NEO FOR NAMIBIA
HELPING BABIES SURVIVE

AUTHORS
Prof. Thomas M. Berger, MD

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MISSION REPORT

Mission 2025 – 1

March 29 to April 23, 2025

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1. INTRODUCTION

The 23rd mission of NEO FOR NAMIBIA – Helping Babies Survive began on March 29, 2025, and lasted until April 23, 2025. It was carried out by Prof. Thomas M. Berger, MD, and his driver and assistant Isaak Boois. Unfortunately, in contrast to what had initially been planned, Dr. Kundai Mapanga (Namibian physician currently undergoing additional training in Dublin, Ireland, and board member of NEO FOR NAMIBIA – Helping Babies Survive) was unable to join the team on this mission.

One day after his arrival in Windhoek (Fig. 1), Prof. Thomas M. Berger, accompanied by Isaak Boois, drove up to Rundu (716 km) with the usual overnight stay at Out of Africa in Otjiwarongo. From April 1 to 12, 2025, they stayed at Kaisosi River Lodge, a short 8 km drive away from the Rundu Intermediate Hospital. The work of Prof. Thomas M. Berger and Isaak Boois in the Prem Unit at the hospital extended over a period of 10 days (including one weekend).

Fig. 1. Impressive cloud formations on the flight from Johannesburg to Windhoek (left); on approaching Hosea Kutako International Airport, Windhoek presented itself surrounded by green mountains, an unusual sight (right).

On April 12, 2025, the two departed for Katima, arriving at the 3 Palms Lodge on April 14, 2025, after an overnight stay at the Riverdance Lodge near Momono Village, Divundu (total distance 514 km). Together, they worked at Katima Hospital for a total of 5 days.

The team left Katima on April 18, 2025, and arrived in Windhoek on April 20, 2025, following overnight stays in Divundu and Rundu (total distance 869 km). Overall, the team travelled more than 3'200 km by car on this mission. Prof. Thomas M. Berger left Windhoek on April 22, 2025, to return to Switzerland via Cape Town the following day.

2. MAIN MISSION GOALS

The main goals of the 23rd mission of NEO FOR NAMIBIA – Helping Babies Survive were:

- To bring a variety of consumables required to use equipment donated by NEO FOR NAMIBIA – Helping Babies Survive (incl. breathing circuits and heater wires for the MTTS Dolphin® bCPAP devices and EVE® neo ventilators, patient cables (RAD-8) and oxygen sensors for Masimo® pulse oximeters, test kits for POCT CRP measurements, glass capillaries for PCT bilirubin measurements, consumables needed for intravenous access (IV cannulas, UVCs, three-way stopcocks), various dressings)
- To install ultrasonic oxygen sensors into the MTTS Dolphin® bCPAP devices
- To update inventories and unit statistics both at Rundu Intermediate Hospital and Katima State Hospital
- To (re)train local health care professionals, focusing on neonatal respiratory support, antibiotic stewardship, and fluid & nutrition management
- To discuss logistics of our NGO's largest donation yet (monitoring equipment, warmers, incubators, resuscitation units) with local health care professionals
- To readdress the possibility of widespread introduction of Vayu® bubbleCPAP devices

3. HOSPITALS VISITED

3.1 Rundu Intermediate Hospital

Prof. Thomas M. Berger and Isaak Boois were warmly welcomed by the medical staff, including the new Medical Superintendent, Dr. Theresia Shivera, the Pediatric specialists (Dr. Isha Kamara, Dr. Geraldine Beukes, Dr. Johannes Helaria) and Medical Officers working in the Department of Pediatrics. They all expressed their gratitude and interest in further collaboration.

3.1.1 Overall impression

The Prem Unit at Rundu Intermediate Hospital continues to be busy, and often the patient rooms in Block A are crowded (Fig. 2). The noise level is usually high (voices, babies crying, various alarms from incubators, CPAP devices and pulse oximeters). Consequently, space for Kangaroo Mother Care (KMC) is lacking. Similarly, there is not enough storage room for consumables and equipment that is not in use.

Dr. Isha Kamara and Dr. Johannes Helaria, both Pediatric Specialists, have switched roles: it is now Dr. Helaria who oversees the care of neonatal patients (Prem Unit, Delivery Rooms, Maternity Ward), and Dr. Kamara has moved to the other pediatric wards (General Pediatric Ward, IV Ward, Outpatient Department, High Care Unit). Dr. Helaria is supported by Dr. Geraldine Beukes, an experienced physician, and a group of medical officers and interns. Cecilia Ndepavali, RN, has been promoted and is now heading both the Prem Unit and the Pediatric High care Unit.

