi-liquid or watery stools or medically noted dehydration  
and  
no medically noted blood in stools.

Uganda:

Caregiver's history of liquid, watery, loose or soft stools for <14 days  
and  
physician's observation of sunken eyes or reduced skin turgor  
and  
no caregiver report of blood in stools.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=77	N2=316	N1=283	N2=464	N1=19	N2=250
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Acute diarrhoea</u>						
1. Frequent liquid/ watery/loose or soft stools <14 days <u>and</u> no blood in stools	47% (76)	78% (314)	58% (265)	83% (449)	53% (19)	77% (247)
2. Local term for diarrhoea <14 days <u>and</u> no blood in stools	29% (72)	89% (302)	58% (265)	84% (449)	63% (19)	76% (249)
3. Frequent liquid/watery/ loose or soft stools <u>or</u> local term for diarrhoea for <14 days and no blood in stools	49% (76)	77% (306)	58% (265)	84% (449)	63% (19)	75% (247)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 5 Acute dysentery – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

**Bangladesh and Nicaragua:**

Caregiver's history of liquid, watery or loose or soft stools or diarrhoea for <14 days plus medically noted liquid or semi-liquid or watery stools plus medically noted blood in the stools.

**Uganda:** Caregiver's report of frequent watery, loose, liquid or soft stools or diarrhoea < 14 days plus caregiver's report of blood in the stools.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=12	N2=381	N1=13	N2=733	N1=6	N2=263
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N2)	Sensitivity (N3)	Specificity (N4)
<u>Acute dysentery</u>						
1. Frequent liquid/watery/loose or soft stools <u>plus</u> blood in the stools <u>plus</u> duration <14 days	25% (12)	97% (378)	27% (11)	91% (702)	67% (6)	93% (261)
2. Diarrhoea (local term) <u>plus</u> blood in the stools <u>plus</u> duration <14 days	18% (11)	98% (363)	36% (11)	91% (703)	67% (6)	93% (263)
3. Frequent liquid/watery/loose or soft stools <u>or</u> local term for diarrhoea <u>plus</u> blood in the stools <u>plus</u> duration <14 days	25% (12)	97% (370)	36% (11)	91% (703)	67% (6)	93% (261)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 6 Persistent diarrhoea or dysentery – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Nicaragua and Bangladesh:

Caregiver's history of liquid, watery, loose or soft stools or diarrhoea for  $\geq 14$  days  
and either medically noted liquid or semi-liquid or watery stools  
or medically noted blood in the stools.

Uganda:

Caregiver's report of frequent loose, liquid, or soft stools or diarrhoea  $\geq 14$  days.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=26	N2=367	N1=27	N2=743	N1=22	N2=247
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Persistent diarrhoea or Dysentery</u>						
1. Frequent liquid/watery/loose or soft stools plus duration $\geq$ 14 days	19% (26)	95% (366)	46% (26)	94% (716)	59% (22)	86% (244)
2. Local term for diarrhoea plus duration $\geq 14$ days	16% (25)	96% (350)	46% (26)	94% (718)	59% (22)	86% (246)
3. Frequent liquid/watery/loose or soft stools <u>or</u> local term for diarrhoea plus duration $\geq 14$ days	19% (26)	95% (358)	46% (26)	94% (718)	59% (22)	86% (244)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 7 Any diarrhoea or dysentery – neonates  
(Deaths and survivors combined)**

**Hospital Reference Diagnosis:**

Caregiver's history of liquid, watery, loose or soft stools and either medically noted liquid/semi-liquid stools or medically noted dehydration.

Verbal autopsy algorithm	Nicaragua	
	N1=28	N2=309
	Sensitivity (N3)	Specificity (N4)
<u>Any diarrhoea or dysentery</u>		
1. Frequent liquid/ watery/loose/or soft stools	91% (22)	92% (273)
2. Local term for diarrhoea	91% (23)	93% (272)
3. Frequent liquid/watery/loose/or soft stools <u>or</u> local term for diarrhoea	91% (23)	91% (276)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 8 Any diarrhoea or dysentery – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Caregiver's history of liquid, watery, loose or soft stools and either medically noted liquid/semi-liquid stools or medically noted dehydration.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=115	N2=278	N1=351	N2=430	N1=47	N2=224
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Any diarrhoea or dysentery</u>						
1. Frequent liquid/ watery/ loose/or soft stools	72% (115)	78% (278)	85% (340)	77% (428)	91% (47)	57% (224)
2. Local term for diarrhoea	52% (108)	90% (267)	88% (340)	78% (430)	96% (47)	57% (224)
3. Frequent liquid/watery/loose/or soft stools <u>or</u> local term for diarrhoea	73% (115)	76% (270)	88% (340)	76% (430)	96% (47)	54% (224)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 9 Pneumonia – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Bangladesh:

Chest X-ray positive for pneumonia or (physician diagnosis of pneumonia plus crepitations or lower chest wall indrawing).

Nicaragua:

Chest X-ray positive for pneumonia or (physician diagnosis of pneumonia plus crepitations or sub-costal retractions).

Verbal autopsy algorithm	Bangladesh		Nicaragua	
	N1=32	N2=86	N1=111	N2=122
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Pneumonia</u>				
1. Local term for pneumonia	74% (27)	87% (52)	58% (104)	82% (95)
2. Cough or difficult breathing and fast breathing or chest indrawing	80% (30)	59% (64)	78% (107)	30% (105)
3. Cough >2 days and difficult breathing > 2 days*	41% (32)	93% (80)	16% (111)	94% (121)

\* This algorithm was developed during data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 10 Pneumonia – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

**Uganda and Nicaragua:**

Chest X-ray positive for pneumonia or (physician diagnosis of pneumonia plus crepitations or sub-costal retractions).

