NEO FOR NAMIBIA
HELPING BABIES SURVIVE

MISSION REPORT

Mission 2022 – 2

August 4, 2022 to September 5, 2022

AUTHORS
Prof. Thomas M. Berger, MD

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1. INTRODUCTION

The 15th mission of NEO FOR NAMIBIA – Helping Babies Survive lasted from August 4 to September 5, 2022. This time, only Prof. Thomas M. Berger was able travel to Namibia. He was picked up by a new driver, Isaak Boois. Together they drove up to Rundu in one day with the new secondhand car (2013 model Toyota HILUX 3-liter D4D (Fig. 1). Two days later, Isaak flew back to Windhoek with Namibia's new airline FlyNamibia.

Fig. 1. Arriving safely in Rundu at sunset, after driving more than 700 km.

Prof. Berger worked for 17 days straight (until August 22, 2022) in Block A of the Prem Unit at Rundu State Hospital. He was then again joined by Isaak Boois (returning to Rundu by air). Together, they completed the rest of the trip, leading them to Katima and ultimately back to Windhoek. Prof. Berger worked at Katima Hospital for a total of 5 days (until August 29, 2022). The last three days of the 15th mission were spent in Windhoek with several meetings with members of the Ministry of Health and Social Services (MHSS), the Vice-President Nangolo Mbumba, as well as the medical superintendent and the senior pediatrician of Katutura Hospital.

2. MAIN MISSION GOALS

The goals of the 15th mission were:

1. To support local health care professionals at Rundu State Hospital by helping with daily ward rounds in the new Prem Unit

2. To attempt to repair one of the EVE neo ventilators (assuming an internal battery problem) and to evaluate the performance of the new Masimo pulse oximeters (incl. a software update of the Rad-97)

3. To evaluate the utility of the point of care testing (POCT) of C-reactive protein concentrations (introduced in April 2022)

4. To test the two new incubators from Phoenix that had arrived in Rundu in a damaged condition after a 6-month-delay and had required repair

5. To evaluate the quality of care at Katima Hospital under the new leadership (Dr. Cristy Victor) and to train new physicians and nurses

6. To revisit both Katutura and Windhoek Central Hospitals in Windhoek to evaluate the use of donated equipment

3. HOSPITALS VISITED

As planned, both Rundu State Hospital and Katima Hospital were visited. In addition, Prof. Berger was invited by the Medical Superintendent of Katutura Hospital, Dr. Nelago Amagulu, to review the status of the neonatal units at Katutura Hospital and Windhoek Central Hospital (both of which had received donations from NEO FOR NAMIBIA – Helping Babies Survive in the past).

3.1 Rundu State Hospital

3.1.1 Overall impression and leadership issues

The Prem Unit continued to be extremely busy over the past few months: often the patient census exceeded 40, and at times, there might be 4–5 patients on CPAP and two patients on invasive mechanical ventilation. The latter form of respiratory support had been introduced 3 years earlier in June of 2019 (Fig. 2).