Fig. 2. Crowded patient rooms in Block A of the Prem Unit at Rundu Intermediate Hospital (left IMC room II, right top: ICU room II with admission bay, right middle: ICU room I with ventilators, right bottom: IMC room I).

3.1.2 Equipment inventory and maintenance

Prof. Thomas M. Berger took stock and checked the functionality of all donated equipment. Both EVE neo® ventilators and the FP 850 humidifiers are currently working. Apparently, they do periodically indicate that servicing is required; unfortunately, this cannot be done in Namibia. There are two back-up ventilators (MTTS Impala®, Airborne T1 transport ventilator); according to Emilie Nangura, RN, they are working.

In the past years, NEO FOR NAMIBIA – Helping Babies Survive purchased nine MTTS Dolphin® bCPAP devices. Of these, one malfunctioning unit could not be repaired and was removed by a medical technician (John Namwira) years ago. Another unit could not be used because neither the heater plate nor the heater wire were working. Supported by Steffen Reschwamm from MTTS Vietnam, Prof. Thomas M. Berger discovered that the heater control board was damaged; this will have to be replaced. Finally, two additional units will need replacement of their loudspeakers (no acoustic alarms). Therefore, out of a total of nine machines donated, seven units can be used (five fully functional, two without acoustic alarms, all equipped with new ultrasonic oxygen sensors, see below). Hopefully, further repair will render all eight units in the Prem Unit back to full functionality.

The NEO FOR NAMIBIA – Helping Babies Survive team also tested all MTTS Wallaby® warming tables. Out of eight units donated, one is completely broken, one does not measure skin temperature (reason to be analyzed), three will need new heating elements (display shows "E3"), one will need a software update (display shows "E1") (Fig. 3). Thus, only three out of eight units are fully functional. Hopefully, with the support of MTTS Vietnam and Leonardo (medical technician from Cuba), four units will be repairable.

Fig. 3. MTTS Wallaby® open warmers: three out of eight units donated will need new heating elements as indicated by "E3" on the display; in another unit "E1" indicates that a software update is needed.

When the light intensity of the donated MTTS Colibri® phototherapy units was measured, only one of eight reached the strength required for intense phototherapy. Fortunately, the recommended cleaning of various contacts rendered all units fully functional again (Table 1).

Unit Nr.	Year - Month	Serial number	Date checked	Hours used	Irradiance (μW/cm²/nm) in normal mode	Irradiance (μW/cm²/nm) in boost mode
1	2019-10	O19151027	18.04.2025	17'576 hrs	37	52
2	2018-01	O17130020	18.04.2025	11'805 hrs	36	50
3	2019-10	O19151030	18.04.2025	19'945 hrs	33	45
4	2018-01	O17130002	18.04.2025	12'412 hrs	41	60
5	2018-01	O17130035	18.04.2025	12'049 hrs	40	66
6	2021-03	O21186004	18.04.2025	14'988 hrs	38	56
7	2024-09	O21207006	18.04.2025	1'947 hrs	34	50
8	2022-10	O21207063	18.04.2025	5'471 hrs	45	67

Table 1. MTTS Colibri phototherapy units available in Rundu: following maintenance (cleaning of various contacts), all units are now fully functional.

Of interest, when measured, none of the government-purchased open warming tables with integrated phototherapy lights reached the recommended light intensity for intensive phototherapy (see below).

Nobody was aware of the poor performance as no light meter was available. This device allows light irradiance measurement in the blue light spectrum (460–490 nm) that is necessary to treat jaundice in infants. According to a position paper from the Fetal and Newborn Committee of the American Academy of Pediatrics (2022) and the most recent Swiss Guidelines for the Care of Neonates with Hyperbilirubinemia (2022), intensive phototherapy means the irradiance of the light is at least 30 μW/cm²/nm as measured at the baby's skin below the center of the phototherapy lamp. With conventional phototherapy the irradiance of the light is less (at least 20–30 μW/cm²/nm), but actual numbers vary significantly between different manufacturers and published guidelines. The handheld light meter mentioned above allows health care professionals to ensure phototherapy units are working correctly and determine when a phototherapy device or its bulbs need to be replaced. The device can be used for any phototherapy unit with LEDs, fluorescent bulbs, or compact bulbs (Fig. 4).