**Bangladesh:**

Chest X-ray positive for pneumonia or (physician diagnosis of pneumonia plus crepitations or lower chest wall indrawing).

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=245	N2=148	N1=439	N2=130	N1=152	N2=118
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Pneumonia</u>						
1. Local term for pneumonia	75% (213)	83% (126)	76% (431)	66% (124)	74% (150)	40% (114)
2. Cough or difficult breathing and fast breathing or chest indrawing*	86% (235)	68% (136)	88% (439)	40% (130)	77% (149)	37% (117)
3. Cough > 2 days and difficult breathing > 2 days**	64% (244)	84% (146)	43% (439)	76% (130)	51% (152)	68% (118)

\* This algorithm had somewhat lower sensitivity and higher specificity for deaths (78/83) than for survivors (86/65) in Bangladesh.

\*\* This algorithm was developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 11 Injury – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Death or hospitalization due to motor vehicle accident, fall, drowning, poisoning, burn, bite, sting by venomous animal, violence or other injury.

Verbal autopsy algorithm	Bangladesh		Nicaragua	
	N1=12	N2=381	N1=30	N2=745
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Injury</u>				
1. Death due to motor vehicle accident, fall, drowning, poisoning, burn, bite, sting by venomous animal, violence or other injury	100% (12)	98% (381)	83% (30)	99% (745)
2. Death within 24 hours due to motor vehicle accident, fall, drowning, poisoning, burn, bite, sting by venomous animal, violence or other injury			57% (30)	100% (745)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 12 Meningitis/encephalitis – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Meningitis

Positive lumbar puncture defined as any of the following:

- culture or bacteria seen on Gram stain
- $\geq 100$  leukocytes/mm<sup>2</sup> and CSF with  $> 80\%$  PMNs
- positive latex agglutination test

Encephalitis:

Positive lumbar puncture defined as all of the following:

- $> 10$  leukocytes/mm<sup>3</sup> and  $> 50\%$  lymphocytes
- no bacteria seen on Gram's stain of CSF
- no bacteria seen on CSF culture (if performed)

Verbal autopsy algorithm	Nicaragua	
	N1=16	N2=104
	Sensitivity (N3)	Specificity (N4)
<u>Meningitis/encephalitis</u>		
1. Fever (hot body) <u>and</u> convulsions	43% (14)	80% (92)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 13 Meningitis/encephalitis – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

**Meningitis:**

Positive lumbar puncture defined as any of the following:

- culture or bacteria seen on Gram stain
- $\geq 100$  leukocytes/mm<sup>2</sup> and CSF with  $> 80\%$  PMNs
- positive latex agglutination test

**Encephelitis:**

Positive lumbar puncture defined as all of the following:

- $> 10$  or more leukocytes/mm<sup>3</sup> and  $> 50\%$  lymphocytes
- no bacteria seen on Gram's stain of CSF
- no bacteria seen on CSF culture (if performed)

Verbal autopsy algorithm	Bangladesh		Nicaragua	
	N1=35	N2=355	N1=20	N2=215
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<b><u>Meningitis/encephalitis</u></b>				
1. Fever (hot body) <u>and</u> convulsions <u>and</u> one or more of the following: - stopped being able to grasp - stopped being able to follow movements with eyes - stopped being able to respond to a voice (all $> 12$ hours before death)	63% (27)	92% (345)	25% (20)	91% (214)
2. Fever (hot body) <u>and</u> stiff neck or bulging fontanelle <u>and</u> one or more of the following: - stopped being able to grasp - stopped being able to follow movements with eyes - stopped being able to respond to a voice (all $> 12$ hours before death)	58% (26)	92% (313)	20% (20)	94% (214)
3. Fever (hot body) <u>and</u> stiff neck or bulging fontanelle	81% (31)	85% (302)	75% (20)	79% (214)
4. Fever (hot body) <u>and</u> convulsions	79% (34)	87% (353)	75% (20)	61% (214)
5. Stiff neck or bulging fontanelle and either fever or convulsions or unconscious for a long time or stopped being able to grasp, respond to a voice or follow movement with eyes*	87% (31)	83% (296)	71% (17)	80% (173)

\* This algorithm was developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 14 Low birth weight/severe malnutrition – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Weight-for-age Z score < -3.

Verbal autopsy algorithm	Bangladesh		Nicaragua	
	N1=46	N2=72	N1=93	N2=241
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Low birth weight /severe malnutrition</u>				
1. Pregnancy ended early or baby was very small at birth	82% (45)	80% (71)	86% (91)	68% (240)
2. Baby was very small at birth*	58% (45)	94% (71)	43% (88)	79% (230)
3. Baby was very small or smaller than usual at birth*	89% (45)	85% (71)	54% (91)	75% (240)
4. Pregnancy ended early*	78% (45)	83% (71)	85% (89)	75% (232)
5. Pregnancy ended early and baby was very small or smaller than usual at birth*	76% (45)	96% (71)	49% (91)	86% (240)

\* These algorithms were developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 15 Severe or moderate malnutrition – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Weight-for-age Z score < -2.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=234	N2=159	N1=298	N2=469	N1=85	N2=98
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Severe or moderate malnutrition</u>						
1. Very thin during the illness <u>or</u> had swollen legs or feet	49% (233)	77% (155)	86% (298)	32% (469)	82% (85)	48% (98)
2. Very thin during illness <u>or</u> local term for kwashiorkor*	52% (233)	77% (156)	84% (296)	37% (467)	80% (84)	54% (98)
3. Very thin during the illness <u>or</u> hair changed colour <u>or</u> skin flaked off in patches <u>or</u> had kwashiorkor during the prior month*	62% (214)	62% (134)	86% (298)	31% (469)	85% (85)	43% (98)

