Concept note: special training for nurse anaesthetists to work in teams in rural hospitals in Liberia where advanced obstetric, neonatal and paediatric care are provided. December 2020

Background

The Ministry of Health in Liberia is currently running a task-sharing programme in partnership with WHO, UNFPA and MCAI to train midwives in the diagnosis and treatment of obstetric emergencies, some involving instrumental delivery or caesarean section, and to train nurses in advanced care of critically ill neonates and infants, including respiratory support by nasal CPAP. This programme evolved from recognition of the need for skilled practitioners to work in rural areas if deaths from avoidable and treatable pregnancy, labour and neonatal complications were to be avoided. During the time needed to transport pregnant women to a facility where advanced obstetrics or neonatal care is available, patients frequently die or suffer irreversible complications. The main underlying problem has been and remains the lack of doctors able and/or willing to work in rural hospitals.

The Minister of Health, Dr. Wilhelmina Jallah, has proposed that for each rural facility where there are resources to undertake comprehensive EmONC, there should be a team consisting of one or two doctors, one or two obstetric clinicians, one or two neonatal clinicians and one or two nurse anaesthetists.

When qualified, the midwives or physician assistants who have undergone the 3 years of advanced obstetric training are known as obstetric clinicians and the nurses who have undergone two years training in advanced neonatal care are known as neonatal clinicians. Most originate from the rural counties where they and their families are based. All are willing and will be contracted to work in rural hospitals as part of the teams recommended by the MOH.

The integration of obstetric, neonatal, and anaesthetic care: This integration is crucial to the continuum of care necessary to improve the overall management of perinatal emergencies, reduce maternal and neonatal mortality and disability, reduce stillbirths, and improve quality of care. Furthermore, the establishment of highly trained professionals to work together as Obstetric/Neonatal/Anaesthetic (ONA) teams in rural hospitals/health centres to provide CEmONC consolidates this integrative approach to the benefit of patient care.

Summary

Title: *Proposed training programme in advanced anaesthesia and critical care in pregnancy and the newborn infant*
Duration: *6 months*
Structure: *14 weeks distance learning (1 tutorial/week) and one 2-day course*
Number of candidates: *10*
Selection of candidates: *by MOH, UNFPA, UNICEF, WHO, MCAI, LBNM*
Educational materials: *textbooks, E-Library, videos, manikins*
Qualification: *Certificate of successful completion of course*
Quality control: *Weekly test marks on examinations following each tutorial, passing 2-day course*
Monitoring and evaluation: *Log books and examination results*

Support after course completion: *mentoring on difficult cases via WhatsApp group and audit meetings with obstetric and neonatal clinicians.*
Budget: *to come*

Nurse Anaesthetists
To enable the obstetric clinicians to be able to operate, anaesthetists will be required to work in the same facilities where comprehensive EmONC can be undertaken. In addition to administering anaesthetic drugs to allow emergency obstetric operations to be performed, anaesthetists are experts in resuscitation and use of the drugs needed to treat cardiovascular collapse which occurs with, for example, major haemorrhage and sepsis. They assist doctors, obstetric and neonatal clinicians in advanced obstetric and neonatal care and are thus valuable as part of the task-sharing team in the delivery units, neonatal, antenatal and postnatal wards, as well as the operating theatre, and managing patients needing high dependency and intensive care.

Additional training for those 10 nurse anaesthetists in 5 rural hospitals who will join the teams aiming to reduce maternal and neonatal mortality

1. **Selection** The nurse anaesthetists who will contribute to the teams working in rural hospitals need to be carefully selected by MOH, LBNM, the association of nurse anaesthetists in Liberia, MCAI and UN partners in a similar way to those becoming obstetric and neonatal clinicians. Initially we aim to train 10 existing nurse anaesthetists who are already working in the public hospitals where the teams to manage advanced obstetrics and neonatal care are to be based. Two will be based in each of the following rural hospitals (Martha Tubman, CB Dunbar, CH Rennie, Tellewoyen and Fishtown). Ideally, they will originate from the rural areas where the teams are going to be placed. They will need to undertake an examination at interview and demonstrate their willingness after training to practice for at least 5 years in a government hospital identified for them by the MOH.
2. **Training** will consist of a combination of tutorial-based classroom teaching followed by a two-day course that summarises the classroom teaching and enables practicing of skills with international and national experts.
3. **Classroom tutorials by volunteer international experts in obstetric anaesthesia and intensive care**

These will be held every 2 weeks and last 2 hours each using audio-visual conferencing from the UK. The teaching will cover the following topics and will be accompanied by an E Library containing books, publications and videos that contain up to date information on each of the following subjects:

