The Liberian Task-Sharing Program
Draft Concept Note 12th Nov 2020

Providing trained Nurse Anaesthetists(NAs) to rural Liberia:

the urgent provision of 10 nurse anaesthetists in 15 rural hospitals/major health centres where there are 2 or less NAs to work as part of a team with doctors and obstetric and neonatal clinicians, nurses and midwives to reduce the number of maternal and neonatal deaths. In the immediate future, this plan seeks to place 10 NAs in the 8 CEmONC facilities in which there are only 1 or zero NAs.

History of NA training in Liberia

- The WFSA global Anaesthesia workforce survey in 2015 estimated that 10 anaesthetists (physician and/or nurse trained) per 100 000 population by 2030 should be the aim, but acknowledged that this is not going to be achieved, and suggested a more realistic aim; initially 1 per 20,000 of the population
- Of the total 85 NAs in Liberia, 42 (49%) are based in the capital city with a ratio of 1 NA to 33,464 for the population. The population of Liberia is 4,369,106 persons and for Montserrado county is 1,405,461 (32% of the total).
- Latest rural county data, as examples, shows ratios for Grand Gedeh are 1 NA to 157,430, and for Sinoe are 1 NA for 128,689 persons
- Ongoing discussions at the MOH Family Health Division's MNDSR meetings, have revealed many avoidable maternal deaths contributed to by an absence of an NA or other problems resulting from the lack of available NAs who often have to be on duty 24/7 with high work intensity
- The data in the accompanying Table and subsequent slide point to an urgent need, not only to train more NAs, but to ensure their distribution throughout the country based on population needs

Current training for NAs in Liberia

- Phebe School of Nursing is the only current training centre for NAs in Liberia producing around 7 qualified NAs per year after a two-year training course
- From discussions with Phebe School the training consists of an induction course, classroom tutorials and clinical training based at Phebe Hospital and at major hospitals mostly in Monrovia (including the private hospitals ELWA and partly private JFK) where there are considered to be sufficient patient numbers and sufficient quality equipment, anaesthetic drugs and supplies such as spinal needles to enable training to be effective
- The curriculum from Phebe school was not available
- The quality of training provided at Phebe conforms to the highest of international standards (WFSA levels)
- From MCAI's clinical experience in 9 public hospitals, the quality of anaesthesia provided by graduates of Phebe School is of high quality. However, MNDSR meetings have revealed considerable problems experienced with some NAs (some from Phebe and some from other past training centres), in terms of their ethical and professional behaviour

Many public hospitals providing CEmOC in Liberia, especially in rural areas, have dangerously low numbers(2 or less) or even no nurse anaesthetists

According to data recently provided by Phebe School there are 15 hospitals/MHCs practicing CEmONC where there are 2 or less nurse anaesthetists (see next slide)

In 8 of these 15 rural public hospitals/MHCs there is only 1 or zero NAs

However, the current design of the training, inadvertently, does not create a model that provides equitable provision of NAs to public hospitals providing CEmONC. Rather there is a heavy preponderance of postgraduates working in Monrovia and, also, many trained NAs work in private rather than in public facilities (this despite training in a National hospital-based training school: Phebe)

While the current training model is understandable, given the lack of decent equipment, drugs and supplies available in public hospitals outside of Monrovia, the main disadvantage is that once trained, NAs largely prefer to remain in Monrovia or in private clinics/hospitals

Furthermore, trainee NAs are **not** being actively recruited from rural counties in partnership with the MOH.

An additional issue relates to the lack of a country-wide fair salary structure for qualified NAs. For example 3 NAs employed by the international NGO PIH at JJ Dossen Hospital each receive 1,500 USD per month. A typical GOL salary for an NA in a rural public Liberian hospital is only 250 USD per month

NURSE ANAESTHETISTS IN LIBERIA from data provided to MNDSR meetings in August 2020 by LANA