\* In Nicaragua there was no identified local term for kwashiorkor.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 16 Severe malnutrition – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Weight-for-age Z score <-3

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=145	N2=248	N1=152	N2=615	N1=38	N2=145
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Severe malnutrition</u>						
1. Very thin during illness <u>or</u> had swollen legs or feet	57% (145)	73% (243)	89% (152)	29% (615)	92% (38)	41% (145)
2. Very thin during illness <u>or</u> kwashiorkor*	63% (145)	73% (244)	88% (152)	33% (611)	92% (38)	47% (144)
3. Very thin during illness or swollen legs or feet or hair changed colour <u>or</u> skin flaked off in patches <u>or</u> had kwashiorkor (local term) during the prior month*	68% (139)	58% (209)	89% (152)	28% (615)	95% (38)	37% (145)
4. Very thin during illness or local term for “marasmus” or “kwashiorkor”*	52% (145)	75% (240)	-	-	95% (38)	44% (144)

\* In Nicaragua there was no identified local term for kwashiorkor.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 17 Severe or moderate anaemia – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Haematocrit < 24% or haemoglobin < 8 g/dl.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=117	N2=180	N1=92	N2=571	N1=58	N2=143
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Severe or moderate anaemia</u>						
1. Pale palms <u>or</u> white nails	71% (76)	48% (120)	75% (91)	33% (557)	76% (58)	45% (139)
2. Lack of blood/pallor and either pale palms <u>or</u> white nails	58% (89)	57% (143)	72% (90)	38% (552)	74% (58)	47% (139)
3. Informant mentioned anaemia in open question			16% (92)	96% (571)		

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 18 Severe anaemia – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Haemoglobin < 5 g/dl or haematocrit < 15%.

Verbal autopsy algorithm	Bangladesh		Nicaragua		Uganda	
	N1=28	N2=269	N1=12	N2=651	N1=10	N2=191
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Severe anaemia</u>						
1. Pale palms <u>or</u> white nails	90% (21)	45% (175)	75% (12)	32% (636)	90% (10)	40% (187)
2. Lack of blood or pallor and either pale palms or white nails	86% (22)	55% (210)	67% (12)	37% (630)	80% (10)	42% (187)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 19 Malaria – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Positive thick blood smear ( $\geq 1$  parasite/hpf) and (caregiver report of fever in the past 24 hours or measured fever or hypothermia) and (altered consciousness without meningitis or laboured breathing without pneumonia or haematocrit  $<18\%$ ).

Verbal autopsy algorithm	Uganda	
	N1=29	N2=203
	Sensitivity (N3)	Specificity (N4)
<u>Malaria</u>		
1. Fever and at least two of the following: <ul style="list-style-type: none"> <li>• convulsions</li> <li>• stopped following with eyes</li> <li>• difficult breathing</li> <li>• pallor</li> </ul> <u>and no stiff neck and no bulging fontanelle and no measles</u>	34% (29)	65% (192)
2. Fever and convulsions <u>and no stiff neck and no bulging fontanelle and no measles</u>	24% (29)	93% (200)
3. Fever and (convulsions <u>or</u> stopped responding to a voice <u>or</u> stopped grasping or stopped following with eyes <u>or</u> unresponsive or difficult breathing) <u>and no stiff neck and no bulging fontanelle and no measles</u>	41% (29)	48% (194)
4. Convulsions <u>or</u> stopped responding to voice*	55% (29)	69% (200)
5. Convulsions <u>or</u> stopped responding to voice <u>and</u> fever <u>and no stiff neck</u> *	45% (29)	77% (197)

\* These algorithms were developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 20 Measles – post-neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Presence of generalized rash and physician's diagnosis of measles.

Verbal autopsy algorithm	Uganda	
	N1=6	N2=265
	Sensitivity (N3)	Specificity (N4)
<u>Measles</u>		
1. Local term for measles	100% (5)	88% (244)
2. Age $\geq$ 120 days <u>and</u> fever <u>and</u> rash on face	83% (6)	85% (265)
3. Age $\geq$ 120 days <u>and</u> fever $\geq$ 3 days <u>and</u> rash $\geq$ 3 days <u>and</u> rash on face	83% (6)	86% (265)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 21 Bacteraemia/septicaemia with no known focus post-neonates  
(Deaths and survivors combined)**

**Hospital Reference Diagnosis:**

Rectal temperature > 38°C plus positive blood culture plus either (for septicaemia) non-consolable irritability, abnormally sleepy or difficult to wake, mottled and cool extremities, or pale and shocky on examination (minus all these signs for bacteraemia) minus reference standard pneumonia, bacterial meningitis, acute or persistent diarrhoea or dysentery, and local bacterial infection.

Verbal autopsy algorithm	Bangladesh	
	N1=8	N2=385
	Sensitivity (N3)	Specificity (N4)
<u>Bacteraemia/septicaemia with no known focus</u>		
1. Fever and (either stopped being able to grasp or respond to a voice or follow movements with eyes) minus fast breathing and indrawing and minus convulsions	29% (7)	93% (353)
2. Fever and either (stopped being able to grasp or respond to a voice or follow movements with eyes) minus (cough > 1 day and chest indrawing > 1 day) minus convulsions	14% (7)	93% (368)
3. Fever > 7 days minus (fast breathing and chest indrawing) minus convulsions*	75% (8)	91% (376)

\* This algorithms was developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 22 Birth asphyxia – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Medical history of birth asphyxia (no spontaneous breathing at birth or 20 minute APGAR score < 4) plus either lethargy, coma, hypotonia or seizures plus rectal temperature always between 36°C and 38°C.