Week of training	**Subject of training**	**Teaching materials provided (from E-Library: papers, books and videos)**
1	anatomical and physiological changes in the pregnant woman relevant to anaesthesia	
2	the effects of anaesthesia on the woman and fetus	

3	multidisciplinary care of critically ill pregnant women	
4	commonly used drugs in obstetrics	
5	cardiac and/or respiratory arrest in pregnant women	
6	latest evidence-based management of obstetric emergencies including placental abruption, placenta praevia, uterine rupture, major obstetric haemorrhage, eclampsia	
7	labour analgesia	
8	spinal anaesthesia	
9	general anaesthesia	
10	Ketamine	
11	pain control during intensive care	
12	vascular access in shock: intraosseous needles, external jugular vein cannulation and long saphenous vein cut-down	
13	special issues regarding intubation including the use of Seldinger techniques and expired carbon dioxide monitoring	
14	the latest advice and training on neonatal resuscitation	

4. Final skill and scenario-based course to consolidate training

The skills training will consist of a 2-day course in Liberia undertaken by specialists in obstetric anaesthesia from Liberia, the UK and The Gambia together with international specialists in obstetrics, neonatal care and critical care.

5. **Training materials and logbooks.** During the first year of this training programme, each nurse anaesthetist will be provided with a computer tablet including the E Library but also a database in which they can enter every patient they are involved in caring for. These databases will be collated in the UK by MCAI and provided on regular basis to the MOH and UN partners.

Advanced obstetric anaesthesia and critical care 2 Day Programme, … 2019
First 10 trainees

Course Director	
Diane Watson (DW)	
Instructor Group 1	**Instructor Group 2**
Diane Watson (DS)	Momodou Baro (MB)
David Southall (DS)	Aaron Sonah (AS)

Group	No.	Name
Yellow	1	
	2	
	3	
	4	
	5	
Blue	6	
	7	
	8	
	9	
	10	

2 from each of the 5 rural hospitals

DAY 1		Instructor
0730 – 0800	**BREAKFAST**	
0800 - 0830	Faculty Meeting	**All**
0830 - 0900	Registration and Photos	**All**
0900 - 0915	Welcome, Introductions, What to expect from the course	**DW**
0915 - 0930	Putting obstetric anaesthesia into context in Liberia	**DS**
0930 - 1015	Anatomical and physiological changes in the pregnant woman relevant to anaesthesia	**DW**
1015 - 1045	Specific effects of anaesthesia on the woman and fetus	**AS**
1045 - 1115	**BREAK**	
1115 - 1145	Multidisciplinary care of critically ill pregnant women	**DS**
	Workshop / Skills stations 1. Vascular access in shocked patients before and after birth (Intraosseous needle, external jugular vein access, long saphenous vein cannulation) 2. Airway and breathing management in pregnant patients (rapid sequence induction, difficult intubation, difficult application of positive airway pressure in an emergency involving laryngospasm, laryngeal mask)	**DW, DS** **MB, AS**
1145 - 1300	**Vascular access**	**DW, DS**
1145 - 1300	**Airway and breathing**	**MB, AS**
1300 - 1400	**LUNCH**	
1400-1515	**Vascular access**	**DW, DS**
1400 - 1515	**Airway and breathing**	**MB, AS**
1515-1600	Principles of multidisciplinary care of critically ill pregnant women: **team-working**	**DS**
1600-1630	BREAK	
1630 - 1700	Scenario on critically ill patient with shock due to massive PPH (team work)	**MB, AS,OD**
1630 - 1700	Scenario on critically ill patient with fitting and coma due to eclampsia (team work)	**DW, DS**
1700 - 1730	Scenario on critically ill patient with shock due to massive PPH (team work)	**DW, DS**

1700 - 1730	Scenario on critically ill patient with fitting and coma due to eclampsia (teamwork)	**MB, AS,OD**
1730 - 1800	Faculty meeting	**ALL**