County	No. Nurse anaesthetists (NA)	Ratio NA to population (1 NA to how many persons in the county?)	County Population 2019
Bomi	3	35,242	105,725
Bong	12	34,928	419,135
GBarpolu	NONE	NR	104,806
Grand Bassa	2	139,318	278,636
Grand CapeMount	3	53,238	159,714
Grand Gedeh	1	157,430	157,430
Grand Kru	1	72,788	72,788
Lofa	2	173,988	347,975
Margibi	6	43,974	263,842
Montserrado	42	33,464	1,405,461
Nimba	8	72,587	580,698
River Cess	1	83,944	83,944
RiverGee	2	44,939	89,877
Maryland	1	170,386	170,386
Sinoe	1	128,689	128,689
TOTALS	**85**	**51,401**	**4,369,106**

Public hospitals/MHC practicing CEmOC with less than 3 NAs in September 2020

Name of CEmOC facility	County	No: NA	No: annual births 2019	County population
Kolahun	Lofa	2	465	347,975
Tellewoyan	Lofa	1*	888	
Curran (Lutheran)	Lofa	0*	453	
Chief Jallahone	Gbarpolu	2	259	104,806
Bong Mines	Bong	2	618	419,135
GW Harley (Methodist)	Nimba	2	1043	580,698
Esther and Jerryline	Nimba	2	522	
Saclapea MHC	Nimba	1*	903	
Martha Tubman	Grand Gedeh	1*	1492	157,714
Fishtown	River Gee	2	448	89,877
St Timothy	Grand Capemount	2	185	159,714
Sinje MHC	Grand Capemount	0*	328	
St Francis	Rivercess	1*	220	83,944
FJ Grant	Sinoe	1*	764	128,689
Rally Time	Grand Cru	1*	102	72,788

Proposed modification to the model of training NAs in Liberia (1)

- Based on the previous slide there is an urgent need to provide 10 NAs to those 8 hospitals/MHCs with only 1 or zero currently in post

- It may be possible for the MOH (perhaps with donor financial support) to identify some qualified NAs willing to move to rural hospitals and to fill the current gaps. Attempts made to find NAs who have been already trained but are no longer working in anaesthesia are also urgently needed, especially to fill the vacancies in the 8 hospitals/MHCs with one or no NAs.

- Attempts to move some of those qualified NAs currently working in the private sector and others working in well-resourced hospitals/clinics in Monrovia to be deployed (perhaps temporarily) to work alongside current qualified NAs in selected rural hospitals where there are < 2 NAs.

- Future trainees need to be recruited in the same way as obstetric and neonatal clinicians: namely by the MOH to work on the National Task Sharing program in rural public facilities

- Training (probably in future 2.5 years in duration) needs to include a period of (ideally 1 year) internship in the above 8 CEmONC facilities with apprenticeship-based training supported by and in support of existing NAs currently working in the hospitals that need more anaesthetic input.

- The curriculum must concentrate on managing common and dangerous operations needed (especially obstetric) not on rarities

Proposed modification to the model of training NAs in Liberia (2)

- It is essential that NAs are highly valued and because they have learned vital resuscitation and other life-saving skills, their salaries and in-hospital support must reflect their value to the National Health System in Liberia

- They must receive adequate salary, recognition and administrative support by MOH and partners during training and receive enhanced financial support after qualification as is done for neonatal and obstetric clinicians (current salaries 500 USD per month) plus accommodation, transport and on-call rooms

- Once qualified NAs must work for at least 5 years in the county of origin or other rural counties where the need is the greatest, as identified and designated by MOH: usually the county of the NA's origin

Proposed modification to the model of training NAs in Liberia (3)

- The trainees must be recruited directly by MOH from government facilities and remain employed and paid GOL salary during their training (as is the case for obstetric and neonatal clinicians)

- Trainees will need an educational allowance on top of their salary (currently 150 USD for obstetric and neonatal clinicians) from a donor

- **Liberian trainers will need to be paid an attractive salary and form the lead for teaching**. However, and if possible, this training should be supplemented by suitably experienced international medical or nursing anaesthetists (both volunteers using distance based audio-visual training and, if possible, long-term on the ground international staff funded and recruited appropriately in close collaboration and in partnership with Liberian trainers)