Verbal autopsy algorithm	Bangladesh	
	N1=19	N2=86
	Sensitivity (N3)	Specificity (N4)
<u>Birth asphyxia</u>		
1. No fever and not able to breath after birth and either convulsions/spasms or not able to suckle normally after birth or not able to cry after birth	43% (14)	86% (76)
2. No fever and either convulsions/spasms or not able to suckle normally after birth or not able to cry after birth	60% (15)	63% (71)
3. Not able to cry after birth and either not able to breathe after birth or not able to suckle normally after birth)*	73% (15)	72% (75)
4. Not able to cry after birth and either (convulsions/spasms or not able to suckle normally after birth)*	87% (15)	69% (76)

\* These algorithms were developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 23 Premature birth – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Medical history or physician diagnosis of birth at less than 37 weeks of gestation.

Verbal autopsy algorithm	Bangladesh		Nicaragua	
	N1=30	N2=65	N1=120	N2=130
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Premature birth</u>				
1. Pregnancy ended early <u>or</u> baby was very small at birth	90% (30)	72% (65)	81% (118)	78% (129)
2. Baby was very small a birth*	67% (30)	85% (65)	42% (114)	89% (121)
3. Baby was very small <u>or</u> smaller than usual at birth*	93% (30)	68% (65)	51% (118)	84% (129)
4. Pregnancy ended early*	90% (30)	78% (65)	79% (115)	85% (125)
5. Pregnancy ended early <u>and</u> baby was very small <u>or</u> smaller than usual at birth*	87% (30)	85% (65)	46% (118)	95% (129)

\* These algorithms was developed during the data analysis

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 24 Congenital abnormality – neonates  
(Deaths and survivors combined)**

**Hospital Reference Diagnosis:**

Medically noted congenital abnormality.

Verbal autopsy algorithm	Nicaragua	
	N1=43	N2=293
	Sensitivity (N3)	Specificity (N4)
<u>Congenital abnormality</u>		
1. Malformation present at birth	53% (43)	95% (291)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 25 Birth trauma – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Physician final diagnosis of birth trauma.

Verbal autopsy algorithm	Bangladesh		Nicaragua	
	N1=8	N2=104	N1=13	N2=326
	Sensitivity (N3)	Specificity (N4)	Sensitivity (N3)	Specificity (N4)
<u>Birth trauma</u>				
1. Bruises or marks of injury on the body or head at birth	50% (8)	94% (104)	40% (10)	85% (275)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 26 Local bacterial infection – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Medical record of red or purulent umbilicus or skin pustules.

Verbal autopsy algorithm	Nicaragua	
	N1=25	N2=312
	Sensitivity (N3)	Specificity (N4)
<u>Local bacterial infection</u>  Child's belly-button went red <u>or</u> pus <u>or</u> discharge from belly-button <u>or</u> parts of child's skin became inflamed, red and hot <u>or</u> skin rash with bumps containing pus <u>and</u> fever for one day or more	48% (25)	89% (233)

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

**Table 27 Tetanus – neonates**  
(Deaths and survivors combined)

**Hospital Reference Diagnosis:**

Physician diagnosis of neonatal tetanus and age >2 days.

Verbal autopsy algorithm	Bangladesh	
	N1=20	N2=98
	Sensitivity (N3)	Specificity (N4)
<u>Tetanus</u>		
1. Tetanus (local term)	88% (17)	95% (75)
2. Age 3-27 days <u>and</u> convulsions or spasms <u>and</u> able to suckle <u>and</u> cry normally after birth <u>and</u> stopped suckling or crying	67% (18)	91% (94)
3. Age 3-27 days <u>and</u> convulsions or spasms <u>and</u> able to suckle or cry normally after birth <u>and</u> stopped suckling or crying.*	83% (18)	89% (95)

\* This algorithm was developed during the data analysis.

**Notes:**

N1 = Number of cases with a positive hospital diagnosis, and a caregiver interview.

N2 = Number of cases with a negative hospital diagnosis, and a caregiver interview.

N3 = Number of cases with a positive hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

N4 = Number of cases with a negative hospital diagnosis for whom sufficient caregiver interview data are available to make a verbal autopsy diagnosis.

## **Annex 2**

### **Standard Verbal Autopsy Questionnaire**

*Instructions to interviewer: Introduce yourself and explain the purpose of your visit. Ask to speak to the mother or to another adult caretaker who was present during the illness that lead to death. If this is not possible, arrange a time to revisit the household when the mother or caretaker will be home.*

**Section 1: Background information on child and household**  
(To be filled in before interview)

1.1 Address of household \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

1.2 Name of child \_\_\_\_\_

1.3 Identification number of child/household \_\_\_\_\_ □□□□□

1.4 Sex of child: 1. Male  2. Female

**Section 2: Background information about the interview**

2.1 Language of interview: \_\_\_\_\_

2.2 Interviewer identification number: \_\_\_\_\_

	day/month/year
Date of first interview attempt	
Date and time arranged for second interview attempt	
Date and time arranged for third interview attempt	
Date of interview	
Date form checked by supervisor	
Date entered in computer	

**Section 3: Information about caretaker/respondent**

3.1 What is the name of the main respondent? \_\_\_\_\_

3.2 What is the relationship of main respondent to deceased child? (*tick relevant box*)

1. Mother
2. Father
3. Grandmother
4. Grandfather
5. Aunt
6. Uncle
7. Other male (specify) \_\_\_\_\_
8. Other female (specify) \_\_\_\_\_

3.3 What is the age of main respondent (in years) \_\_\_\_

3.4 How many years of school did the main respondent complete? \_\_\_\_

3.5 Were other people present at the interview?

1. Yes

2. No

(If "No", go to question 3.5.3)