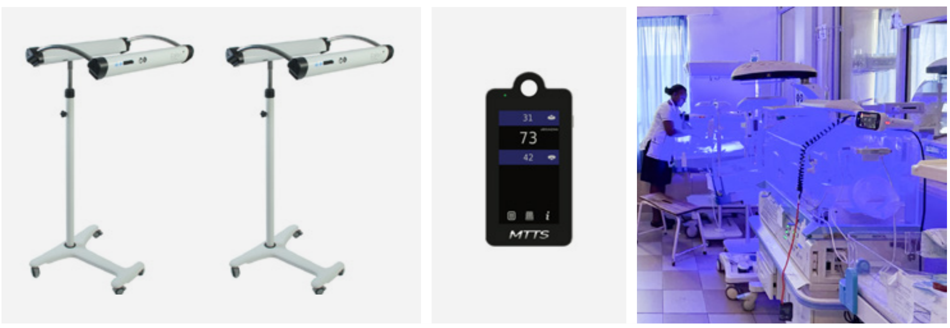


Fig. 4. MTTS Colibri® phototherapy unit (left) and MTTS light meter (middle): the latter allows to measure light intensity (example shown: 31 μW/cm²/nm from above, 42 μW/cm²/nm from below (e.g., bilirubin blanket), total 73 μW/cm²/nm) and determine whether the unit can still be used for patients (right).

The above observations highlight the importance of scheduled maintenance of all medical equipment. This requires early involvement of local medical technicians, adequate provision of both user and service manuals, and, finally, timely communication of issues discovered during routine maintenance that require the support of our NGO.

3.1.3 Installation of ultrasonic oxygen sensors (MTTS Dolphin® bCPAP)

With the support of Steffen Reschwamm, MTTS Vietnam (via WhatsApp calls, WhatsApp video calls, e-mails), Prof. Thomas M. Berger and Isaak Boois were able to install a new ultrasonic oxygen sensor into six of the donated MTTS Dolphin® bCPAP devices (Fig. 5, 6). Another unit had been delivered in 2024 with such a new sensor already in place. Finally, a 7th sensor will have to be installed into the unit with the damaged heater control board (Fig. 7) once this has been repaired.

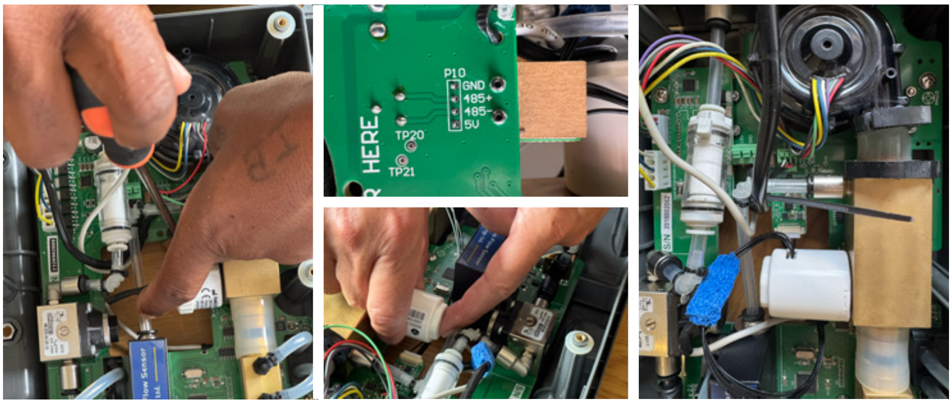


Fig. 5. Installation of new ultrasonic oxygen sensors (part I): after removal of the old electrochemical oxygen sensor, a sensor adapter board is positioned on a supporting substrate (left) and its pins are pushed down (middle top); the new sensor is rotated into its socket (middle bottom) and the sensor cable is plugged in (right).

Fig. 6. Installation of new ultrasonic oxygen sensors (part II): the process is completed with a software update.