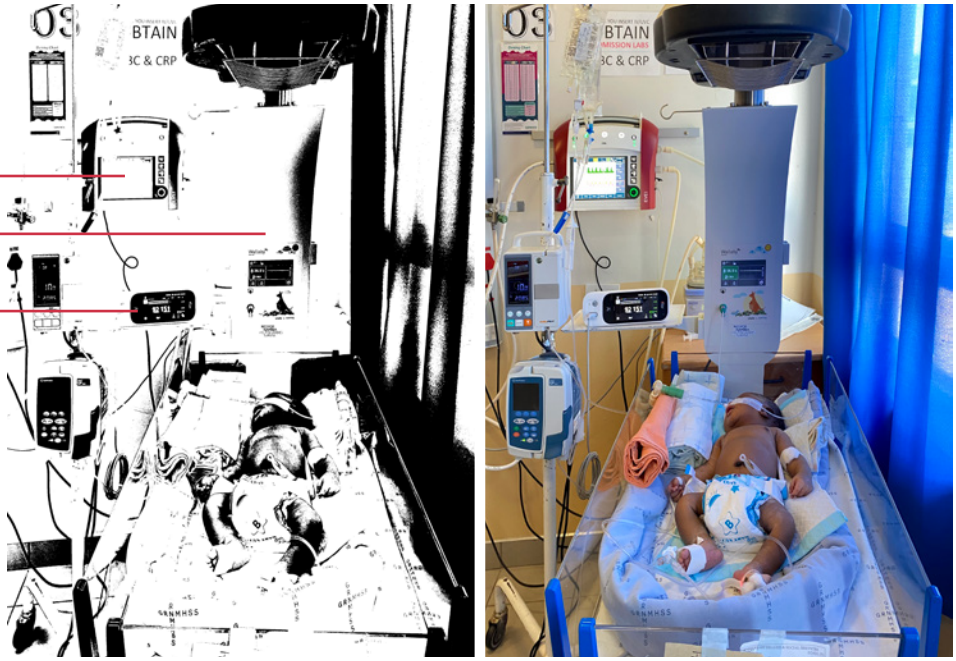


Fig. 2. Neonatal intensive care at Rundu State Hospital: this level of care would not be possible without equipment donated by NEO FOR NANMIBIA – Helping Babies Survive (see 1–3).

The physician team of the Department of Pediatrics was still led by Dr. Isha Kamara; the team included Dr. Geraldine Beukes, Dr. Katamba Banza and two new medical officers (Dr. Kudzanayi Masenda, Dr. David Nakuanda). It had now become likely that a very sizable number of interns would arrive soon at Rundu State Hospital. While they will require solid training and close supervision, they will likely be very helpful to decrease the workload of the more senior colleagues.

The nurses working in Block A and B of the Prem Unit continue to be guided by Cecilia Ndepavali. However, she will shift to night supervisor duties in September 2022, and plans to go to Windhoek Central Hospital for additional training in 2023. During several meetings, Prof. Berger insisted that the nurses taking over Sr. Ndepavali's duties for the next 15 months must be named, and specific areas of expertise and responsibilities must be defined.

Before leaving Rundu, the following nurses were designated as the future leaders (as of September 1, 2022):

- Emilie Siponga: nurse in charge
- Paula Haingura: second nurse in charge
- Martha Martin: pharmacy and ordering
- Martha Leevi: equipment
- Hendrik Leena: ordering and communication

The nursing team for the Prem Unit (Block A & B) consists of 24 nurses (both RNs and ENs); given the constantly high patient census, this is significantly below the number that would be required to care for up to 45 patients per shift.

3.1.2 Equipment malfunction and repair

3.1.2.1 Masimo® pulse oximeters

A software update of the Rad-97 pulse oximeters was performed as suggested by the manufacturer. This appeared to be successful, and unexpected shutdowns no longer occurred. Unfortunately, 2 of 3 Rad-G monitors were not functioning. Our fears that more complex monitors (e.g., touch screen display) might render such equipment less reliable than the old, robust Rad-8 monitors appeared to come true (Fig. 3).

A B C

Fig. 3. The older Masimo® Rad-8 pulse oximeters (A) appear to be more robust than the new, more sophisticated Masimo® Rad-97 (B) and Rad-G devices (C) (right): time will tell.

3.1.2.2 EVE® TR neo ventilators

The internal battery of one of the EVE® TR neo ventilators was replaced. Whether this will resolve all the problems seen in the past weeks (Fig. 4) remains to be seen. The fact that the two ventilators cannot be serviced regularly in Namibia will ultimately need to be addressed: most likely, they will have to be brought/sent to Europe for professional maintenance.

Fig. 4. Equipment maintenance: despite a fully charged external battery (right bottom), it was noted that the EVE® TR neo ventilator did not function properly because of internal battery malfunction.