3.5.1 Of those present at the interview, which were present at the illness that led to death/hospitalization? (*tick all relevant boxes*)

	Present at interview	Present during illness
1. Mother . . . . .	<input type="checkbox"/>	<input type="checkbox"/>
2. Father . . . . .	<input type="checkbox"/>	<input type="checkbox"/>
3. Grandmother . . . . .	<input type="checkbox"/>	<input type="checkbox"/>
4. Grandfather . . . . .	<input type="checkbox"/>	<input type="checkbox"/>
5. Aunt . . . . .	<input type="checkbox"/>	<input type="checkbox"/>
6. Uncle . . . . .	<input type="checkbox"/>	<input type="checkbox"/>
7. Other male (specify _____)	<input type="checkbox"/>	<input type="checkbox"/>
8. Other female (specify _____)	<input type="checkbox"/>	<input type="checkbox"/>

3.5.2 Total number present at interview (excluding interviewer) \_\_\_\_

3.5.3 If mother is not present at the interview, is the mother still alive? Yes  No





Take a moment to tick all items mentioned spontaneously in the open history questionnaire.  
Use this to guide you through the rest of the questionnaire.

- 5.1.1 Diarrhoea .....
- 5.1.2 Cough .....
- 5.1.3 Fever .....
- 5.1.4 Rash .....
- 5.1.5 Injury .....
- 5.1.6 Coma .....
- 5.1.7 Fit .....
- 5.1.8 Stiff neck .....
- 5.1.9 Tetanus .....
- 5.1.10 Measles .....
- 5.1.11 Kwashiorkor .....
- 5.1.12 Marasmus .....
- 5.1.13 Difficult breathing .....
- 5.1.14 Rapid breathing .....
- 5.1.15 Complicated delivery .....
- 5.1.16 Malformation .....
- 5.1.17 Multiple birth .....
- 5.1.18 Very small at birth .....
- 5.1.19 Very thin .....
- 5.1.20 Born early .....
- 5.1.21 Pneumonia .....
- 5.1.22 Accident .....
- 5.1.23 Malaria .....
- 5.1.24 Jaundice .....
- 5.1.25 Other terms (specify \_\_\_\_\_) ....

Note: When developing the country-specific questionnaire, local terms likely to be used by respondents should be added to this list.

5.2 What was the length of time the child was ill before he/she died? \_\_\_ days  
(Use one month = 28 days to determine the number of months) \_\_\_ months

## 5.3 Was care sought outside the home while he/she had this illness?

1. Yes                       2. No                       3. Don't know   
 (If "No" or "Don't know", go to section 6)



5.3.1 (If yes ask:) Where or from whom did you seek care? (Record all responses)

1. Traditional healer .....
2. Religious leader .....
3. Government hospital .....
4. Governmental health centre or clinic .....
5. Community-based practitioner associated with health system including trained birth attendants. ....
6. Private physician .....
7. Pharmacy, drug seller, store, market .....
8. Other provider .....
9. Relative, friend (outside household) .....

*After respondent finishes prompt: Did you seek care anywhere else? Keep using this prompt until respondent replies that they did not seek care from anyone else.*

Note: Above categories should be country-specific.

## Section 6: Accident

6.1 Did \_\_\_\_\_ die from an injury, accident, poisoning, bite, burn or drowning?

1. Yes                       2. No.                       3. Don't know   
 (If "No" or "Don't know", go to section 7)



6.1.1 (If yes ask): What kind of injury or accident? Allow respondent to answer spontaneously. If respondent has difficulty identifying the injury or accident, read the list slowly.

1. Motor vehicle accident
2. Fall
3. Drowning
4. Poisoning
5. Bite or sting by venomous animals
6. Burn
7. Violence
8. Other injury (specify) \_\_\_\_\_

6.1.2 How long did \_\_\_\_\_ survive after the injury, poisoning, bite, burn or drowning?

- 1. Died within 24 hours
- 2. Died 1 day later or more

**Section 7: Age determination and reconfirmation**

7.1 Record the child's date of birth from question 4.1 \_\_\_\_/\_\_\_\_/\_\_\_\_  
dd mm yy

Record child's date of death from question 4.2 \_\_\_\_/\_\_\_\_/\_\_\_\_  
dd mm yy

7.2 Take a moment and calculate the age of the child at the time of death.  
Read out: I have calculated that \_\_\_\_\_ was \_\_\_\_ days (or months or years old as appropriate) at the time of death. Is this correct?

*If the respondent indicates this is not correct, reconcile the inconsistency by re-checking the child's date of birth and date of death. Make the necessary corrections here and in section 4.*

7.3 If it is not possible to reconcile the inconsistency, ask:  
How old was \_\_\_\_\_ at the time of death?

- 1. 28 days or more
- 2. less than 28 days

IF CHILD DIED WITHIN 24 HOURS FROM INJURY OR ACCIDENT,  
GO TO SECTION 10 – TREATMENT AND RECORDS

IF CHILD WAS LESS THAN 28 DAYS OLD AT THE TIME OF DEATH,  
GO TO SECTION 8 – NEONATAL DEATHS

IF CHILD WAS 28 DAYS OLD OR MORE AT THE TIME OF DEATH,  
GO TO SECTION 9 – POST-NEONATAL DEATHS

**Section 8: Neonatal deaths**

8.1 Was the child a singleton or multiple birth?

*(If two or more children are born at the same time, it is counted as a multiple birth, even if one or more of the babies are born dead).*

1. Singleton   
2. Multiple

8.2 Did this child's pregnancy end early, on time, or late?

1. Early   
2. On time   
3. Late   
4. Don't know

8.3 Was the late part of the pregnancy, labour or delivery complicated?

1. Yes                       2. No                       3. Don't know   
*(If "No" or "Don't know", go to question 8.4)*



