

## Curriculum for the advanced neonatal clinician training course.

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### Components:

This programme involves a combination of apprenticeship-based work caring for individual seriously unwell infants and classroom based teaching on the main causes of neonatal illnesses.

**Apprenticeship based work.** Apprenticeship based training will be undertaken and overseen by a senior paediatrician or advanced neonatal care nurse, supported by volunteer international paediatricians and neonatal nurse practitioners from MCAI. During the first 1-year of the two years of training, the international trainer will be based in both CB Dunbar (where the model for this programme is already based) and CH Rennie Hospitals.

The training program rigorously follows the curriculum developed by MCAI and approved by all partners. It covers neonatal resuscitation and managing major complications seen in the neonatal period such as overwhelming infection (sepsis), breathing problems (asphyxia) and brain injury due to lack of oxygen and circulation to the fetus during pregnancy and delivery.

As with the complementary obstetric training, the neonatal trainees are involved in handover meetings, ward rounds, and case presentations.

### Classroom based work

Apprenticeship training is complemented by weekly audio-visual distance learning from the UK using the software programme “Go-To-Meeting”. Interactive tutorials are led by volunteer international expert paediatric doctors (including one consultant paediatrician from the UK Dr Alison Earley and two professors of paediatrics Professor Neil McIntosh and Professor David Southall). During these sessions, a clinical topic is taught and discussed in detail supplemented by presentations, videos and clinical scenarios.

### Continuous assessment

Again, as with the obstetric training program, each trainee undertakes a weekly written test (produced and marked by international expert doctors) on the classroom-based topics on which they were taught the week before. The results of each test are feedback to the trainees and provide continuous evaluation, while highlighting any areas where further support is needed.

Before continuing to their internship year (year two of training), each trainee must pass an OSCE and before being licensed as a qualified Neonatal Clinician by the Liberian Medical and Dental Council, they must pass a high-level written exam marked by the LMDC.

## Monitoring and Evaluation

The monitoring and evaluation of the neonatal program follows the same requirements as the obstetric program: each trainee must record all performed procedures and the outcome in a paper and electronic logbook; weekly exam results are recorded, and monitoring of neonatal mortality rates in the catchment area of CB Dunbar Hospital is undertaken jointly by MCAI the MOH, and WHO Liberia.

Each trainee also receives a Chromebook portable computer, containing the extensive neonatal care E-Library, MCAI's textbook and handbook.

Every procedure undertaken by each trainee will be documented in a **paper log book** and also onto a **database** (Memento) held in the Chromebook computer. The computer also contains an E Library updated 3 monthly containing a large number of videos and published training manuals/documents concerning the hospital care of new-born infants, orientated for low resource settings.

Reflective care will also be undertaken through regular clinical audit meetings, especially related to neonatal deaths or "near deaths".

Each month the logistician attached to the programme will download the electronic data base from each trainee and email it to the programme lead in the UK as an Excel spread sheet. The paper logbooks will also be copied and sent to the UK so that they can be checked against the electronic logbooks.

Every trainee will also have a copy of the new MCAI textbook and **Handbook of Hospital Care for Newborn Infants June 2020**.

Every 6 weeks there will be a 2-hour meeting in each of the 2 hospitals (CB Dunbar and CH Rennie) where the clinical audit of selected new-born infants who have died or nearly died will be attended by the trainees and supervised by the national lead trainer.

Because the training is part apprenticeship-based, all medical problems encountered will be managed as they occur and the monthly curriculum below is to show that during each particular month there will be an emphasis on consolidating background knowledge on that particular subject. Every candidate will have the curriculum and knowledge base to support each subject from the outset in both the reference textbook and for immediate use in their pocketbook.