- Personal educational materials will need to be provided for each of the trainers and trainee NAs. These could consist of 1. computers containing a database for their logbooks (ideally Chromebooks for each), 2. E Libraries (including relevant videos), Email, PDF, word, excel and PowerPoint programmes 3. Smart phones containing hot spots (for example Iphones 6 or 6s refurbished) 4. Relevant textbooks and handbooks on anaesthesia appropriate for low resource countries 5. Adequate scratch cards providing sufficient internet available at all times to enhance teaching

- Provide accommodation for the 10 trainees at both the Training and Intern based Hospital(s) and when undertaking induction courses, refresher courses and examinations

- Provide and cover the costs of adequate private accommodation for the 10 trainees at the hospital(s) where they will be trained

Proposed modification to the model of training NAs in Liberia (4)

1. Ensure that each public county hospital from which the first cohort of 10 new NAs are recruited has sufficient anaesthetic equipment *suitable for low resource settings* according to World Health Organization-World Federation of Societies of Anaesthesiologists (WHO-WFSA) International Standards for a Safe Practice of Anaesthesia (Canadian Journal of Anaesthesia) https://doi.org/10.1007/s12630-018-1111-5

   anaesthetic machines, suction systems, multi-channel vital signs monitoring (including SaO2, ECG, respiratory rate, heart rate, temperature, non-invasive BP), pulse oximeters, laryngoscope, laryngeal masks, bag and masks, endotracheal tubes, tracheal bougies, oxygen cylinders, oxygen concentrators, nasal CPAP, spinal needles, Automatic External Defibrillator, airway CO2 monitoring, point of care stick test HB monitoring

2. Ensure that each public county hospital from which the first cohort of 10 new NAs are recruited has sufficient anaesthetic and resuscitation drugs in particular

bupivacaine, lidocaine, ketamine, thiopentone, atropine, adrenaline, ephidrene, propofol, suxamethonium, furosemide, GTN, anti hypertensive drugs, tranexamic acid, magnesium sulphate

Proposed modification to the model of training NAs in Liberia (5)

- The apprenticeship-based (internship) component of training must predominantly occur in the rural hospitals from which the students originate. This apprenticeship will be supervised by the individual qualified NAs working in the rural hospitals and overseen by senior trainers from the Training hospital(s)

- Transport will be required to take trainees to and from the Training Hospital(s), plus between different hospitals during their 2.5 years of training to gain more experience from different facilities and apprenticeship-based trainers.

- As training progresses, and especially during internship, trainees will need to play an increasing part in the on-call rotas of the qualified NAs they are working with and, as their knowledge and skills increase, increase the clinical contribution of their workload with their trainers helping to reduce the local trainers' stress and potential "burn-out"

- MOH, through donor support, will need to provide the logistic support for transporting students to and from the main training hospital(s) and also between different rural and central hospitals where the trainees can experience different levels of work; some with less facilities and advocate for conditions that conform to the WFSA minimal standards for Global Anaesthesia

- Education in **medical ethics and professional standards** must be part of the curriculum

- Monitoring and Evaluation by trainers and with international support from MOH and partners is essential

Key issues that could be addressed before applying to donors for an urgent solution to the existing dangerous situation

- Any rural hospital where trainees are to become qualified NAs, must be equipped with basic essential emergency anaesthetic and vital-signs monitoring equipment (see earlier)
- Equipment must enable the provision of high-quality General as well as Spinal Anaesthesia but suitable for low resource settings
- Biomedical engineering support must be available for all hospitals in this program
- Trainees should not have to pay for their training but rather receive an educational allowance in addition to GOL salaries for example 150 USD per month, free accommodation and free transport to and from sites of training as happens with the obstetric and neonatal clinicians
- At least 9-12 months of the training (internship) should be in a hospital from the county of origin where there is an experienced NA to act as trainer and supporter. Perhaps best beginning after end of 18 months of training at the primary training hospital
- Educational support funds for the trainers, including the need for extensive internet access, must be ensured