8.3.1.1 *(If yes ask):* What complications occurred during late pregnancy, labour or delivery? (Record all responses)

1. Mother had convulsions   
2. Child delivered feet first   
3. Excessive bleeding   
4. Emergency Caesarean section   
5. Multiple delivery   
6. Other (specify) \_\_\_\_\_

8.3.1.2 *(After respondent finishes prompt):* Was there anything else? *(Keep using this prompt until the respondent replies that there were no other complications.)*

8.4 How many months long was the pregnancy? \_\_\_\_\_ months

8.5 Did the waters break before labour or during labour?

1. Before     2. During     3. Waters never broke     4. Don't know   
*(If waters did not break before, go to question 8.6)*



8.5.1 *(If waters broke before labour ask):* How much time before labour did the waters break?

1. Less than one day   
2. One day or more

8.6 How much time did the labour and delivery take?  
(Note: labour begins when contractions are no more than 10 minutes apart.)

- 1. Less than 12 hours
- 2. Twelve hours or more

8.7 Were there any bruises or marks of injury on \_\_\_\_\_'s body at birth?

- 1. Yes
- 2. No
- 3. Don't know

8.8 Did he/she have any malformations at birth?

- 1. Yes
  - 2. No
  - 3. Don't know
- (If "No" or "Don't know", go to question 8.9)



8.8.1 (If yes ask): Where were there malformations?

- 1. Head
- 2. Body
- 3. Arms/hands
- 4. Legs/feet

8.8.2 (After respondent finishes prompt): Were there malformations anywhere else? (Keep using this prompt until the respondent replies that there were no malformations anywhere else.)

8.9 At the time of birth was \_\_\_\_\_:  
(Read out choices)

- 1. Very small?
- 2. Smaller than usual?
- 3. About average?
- 4. Larger than usual?

8.10 Was \_\_\_\_\_ able to breathe after birth?  
(Note: This does not include gasps or very brief efforts to breathe)

- 1. Yes
- 2. No
- 3. Don't know

8.11 Was \_\_\_\_\_ able to suckle (or bottle feed) in a normal way after birth?

- 1. Yes
- 2. No
- 3. Don't know

8.12 Did \_\_\_\_\_ stop being able to suckle in a normal way?

1. Yes                       2. No                       3. Don't know

(If "No" or "Don't know", go to question 8.13)



8.12.1 (If yes ask): How long before he/she died did \_\_\_\_\_ stop suckling?

1. Less than one day   
 2. One day or more   
 3. Don't know

8.12.2 How long after birth did \_\_\_\_\_ stop suckling?

1. Less than one day   
 2. One to two days   
 3. Three to seven days   
 4. Eight to 14 days   
 5. Fifteen to 30 days   
 6. Don't know

8.13 Was \_\_\_\_\_ able to cry after birth?

1. Yes   
 2. No   
 3. Don't know

8.14 Did \_\_\_\_\_ stop being able to cry?

1. Yes                       2. No                       3. Don't know

(If "No" or "Don't know", go to question 8.15)



8.14.1 (If yes ask): How long before he/she died did \_\_\_\_\_ stop crying?

1. Less than one day   
 2. One day or more

8.15 During the illness that led to death did \_\_\_\_\_ have spasms or convulsions?

1. Yes   
 2. No   
 3. Don't know

8.16 During the illness that led to death, did he/she become unresponsive/unconscious?

1. Yes   
 2. No   
 3. Don't know

8.17 During the illness that led to death, did he/she have a bulging fontanelle?

- 1. Yes
- 2. No
- 3. Don't know

8.18 During the illness that led to death, did he/she have "tetanus" (local words)?

- 1. Yes
- 2. No
- 3. Don't know

Note: When preparing the country-specific questionnaire include local terms for tetanus here.

8.19 During the illness that led to death, did he/she have yellow eyes?

- 1. Yes
- 2. No
- 3. Don't know

8.20 During the illness that led to death, did he/she have redness or drainage from the umbilical cord stump?

- 1. Yes
- 2. No
- 3. Don't know

8.21 During the illness that led to death, did he/she have areas of skin that were red and hot?

- 1. Yes
- 2. No
- 3. Don't know

8.22 During the illness that led to death, did he/she have a skin rash with bumps containing pus?

- 1. Yes
- 2. No
- 3. Don't know

8.23 During the illness that led to death, did he/she have a fever?

- 1. Yes
  - 2. No
  - 3. Don't know
- (If "No" or "Don't know", go to question 8.24)



8.23.1 (If fever ask): How many days did the fever last? . . . . . \_\_ \_\_ days

8.24 During the illness that led to death, did he/she have frequent loose or liquid stools?

1. Yes   
 2. No   
 3. Don't know

8.25 During the illness that led to death, did he/she have (local terms for diarrhoea)?

1. Yes                       2. No                       3. Don't know

(If "No" or "Don't know", for *both* questions 8.24 and 8.25, go to question 8.26)



Note: When preparing country-specific questionnaire include local terms for diarrhoea here.

8.25.1 (If frequent or liquid stools or local term for diarrhoea, ask):  
 For how many days did he/she have loose or liquid stools? . . . . . \_\_\_ days

8.25.2 Do you feel that this represented more loose or liquid stools than usual for that child?

1. Yes   
 2. No   
 3. Don't know

8.25.3 Was there visible blood in the loose or liquid stools?

1. Yes   
 2. No   
 3. Don't know

8.25.4 During the time with loose or liquid stools did the child drink (insert a list of home-made fluids recommended by national CDD program) or ORS?