### Monthly components of the training programme

#### Month 1 Resuscitation of the new-born infant: basic and advanced.

*(Handbook P1-19 and P206-224)*

- a. Assessment and recognition of need for resuscitation
- b. ABC approach

- c. Airway opening
- d. Use of bag valve mask
- e. Management of meconium aspiration
- f. Chest compressions
- g. Drugs
- h. Endotracheal intubation
- i. When to stop resuscitation
- j. Talking to parents about what has happened

**Month 2 Basic care of the full-term, pre-term and low birth weight infant including organisation and management of the neonatal ward**

*(Handbook P 20-47)*

- a. In pregnancy, minimizing surfactant deficiency using corticosteroids and preventing neonatal sepsis by appropriate antibiotics to the mother
- b. Organising the neonatal unit (including cleaning and care of equipment and ward, staff hygiene, duty rotas, observation charts, notes and record keeping etc.)
- c. Temperature control: keeping the baby warm including Skin to skin (Kangaroo Mother Care: KMC) Treating hypothermia
- d. Managing the placenta, cord and umbilical stump
- e. Vitamin K
- f. Assessing prematurity and measuring birth weight
- g. Feeding the newborn: breast feeding (including researching the possibility of setting up a *safe* breast milk bank with pasteurization/freezing/storing facilities near the new neonatal unit) and nasogastric feeding
- h. Managing feeding difficulties
- i. Fluid and electrolyte management in infants needing IV fluids
- j. Monitoring for and prevention of hypoglycaemia
- k. Monitoring oxygenation and safely giving oxygen when needed
- l. Prevention of hospital acquired infection
- m. Caring for infants and vulnerable mothers: diabetes, drug dependence and those with mental health problems
- n. Discharge plans including nutritional supplements when required

**Month 3 Basic practical procedures needed for caring for ill new-born infants.**

*(Handbook P 231-276)*

- o. Placing of gastric tubes
- p. How to measure temperature reliably?
- q. How to obtain urine samples and research possibility of undertaking ward-based urine microscopy
- r. How to obtain blood samples safely, especially heel capillary blood.
- s. Detection and management of hypoxaemia: pulse oximetry and safe administration of oxygen (see k. above, teach together)
- t. Detection and management of hypoglycaemia (see i. above, teach together)
- u. Safety in administering drugs, fluids and electrolytes
- v. Measuring blood glucose (see c. above, in this section)
- w. Giving injections (IM, IV and SC)

- x. Placing IV cannulae (peripheral venous, scalp vein and external jugular) and care of IV lines and cannulae
- y. Lumbar puncture
- z. Umbilical venous cannulation for exchange transfusion and in an emergency for resuscitation in the first 3 days of life.
- aa. Nasal CPAP treatment

#### **Month 4 Detection and management of neonatal sepsis**

*(Handbook P 48-65)*

- a. Neonatal sepsis: recognition, treatment (antibiotics, nutrition and fluid management including prevention and treatment of hypoglycaemia)
- b. Life threatening infection: meningitis and septicaemia
- c. Laboratory evaluation
- d. Pneumonia
- e. Skin infection
- f. Eye infections
- g. Umbilical infection
- h. Mucous membrane infections
- i. Necrotising Entero-Colitis (NEC)
- j. Knowledge of the neonatal use of antibiotics

#### **Month 5 Detection and management of neonatal respiratory failure**

*(Handbook P 80-99)*

- a. Neonatal respiratory failure: recognition, causes, treatment (antibiotics, oxygen, early nasal CPAP, nutrition and fluid management)
- b. Treatment of pneumothorax: needle thoracocentesis and chest drain insertion
- c. Tracheal intubation and assisted ventilation
- d. Apnoeic/hypoxaemic episodes causes, treatments, oxygen, nasal CPAP and caffeine

#### **Month 6 Management of anaemia, jaundice, haemorrhage, shock, heart failure and polycythaemia**

*(Handbook P 100-118)*

- a. Neonatal jaundice causes and management including collecting of blood samples, measurement of bilirubin and other laboratory tests for the causes of jaundice. Treatment with phototherapy and exchange transfusion
- b. Diagnosis and management of anaemia and haemorrhage
- c. Recognition and management of shock (including intraosseous needle insertion)
- d. Recognition and management of heart failure
- e. Recognition and management of polycythaemia (including hydration and partial exchange transfusion)