Concepts that will improve likelihood of donor support

- Need for a grant application to be developed by MOH and the Training School(s) with support from WHO/MCAI to go to donors such as UN agencies (UNFPA and UNICEF) and Irish Aid.
- No training in the private sector
- Logbooks to be completed both in writing and electronically through the Cloud (for example collected on Chromebook Computers using Memento Database)
- Simulation equipment (manikins etc) requested from the donor should be basic, effective, but inexpensive
- Tutorials at Training School(s)to be supplemented by international senior anaesthetist volunteers using audio-visual/screen sharing ZOOM type arrangements (Router internet needs funding)
- On-line E Library, perhaps similar to those used for MCAI's trainees, using Google Drive: https://www.mcaiteachingresources.org/

- Infra-stucture support to the training hospital(s) and for a dedicated vehicle, although ideal, may be difficult for donors

EMERGENCY FUNDING NEEDED Phase 1 actions and costs

Goal 1: Install 10 NAs in 8 CEmONC facilities where <2 or even zero NAs.

Actions:

1.Recruit from a) private clinics, b) from public facilities with > 1per 20,000 population base, c) especially those NAs who originate from a rural county and would like to return ALL for a minimum contract of 3 years to provide desperately needed services to reduce maternal and neonatal deaths

2. Provide 1000 USD accommodation/settling/FAMILY allowance

3. Provide at least 500 USD/month GOL salary for 3 years

4. Identify and where necessary fund the basic equipment pack identified in earlier slide
5. Include biomed support for the anaesthetic equipment in each of the 8 facilities for the next 3 years
6. Include guarantee of essential anaesthetic drugs and supplies for the provision of safe anaesthesia for the next 3 years for each 8 CEmONC facility
7. Provide each NA recruited with a new Chromebook computer containing database for documenting logbooks for all major procedures undertaken, smart phone, monthly internet access, E Library, key handbook(s)
8. Provide support to any existing NA in each facility (n = 6) to ensure they have the same GOL salary (500 USD per month) plus 500 USD one off support package for them and their families.
9. Ensure media coverage of the importance of this program to help with future recruitment (see Goal 2)
10. Recruit international consultant anaesthetists willing to work long term with each appointed NA providing CPD and additional support and advice on difficult cases

Phase 1 Estimated costs over 3 years

1. Recruitment costs including advertisement organised by MOH through LANA and Phebe School of anaesthesia: 2,000 USD
2. Initial accommodation, transfer and family support 1000 USD each for 10 NAs (10,000 USD)
3. GOL salary of 500 USD per month for 3 years for each of 10 NAs (180,000 USD) To be continued after 3 years by the MOH. To be gradually taken over by MOH through central funding so that by end of 3 years is self sustaining.
4. Package of essential basic anaesthetic equipment suitable for a low resource setting for each of the 8 facilities (Estimated as average costs of 5000 USD per facility but quotes needed (40,000 USD)
5. Cost of biomedical engineering support provided by manufacturers of the equipment in 4 above together with salary of Liberian Biomedical Engineer 400 USD per month (14,400 USD over 3 years) plus travel costs (1000 USD per year for 3 years = 3000 USD). To be gradually taken over by MOH so that by end of 3 years is self sustaining.
6. Essential anaesthetic supplies and drugs for each facility for 3 years: Estimated 5,000 USD for each of 8 facilities per year (120,000 USD) To be gradually taken over by MOH through central stores so that by end of 3 years is self sustaining.
7. Chromebooks containing database and E Library (280 USD each NA: total 2800 USD), Refurbished smart phones (130 USD each) for each of 10 recruited NAs (total 1300 USD) with 20 USD per month internet scratch cards for communication and CPD for each of 10 NAs (total 2400 USD)
8. Upgrade GOL salaries of existing 6 NAs working in the 8 selected CEmONC facilities from 350 USD to 500 USD for initial 3 years (6 x 150 per month = 32,400 USD). To be gradually taken over by MOH so that by end of 3 years is self sustaining. Additional 1000 USD (Total 6000 USD) Family support cost at onset of this emergency program in recognition of their excellent work to date
9. Media and community communication costs 1000 USD per year (3000 USD)
10. Recruitment and support for at least 8 international volunteer consultant anaesthetists (NO COST)

PROVISIONAL ESTIMATED COSTS TO BE TIGHTENED UP FOLLOWING FURTHER INVESTIGATION

407,300 USD