1. Yes   
 2. No   
 3. Don't know

8.26 During the illness that led to death, did \_\_\_\_\_ have a cough?

1. Yes                       2. No                       3. Don't know

(If "No" or "Don't know", go to question 8.27)

8.26.1 (If yes ask): For how many days did the cough last? . . . . . \_\_\_ days

8.27 During the illness that led to death, did \_\_\_\_\_ have difficult breathing?

1. Yes                       2. No                       3. Don't know   
(If "No" or "Don't know", go to question 8.2.8)



8.27.1 (If yes ask): For how many days did the difficult breathing last? . . . . . \_\_\_ days

8.28 During the illness that led to death, did the child have fast breathing?

1. Yes                       2. No                       3. Don't know   
(If "No" or "Don't know", go to question 8.29)



8.28.1 (If yes ask): For how many days did the fast breathing last? . . . . . \_\_\_ days

8.29 During the illness that led to death, did \_\_\_\_\_ ever stop breathing for a long time, and start again?

1. Yes   
2. No   
3. Don't know

8.30 During the illness that led to death, did he/she have indrawing of the chest?

1. Yes   
2. No   
3. Don't know

8.31 During the illness that led to death, did he/she have noisy breathing? (*Demonstrate each sound*)

8.31.1 Stridor . . . . . 1. Yes   
2. No   
3. Don't know

8.31.2 Grunting . . . . . 1. Yes   
2. No   
3. Don't know

8.31.3 Wheezing . . . . . 1. Yes   
2. No   
3. Don't know

8.32 During the illness that led to death, did his/her nostrils flare with breathing?

1. Yes   
2. No   
3. Don't know



9.3.2 Was there visible blood in the loose or liquid stools?

- 1. Yes
- 2. No
- 3. Don't know

9.3.3 During the time with the loose or liquid stools, did the child drink (when preparing the country-specific questionnaire, insert a list of home-made fluids recommended by the National CDD program) or ORS?

- 1. Yes
- 2. No
- 3. Don't know

9.4 During the illness that led to death, did the child have a cough?

- 1. Yes
  - 2. No
  - 3. Don't know
- (If "No" or "Don't know", go to question 9.5)



9.4.1 (If yes ask): For how many days did the cough last? . . . . . \_\_\_ days

9.4.2 Was the cough very severe?

- 1. Yes
- 2. No
- 3. Don't know

9.5 During the illness that led to death, did \_\_\_\_\_ have difficult breathing?

- 1. Yes
  - 2. No
  - 3. Don't know
- (If "No" or Don't know", go to question 9.6)



9.5.1 (If yes ask): For how many days did the difficult breathing last? \_\_\_ days

9.6 During the illness that led to death, did \_\_\_\_\_ have fast breathing?

- 1. Yes
  - 2. No
  - 3. Don't know
- (If "No" or Don't know", go to question 9.7)



9.6.1 (If yes ask): For how many days did the fast breathing last? . . . . . \_\_\_ days

9.7 During the illness that led to death, did he/she have indrawing of the chest?

- 1. Yes
- 2. No
- 3. Don't know

9.8 During the illness that led to death, did he/she have noisy breathing? (*Demonstrate each sound*)

- 9.8.1 Stridor . . . . .
- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

- 9.8.2 Grunting . . . . .
- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

- 9.8.3 Wheezing . . . . .
- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

9.9 During the illness that led to death, did his/her nostrils flare with breathing?

- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

9.10 During the illness that led to death, did \_\_\_\_\_ have pneumonia?

- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

**Note:** When preparing country-specific questionnaires include local terms for pneumonia here.

9.11 Did \_\_\_\_\_ experience any generalized convulsions/fits during the illness that led to death?

- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

9.12 Was \_\_\_\_\_ unconscious during the illness that led to death?

- |               |                          |
|---------------|--------------------------|
| 1. Yes        | <input type="checkbox"/> |
| 2. No         | <input type="checkbox"/> |
| 3. Don't know | <input type="checkbox"/> |

9.13 At any time during the illness that led to death, did \_\_\_\_\_ stop being able to grasp?

1. Yes                       2. No                       3. Don't know   
(If "No" or Don't know", go to question 9.14)



9.13.1 (If yes, ask): How long before he/she died did the child stop being able to grasp?

1. Less than 12 hours   
2. 12 hours or more

9.14 At any time during the illness that led to death, did \_\_\_\_\_ stop being able to respond to a voice?

1. Yes                       2. No                       3. Don't know   
(If "No" or Don't know", go to question 9.15)



9.14.1 (If yes, ask): How long before he/she died did the child stop being able to respond to a voice?

1. Less than 12 hours   
2. 12 hours or more

9.15 At any time during the illness that led to death, did the child stop being able to follow movements with their eyes?

1. Yes                       2. No                       3. Don't know   
(If "No" or Don't know", go to question 9.16)



9.15.1 (If yes, ask): How long before he/she died did the child stop being able to follow movements with their eyes?

1. Less than 12 hours   
2. 12 hours or more

9.16 Did \_\_\_\_\_ have a stiff neck during the illness that led to death?  
(Demonstrate)

1. Yes   
2. No   
3. Don't know

9.17 Did \_\_\_\_\_ have a bulging fontanelle during the illness that led to death?

1. Yes   
2. No   
3. Don't know

9.18 During the month before he/she died, did \_\_\_\_\_ have a skin rash?

1. Yes                       2. No                       3. Don't know



*(If "No" or Don't know", go to question 9.19)*

9.18.1 *(If yes, ask)* Was the rash all over \_\_\_\_\_'s body?