## **Month 7 Management of neurological disorders**

*(Handbook P 119-134)*

- a. Identifying the causes of fits and reduced conscious level
- b. Metabolic causes including hypoglycaemia, hypocalcaemia and hyponatraemia
- c. Diagnosis and management of hypoglycaemia and its different causes
- d. Managing fits with glucose and anticonvulsants when indicated
- e. Neonatal tetanus: management
- f. Hypoxic ischaemic brain injury; diagnosis and management
- g. Other causes such as drug dependence, toxic substances from traditional healers, meningitis and congenital brain abnormalities

## **Month 8 Recognition and management of congenital abnormalities**

*(Handbook P135-160)*

- a. Congenital heart disorders
- b. Management of serious brain disorders including hydrocephalus and spina bifida
- c. Management of chromosome disorders such as Down's syndrome
- d. Gastrointestinal disorders such as oesophageal atresia, pyloric stenosis, duodenal stenosis, diaphragmatic hernia, volvulus, intussusception, peritonitis and Hirschsprung's disease
- e. Renal disorders
- f. Genital problems

## **Month 9 Recognition, prevention and management of infections that can affect the new-born infant**

*(Handbook P 58-61, P 66-75, P179-180)*

- a. HIV and PTMCT
- b. Syphilis
- c. Varicella zoster
- d. Dehydration and gastroenteritis
- e. Bronchiolitis
- f. TB

## **Month 9 Ethical and professional standards when caring for the new-born infant**

*(Handbook P225-230, P237, P277-279)*

- a. Pain control for infants undergoing procedures
- b. Restraint for procedures in infants
- c. UNCRC and Maternal and Child Friendly Healthcare Initiative (MCFHI)
- d. 3-day course in Medical Ethics and Professional Standards (already performed in Liberia July 2015)
- e. Care for the family, including the breaking of bad news, withdrawing treatment when palliative care is the only possible way forward.

**Months 10 and 11**

**Consolidation of the training**

**Month 12**

Final analysis of the continuous assessment materials collected during the training and decision on accreditation of each candidate following an OSCE.

TRAINEE'S NAME:	SUPERVISOR'S NAME:	DATE OF PROCEDURE:
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NEWBORN INFANT'S NAME: MOTHER'S NAME:	DATE OF BIRTH OR AGE:	HOSPITAL:
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REASON FOR TREATMENT:

DESCRIBE TREATMENT GIVEN INCLUDING ANY PROCEDURES AND DRUGS USED

AT TIME OF ONSET OF TREATMENT:

Pulse rate in beats/min:

Respiratory rate in breaths/min:

Capillary refill time in seconds:

Temperature in degree C:

Was shock present?

Was the baby fitting?

Was hypoglycaemia present?

What was blood glucose?:

Was the baby jaundiced?

DURATION OF TREATMENT:

WAS BLOOD TRANSFUSION NEEDED AND AVAILABLE?

WAS NEONATAL RESUSCITATION NEEDED?

DESCRIBE ANY UNEXPECTED PROBLEMS WITH TREATMENT GIVEN?

ANY EQUIPMENT PROBLEMS?

IF INFANT HAS JUST BEEN BORN DESCRIBE STATE OF BABY AT ONSET OF ANY RESUSCITATION GIVEN:

Breathing? Normal, gasping or apnoeic?

Colour?

Muscle tone?

Heart rate > 100 or < 100 or < 60 beats/min.

What was Apgar score at 5 minutes?

IF BABY WAS RESUSCITATED DESCRIBE WHAT WAS DONE

Bag and mask?

Chest compressions/

Drugs?

DID BABY SURVIVE?

IF NOT DESCRIBE WHAT HAPPENED HERE:

SIGNATURE OF TRAINEE

SIGNATURE OF SUPERVISOR

**LOG BOOK FOR PROCEDURES UNDERTAKEN AS PART OF BASIC NEONATAL CARE**