3.1.2.3 MTTS Dolphin® CPAP devices

The MTTS Dolphin® CPAP devices have a bult-in Masimo® pulse oximeter; however, the patient cables provided by MTTS do not allow to use the new neonatal pulse oximetry sensors (RD SET NEOPT ADH SENS) provided by NEO FOR NAMIBIA – Helping Babies Survive. Prof. Thomas M. Berger was able to procure replacement patient cables so that all the MTTS Dolphin® CPAP devices can now be used to their full potential (Fig. 5).

Fig. 5. MTTS Dolphin® CPAP machines with integrated Masimo® SET pulse oximeters: new patient cables allow the use with the new pulse oximetry sensors (RD SET NEOPT ADH SENS).

It was noted that the internal oxygen sensors needed replacement in two of the four machines. These sensors verify that the desired fraction of inspired oxygen (FiO_2) is delivered to the patient. John Namwira was informed accordingly.

3.1.3 Brittle supply chains

Thus far, the issue of unreliable supply chains for essential consumables and drugs had not been resolved. During the current mission, IV cannulas, human milk fortifier and caffeine were again out of stock. It was frustrating to see that nobody appeared to understand the ordering and delivery processes. For temporary relief, NEO FOR NAMIBIA – Helping Babies Survive procured human milk fortifier (Rundu State Hospital, Katima Hospital) and caffeine (Katima Hospital) at a total cost of NAD 30 000.00 (CHF 1800.00) from public pharmacies.

It was interesting to note that Nestlé FM85 was not reliably available (at the time of this writing it has been replaced by Nestlé PreNAN FM85). Therefore, an alternative product, alula S-26 HMF, had been introduced (at a much higher cost). Human milk fortifier is essential for adequate growth of very low birth weight (VLBW) infants with a birth weight < 1500 g; it increases the caloric density of human milk from 65 – 70 kcal/100 ml to 80 – 85 kcal/100 ml (Fig. 6).

1 sachet (1 g) in 25 ml of EBM

Content of 100 ml of fortified milk
– Calories 84.0 kcal
– Protein 2.7 g

1 sachet (1 g) in 25 ml of EBM

Content of 100 ml of fortified milk
– Calories 80.0 kcal
– Protein 2.1 g

Fig. 6. On several occasions, NEO FOR NAMIBIA – Helping Babies Survive financed the purchase of human milk fortifiers from public pharmacies when the MHSS system was unable to provide this essential supplement.

3.1.4 Point of care testing of C-reactive protein concentrations

Rule out early- or late-onset neonatal sepsis (r/o EOS or LOS) remains one of the most common diagnoses of Prem Unit patients. The previously suggested approach do decrease unnecessary exposure to antibiotics was almost never followed. The reasons are multifactorial: non-adherence to our recommendations (not all patients get the recommended admission laboratory examinations, i.e., full blood count (FBC) and C-reactive protein (CRP) level), follow-up CRP levels are not ordered, blood samples are lost, or samples are judged insufficient by the NIP lab (National Institute of Pathology); in addition, results are often reported with great delays.

In April 2022, a point of care testing (POCT) for C-reactive protein (CRP) measurement device (AIDIAN QuikRead® go) was introduced. Data on its use was collected prospectively to study its impact on the use of antibiotics (part of what is called "antibiotic stewardship"). The predetermined rules (CRP cut-off value of 10 mg/l to start/continue or stop antibiotics) were applied in 73 % of cases (Fig. 7). While not perfect, this undoubtedly has led to a significant reduction in unnecessary exposure to antibiotics. Therefore, the project will continue.