1. Yes   
2. No   
3. Don't know

9.18.2 Was the rash also on \_\_\_\_\_'s face?

1. Yes   
2. No   
3. Don't know

9.18.3 How many days did the rash last? . . . \_\_\_ days

9.18.4 Did the rash have blisters containing clear fluid?

1. Yes   
2. No   
3. Don't know

9.18.5 Did the skin crack/split or peel after the rash started?

1. Yes   
2. No   
3. Don't know

9.18.6 Was this illness "measles"?

1. Yes   
2. No   
3. Don't know

**Note:** When preparing country-specific questionnaire include local term for measles.

9.19 During the illness that led to death, did \_\_\_\_\_ become very thin?

1. Yes   
2. No   
3. Don't know

9.20 During the illness that led to death, did \_\_\_\_\_ have swollen legs or feet?

1. Yes             2. No             3. Don't know



(If "No" or Don't know", go to question 9.21)

9.20.1 (If yes, ask): How long did the swelling last? Number of weeks \_\_\_\_

9.21 During the illness that led to death, did \_\_\_\_\_'s skin flake off in patches?

1. Yes   
2. No   
3. Don't know

9.22 Did \_\_\_\_\_'s hair change in colour to a reddish (or yellowish) colour?

1. Yes   
2. No   
3. Don't know

**Note:** When preparing country-specific questionnaire, terms for colour to be locally adapted.

9.23 Did \_\_\_\_\_ have "kwashiorkor" during the month before he/she died?

1. Yes   
2. No   
3. Don't know

**Note:** When preparing country-specific questionnaire, local terms for kwashiorkor should be included.

9.24 Did \_\_\_\_\_ have "marasmus" during the month before he/she died?

1. Yes   
2. No   
3. Don't know

**Note:** When preparing country-specific questionnaire, local terms for marasmus should be included.

9.25 During the illness that led to death, did \_\_\_\_\_ suffer from "lack of blood" or "pallor"?

1. Yes   
2. No   
3. Don't know

**Note:** When preparing country-specific questionnaire, local terms for "lack of blood" or "pallor" should be included.

9.26 During the illness that led to death, did \_\_\_\_\_ have pale palms?  
(Show photo if possible)

1. Yes
2. No
3. Don't know

Note: When preparing country-specific questionnaire, local terms for "pale palms" should be included.

9.27 During the illness that led to death, did \_\_\_\_\_ have white nails?  
(Show photo if possible)

1. Yes
2. No
3. Don't know

Note: When preparing country-specific questionnaire local terms for "white nails" should be included here.

9.28 During the illness that led to death, did \_\_\_\_\_ have swellings in the armpits?

1. Yes
2. No
3. Don't know

9.29 During the illness that led to death, did \_\_\_\_\_ have swellings in the groin?

1. Yes
2. No
3. Don't know

9.30 During the illness that led to death, did \_\_\_\_\_ have a whitish rash inside the mouth or on the tongue?

1. Yes
2. No
3. Don't know

**Section 10: Treatment and records**

I would now like to ask a few questions about any drugs \_\_\_\_\_ may have received during the illness that led to death.

10.1 Did \_\_\_\_\_ receive any of the following?

- 10.1.1 Antibiotics . . . . . 1. Yes   
2. No   
3. Don't know

- 10.1.2 Chloroquine . . . . . 1. Yes   
2. No   
3. Don't know

- 10.1.3 Aspirin . . . . . 1. Yes   
2. No   
3. Don't know

10.2 Do you have any health records that belonged to \_\_\_\_\_?

1. Yes                       2. No                       3. Don't know   
*(If "No" or Don't know", go to question 10.5)*



10.2.1 *(If yes ask):* Can I see the health records?

1. Yes                       2. No                       3. Don't know   
*(If "No" or Don't know", go to question 10.5)*



*If respondent allows you to see the health records, transcribe all the entries within the 12 months before the child died.*

10.3 Weights (most recent two)

10.3.1 Record the dates of the most recent weight two weights

1. \_\_\_/\_\_\_/\_\_\_ (dd/mm/yy)  
2. \_\_\_/\_\_\_/\_\_\_ (dd/mm/yy)

10.3.2 Record the most recent two weights . . . 1. kg \_\_\_.  
2. kg \_\_\_.

10.4 Medical notes

10.4.1 Record the date of the last note. . . \_\_\_/\_\_\_/\_\_\_ (dd/mm/yy)

10.4.2 Transcribe the note \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## 10.5 Was a death certificate issued?

1. Yes 2. No 3. Don't know *(If "No" or Don't know", go to question 10.7)*

*INSTRUCTIONS TO INTERVIEWER - Ask to see the death certificate and record whether you have been able to see it.*

## 10.5.1 Able to see death certificate?

1. Yes 2. No *(If "No", go to question 10.7)*

## 10.6 Record the immediate cause of death from the certificate \_\_\_\_\_

10.6.1 Record the first underlying cause of death from the certificate \_\_\_\_\_

10.6.2 Record the second underlying cause of death from the certificate \_\_\_\_\_

10.6.3 Record the third underlying cause of death from the certificate \_\_\_\_\_

10.6.4 Record the contributing cause(s) of death from the certificate \_\_\_\_\_

Now I would like to ask a few questions about the child's mother.

## 10.7 Has the child's (biological) mother ever been tested for "HIV"?

1. Yes 2. No 3. Don't know *(If "No" or Don't know", go to question 10.8)*10.7.1 *(If yes ask):* Was the "HIV" test ever positive?1. Yes 2. No 3. Don't know

10.8 Has \_\_\_\_\_'s (biological) mother ever been told she had "AIDS" by a health worker?

- 1. Yes
- 2. No
- 3. Don't know

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**END OF INTERVIEW**

**THANK RESPONDENT(S) FOR THEIR COOPERATION**

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