DAY 2		
0730 – 0800	**BREAKFAST**	
0800 – 0815	Faculty Meeting	**ALL**
0815 - 0845	Commonly used drugs in pregnancy	**AS**
0845 - 0915	Cardiac and/or respiratory arrest in pregnant women (scenario based)	**DW, OD,AS**
0915 - 0930	Pain control during labour: the future?	**DS**
0930 - 1000	**BREAK**	
1000 - 1030	Spinal anaesthesia during caesarean section	**MB**
1030 - 1100	General anaesthesia during caesarean section	**DW**
1100 - 1230	Workshop for everyone on oxygen use / oxygen concentrator pulse oximetry/ nasal CPAP	**ALL INSTRUCTORS**
	Workshop / Skills stations/scenario 1. Special issues regarding intubation in pregnancy (use of bougie, expired CO2 monitoring, difficult/failed intubation) 2. Special issues regarding neonatal resuscitation	**DW, MB, AS** **DS, AK**
1230-1315	**Intubation in pregnancy**	**DW, MB, AS**
1230- 1315	Neonatal resuscitation	**AK, DS**
1315 - 1415	**LUNCH**	
1415 - 1500	**Neonatal resuscitation**	**AK, DS**
1415 - 1500	**Intubation in pregnancy**	**DW, MB, AS**
1500 - 1530	Use of Ketamine in pregnancy	**AS**
1530-1600	BREAK	
1600- 1630	Use of local anaesthesia in pregnancy	**DW**
1630 - 1715	Developments in managing massive obstetric haemorrhage (Tranexamic acid, Condom Catheter, cell saving etc.)	**OD**
1715– 1745	**FACULTY MEETING**	**ALL**
1745- 1815	**PRESENTATIONS AND CLOSE**	**ALL**

Estimated additional budget to support 2 anaesthetists in each of 4 rural hospitals (as yet uncosted)

Needs		**Cost**
2 -day training course for anaesthetists in advanced obstetrics, emergency resuscitation and care of the newborn infant and critically ill pregnant women PLUS team-working	Includes training manikins, anaesthetic equipment, monitoring equipment, funds for the travel and accommodation for 3-4 international volunteers	
Incentives and accommodation in each rural hospital for the specialist NAs	MOH to advise	
Anaesthetic equipment required for each hospital	Anaesthetic machine, hoses and valves and patient circuits with in-built oxygen concentrator and also links to an oxygen cylinder for back-up	
	Multichannel non-invasive physiological monitor with long battery life including SaO2, non-invasive BP, ECG, temperature, respiratory and heart rates	
	Pulse oximeter and non-invasive BP machines ECG for theatre and recovery period	£1500
	Surge protectors	
	Three oxygen cylinders, Hudson masks and tubing	
	Thermometers x2	
	Expired CO2 monitors	
	Self-inflating bags x 4 (adult) with masks and reservoirs	
	Anaesthetic masks	
	One foot operated and one electric suction system	
	Laryngoscopes, Mackintosh blades 1-3 x4	
	IV pressure infuser bags x4	
	Magill forceps	
	Intubation stylet and bougies – 4 of each	
	Nerve stimulator	
Disposable anaesthetic supplies for each hospital	Examination gloves	
	Spinal needles 22-24G	
	IV infusion equipment – IV cannulae and dressings, fluid bags, giving sets	
	Suction catheters size 6 to 16 FG	
	Sterile gloves sizes 6-8	

Needs		Cost
	NG tubes size 6 -16FG	
	Oropharyngeal airways size 3-4	
	Tracheal tubes size 5.5-8.0mm	
	Batteries size C	
	Yankauer suction adult and tubing	
	ECG electrodes	
	Patient anaesthetic record forms	
	Log books for anaesthetists	
Anaesthetic drugs for each hospital	Ketamine 50mg/ml injection	
	Lidocaine 1% or 2%	
	Diazepam 5mg/ml injection (2ml) or Midazolam 1mg/ml injection (5ml)	
	Pethidine 50mg/ml (2ml)	
	Morphine 10mg/ml (1ml)	
	Epinephrine (Adrenaline) 1mg	
	Atropine 0.6mg/ml	
	Appropriate inhalational anaesthetic if vaporiser available	
	Thiopental 500mg/1g powder, or Propofol	
	Suxamethonium bromide 500mg powder	
	Neostigmine 2.5mg injection	
	Lidocaine 5% heavy spinal solution, 2ml	
	Bupivacaine 0.5% heavy, 4ml	
	Hydralazine 20mg injection	
	Furosemide 20mg injection	
	Dextrose 50% 20ml injection	
	Aminophylline 250mg injection	
	Ephedrine 30/50 mg ampoule	
	Hydrocortisone	
	Metaraminol injection 10mg/ml	
	Hydrocortisone	
	0.9% saline 10ml injections	
	Water for injections 10/20ml	
	Magnesium sulphate 50% 10ml ampoules	
	Calcium gluconate 10%	
	Vecuronium	

Main reference: Alan F. Merry, FANZCA, J.B Cooper, PhD, Olaitan Soyannwo, MMed, Iain Wilson, FRCA, John H. Eichhorn, MD. International Standards for a Safe Practice of Anaesthesia 2010. *Canadian J Anaesthesia* (2010) 57:1027-1034