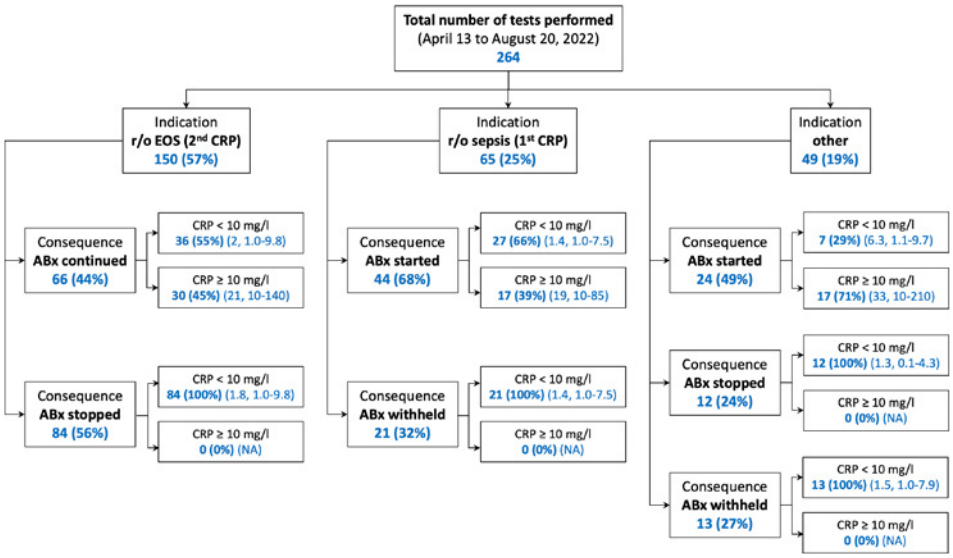


Fig. 7. Analysis of the use of point of care testing (POCT) of C-reactive protein concentrations.

3.1.5 Challenging cases

3.1.5.1 EEC syndrome

Shortly after his arrival, Prof. Thomas M. Berger was asked to review a patient with multiple congenital anomalies (Fig. 8, 9). The most notable features were bilateral clefts of lip/palate, and complex malformations of hands and feet with ectrodactyly (missing fingers, toes) and syndactyly (fused fingers/toes). A brief internet search rapidly suggested a diagnosis of Ectrodactyly Ectodermal dysplasia Cleft lip/palate (EEC) syndrome, a rare genetic condition. The diagnosis was confirmed by a Swiss geneticist (by review of images sent to her); however, genetic analysis (search for a mutation in the TP63 gene) was not available. EEC syndrome is usually inherited as an autosomal dominant trait although sporadic cases have also been reported. The patient was sent home with a feeding tube in place; the outcome is very uncertain.

Fig. 8. Infant with multiple congenital anomalies: bilateral cleft lip and palate and split hand/foot malformation (see also Fig. 9); possibly a rare case of Ectrodactyly-Ectodermal Dysplasia-Cleft Lip/Palate (EEC) syndrome.

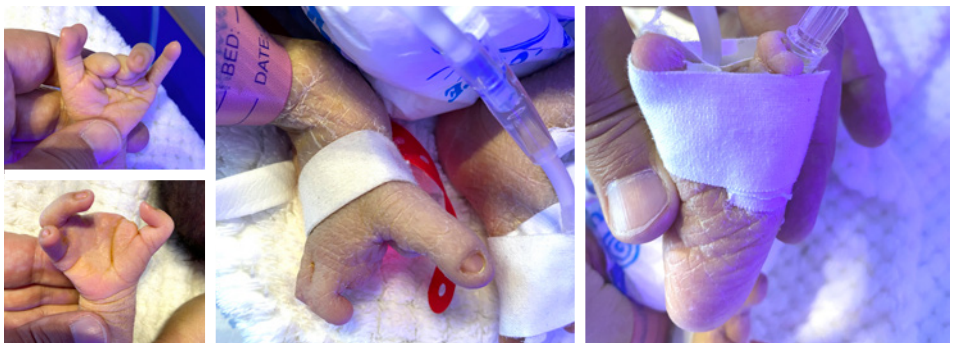


Fig. 9. Infant with multiple congenital anomalies: split hand/foot malformation and bilateral cleft lip/palate (see also Fig. 8); possibly a rare case of Ectrodactyly-Ectodermal Dysplasia-Cleft Lip/Palate (EEC) syndrome.

3.1.5.2 Monochorionic monoamniotic twins

These twins were born by emergency Cesarean section due to fetal distress of twin B. They were found to be monochorionic (sharing one placenta) monoamniotic (sharing one amniotic sac) twins. This represents a high-risk twin pregnancy because of the possibility of cord entanglement (Fig. 10). Fortunately, they recovered rapidly from transient tachypnea of the newborn (also known as wet lung).