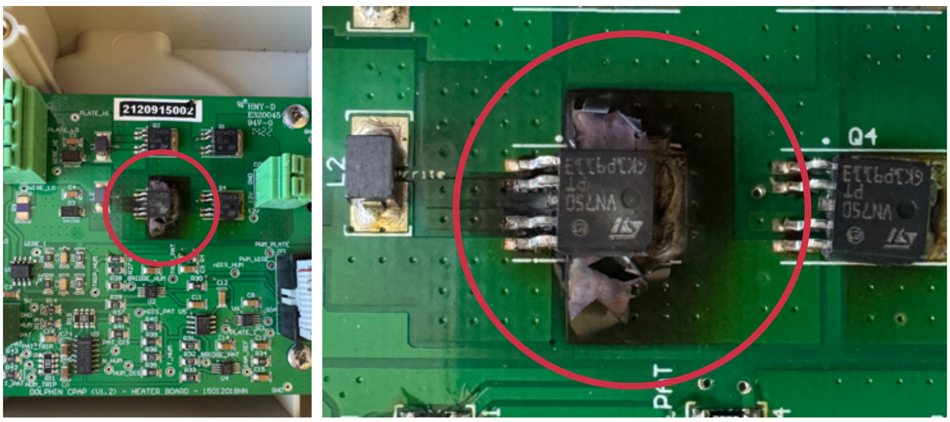
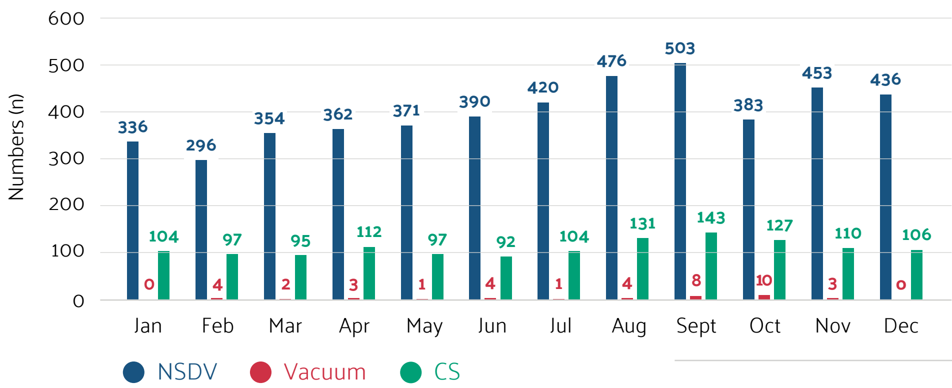


Fig. 7. Damaged heater control board: with the help of Steffen Reschwamm (MTTS Vietnam), the cause for the malfunctioning of the MTTS Dolphin® bCPAP unit Nr. 7 could be identified: the heater control board was damaged (circle) and will have to be replaced.

In contrast to the conventional electrochemical oxygen sensors, which last for about 24 months, ultrasonic oxygen sensors have a longer lifespan (> 5 years), do not need calibration, and have high accuracy. Given the environment we work in, the higher acquisition cost of US$ 100.00 compared to US$ 65.00 (MTTS, personal communication) is more than justified.

3.1.4 Statistics

From January 1, 2024, to December 31, 2024, a total of 6'170 babies were born alive at Rundu Intermediate Hospital. In addition, there were 22 and 48 fresh and macerated stillbirths, respectively. Finally, six by babies died in the delivery room (severe birth asphyxia: three cases, multiple congenital malformations: three cases). The Cesarean section rate was 21.5%; due to lack of equipment, vacuum-assisted deliveries were rare (40 in 2024). (Fig. 8).



Total	**6'170**
NSDV	4'780
Vacuum	40
CS	1'318

Fig. 8. Rundu Intermediate Hospital: Delivery Room (DR) statistics (January 1, 2024, to December 31, 2024).

Over the same period, there were 1'132 admissions to the Prem Unit. Of these, 937 were inborn (admission rate of 15.2% for babies born at Rundu Intermediate Hospital). As can be expected, mortality rates differed depending on the location of birth: it was 7.6% for inborn babies and 13.3% for outborn babies, resulting in an overall mortality rate of 8.6%.

To better understand the observed overall mortality rate, birthweight-specific data was analyzed. Extremely low birthweight infants (birth weight < 1'000 g) contributed 4.5% to the total number of admissions but were responsible for 37.1% of all Prem Unit deaths (mortality rate 70.6%). Infants with a birthweight of 1'000 g – 1'500 g contributed 11.2% to the total number of admissions and were responsible for 29.9% of all Prem Unit deaths (mortality rare 22.8%). In contrast, babies with a birthweight > 1'500 g contributed to 84.3% of all admissions, but only 33.0% of all deaths (mortality rate 4.5% and 2.7% for infants with a birthweight of 1'501 – 2'500 g and > 2'500 g, respectively (Fig. 9).