Fig. 10. Monochorionic-monoamniotic twins (left) are admitted to the Prem Unit at Rundu State Hospital: despite extensive cord entanglement (right), they rapidly recovered from mild respiratory distress.

3.1.5.3 Sudden unexpected arrest in maternity ward

This post-term infant had a sudden, unexpected cardiorespiratory arrest in the maternity ward. Resuscitation was unsuccessful and the baby was declared dead by the physician on call. Several hours later, the infant was found gasping in the sleuth room. He was intubated and brought to the Prem Unit and put on a ventilator (Fig. 11). After another 12 hours, the baby was declared brain dead (no reflexes, dilated and fixed pupils, no respiratory effort) and extubated. The etiology of the arrest remained unclear.

Fig. 11. Post-term baby admitted to Prem Unit at Rundu State Hospital after postnatal collapse in the maternity ward; the baby later died.

3.2 Katima Hospital

3.2.1 Overall impression

This was the 7th visit of Katima Hospital by NEO FOR NAMIBIA – Helping Babies Survive. The neonatal unit had continued to make impressive progress (Fig. 12). In contrast, the situation in the delivery rooms had remained highly unsatisfactory (Fig. 13).

Fig. 12. Impressive progress of neonatal care at Katima Hospital: routine use of open warming tables, continuous pulse oximetry monitoring and CPAP devices.

Fig. 13. . Much room for improvement in the delivery rooms at Katima Hospital: the neonatal resuscitation areas are ill equipped, poorly maintained and not clean!

3.2.2 New neonatal unit

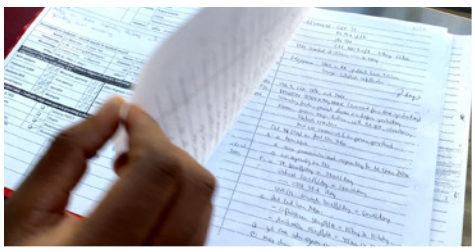
The neonatal unit had become increasingly busy. Under the leadership of Dr. Cristy Victor, a dedicated team has implemented several changes that improved the quality of care of sick neonates. It was once again impressive to see how mothers are involved in the care of their babies (Fig. 14). Provided that proper supervision by nurses can be guaranteed, this clearly represents a win-win situation: nurses can concentrate on chores that require more advanced nursing skills, and mothers get to know their babies well.

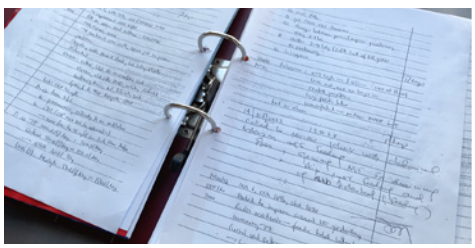
Fig. 14. Mothers feed their sick babies through feeding tubes or by cup around the clock; nurses supervise them to make sure that the prescribed volumes are administered.

Several aspects of neonatal care will have to be re-emphasized. These include infant positioning (Fig. 15), more expansive use of Kangaroo Mother Care (KMC) and uniform writing of progress notes and medication orders (Fig. 15 – 17).

Fig. 15. A preterm baby in an incubator: refresher training in proper infant positioning providing both support and containment will be required.

Fig. 16. Kangaroo Mother Care (KMC): the importance of this intervention is still not well recognized by local nurses and doctors.





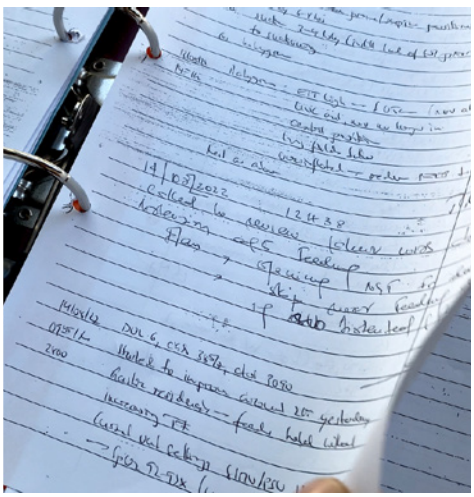


Fig. 17. All doctors' and nurses' notes are written by hand; Prof. Thomas M. Berger emphasized the importance of well-structured documentation.

To support these efforts, 5 new reclining chairs had been brought up from Windhoek (the same number of chairs had been brought to Rundu State Hospital), and new templates for the hand-written progress notes were introduced.

3.2.3 Future development

Repair of the old mobile X-ray unit or the acquisition of a new machine remains a high priority. This was once again discussed with the hospital administration. Given the positive experience with POCT CRP measurements at Rundu State Hospital, the same device should be introduced in the neonatal unit at Katima Hospital. In addition, the team in Katima appears to be ready for the introduction of MTTS Dolphin® CPAP devices to improve longer-term respiratory support of the more immature patients.

3.3 Katutura and Windhoek Central Hospitals

The precarious situation at Katutura Hospital had not changed since the last visit of the NEO FOR NAMIBIA – Helping Babies Survive team. Regrettably, the donated Pumani® bubbleCPAP machines had not been used. The reasons given were not convincing. Nevertheless, it was decided that additional training would be provided during the upcoming mission in November 2022. In the meantime, the hospital leadership promised to designate motivated local leaders.

Dr. Nelago Amagulu also invited Prof. Thomas M. Berger to visit the neonatal intensive care unit at Windhoek Central Hospital, the country's top referral center. The unit appeared to be well equipped: the equipment donated by NEO FOR NAMIBIA – Helping Babies Survive was still in use. In addition, donations had been made by international organizations during the Corona pandemic (Fig. 18). Patients cared for in this unit are often very ill (Fig. 19), and the overall mortality rate seemed to be quite high.

Fig. 18. During the Corona pandemic, high-tech medical equipment was donated to Namibia by various organizations (left: LED phototherapy unit, right: LYRA x2 ventilator): apparently appropriate training was not provided and proper maintenance plans do not exist.

Fig. 19. Patient with congenital syphilis at Windhoek Central Hospital: the most severe forms of symptomatic neonatal infections can be fatal.

4. MEETING WITH REPRESENTATIVES OF THE GOVERNMENT

4.1 Ministry of Health and Social Services (MHSS)

As planned, Prof. Thomas M. Berger met with various representatives of the MHSS. Feedback was given and future developments were discussed. The Executive Director, Dr. Ben Nangombe, thanked NEO FOR NAMIBIA – Helping Babies Survive for the ongoing support.

4.2 Vice-President

Namibia's Vice-President, Dr. Nangola Mbumba welcomed Prof. Thomas M. Berger at the Old State House in Windhoek. During their one-hour meeting, they were able to exchange information and ideas. The Vice-President was very impressed by what had been achieved in a few years. He again promised to fully support the efforts of NEO FOR NAMIBIA – Helping Babies Survive.

5. VISITING OUR AFRICAN FRIENDS

As usual, the mission report concludes with some images from scenes encountered outside of the hospital walls (Fig. 20, 21). This time, a series of photographs depict the daily lives of children in the Kavango East region of Namibia (22 – 25).

Fig. 20. Bush fires in the Kavango East region (these fires typically occur from mid-August to October).

Fig. 21. African flora: fascinating diversity: Pterocarpus angolensis (left); undetermined flowers (right) at Tambuti Lodge in Rundu.

Fig. 22. Kids at Johannes' place: playing with a simple wire toy car.

Fig. 23. Kids near Eleotelia's place: playing with an improvised plough.

Fig. 24. Kids near Eleotelia's place: waiting for our treats (usually apples and cookies).

Fig. 25. Nicoteh (Eleotelia's daughter, a former 1150 g preterm infant): she benefitted from CPAP treatment at Rundu State Hospital in 2018.

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