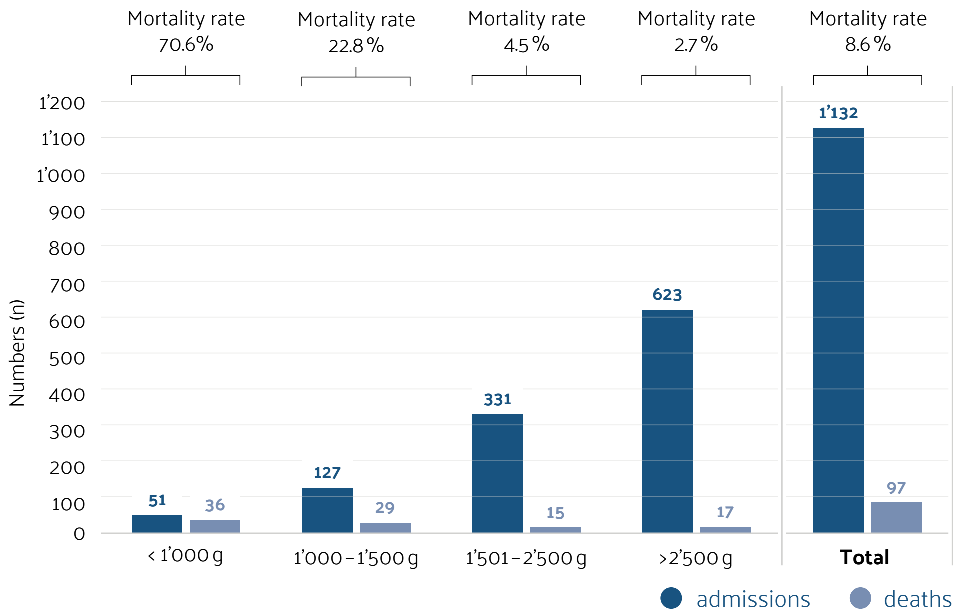


Fig. 9. Rundu Intermediate Hospital: Prem Unit statistics (January 1, 2024, to December 31, 2024): as could be expected, mortality rates correlate strongly with birthweight (i.e., degree of prematurity).

When compared with the statistics of 2023, number of admissions have remained stable (1'098 admissions in 2023 versus 1'132 admissions in 2024). The overall mortality rates were also comparable (8.3% in 2023 versus 8.6% in 2024). When birthweight-specific mortality rates were compared, the following observations can be made (Table 2): mortality rates for very low birth weight (VLBW) infants (birthweight < 1'500 g) were higher in 2024 than in 2023; in contrast, mortality rates for infants with a birthweight > 1'500 g were lower in 2024 than in 2023. In part, this may be explained by a "minimal handling" policy introduced in 2024: extremely low birthweight (ELBW) infants were only treated with nasal cannula oxygen, surfactant and CPAP were not used. Prof. Thomas M. Berger argued that a policy of withholding non-invasive therapies from ELBW infants should be reevaluated. However, without detailed analyses of causes and circumstances of deaths, any attempt to explain these differences must remain speculative.

Table 2. Comparison of Prem Unit statistics between 2023 and 2024 (Rundu Intermediate Hospital): higher mortality rates in VLBW infants (BW < 1'500 g) in 2024 are counterbalanced by lower mortality rates in babies with a birthweight > 1'500 g.

	2023			2024		
BW category	**Admissions**	**Deaths**	**Mortality rate**	**Admissions**	**Deaths**	**Mortality rate**
< 1'000 g	39	21	53.8 %	51	36	70.6 %
1'000 – 1'500 g	140	15	10.7 %	127	29	22.8 %
1'501 – 2'500 g	309	29	9.4 %	331	15	4.5 %
> 2'500 g	610	24	3.9 %	623	17	2.7 %
Total	1'098	89	8.1 %	1'132	97	8.6 %

One very common cause of death noted was massive pulmonary hemorrhage, often occurring on day of life 2 to 3. Assuming that the diagnoses listed in the Prem Unit's admission book were correct, Prof. Thomas M. Berger calculated that pulmonary hemorrhage was responsible for 10/26 (38.5%) of deaths among infants with a birthweight < 1'000 g, and 6/29 (20.7%) of deaths among infants with a birthweight between 1'000 – 1'500 g.

It is well known that failure of the ductus arteriosus to close may lead to pulmonary hyperperfusion when pulmonary vascular resistance falls, and, in extreme cases, to hemorrhagic pulmonary edema due to pulmonary capillary stress failure (John B. West). As a consequence, the role of prophylactic indomethacin to prevent periventricular/intraventricular hemorrhage and, potentially, pulmonary hemorrhage were discussed at a feedback session. This might be particularly helpful in high-risk patients in an environment where echocardiography is not available. Prof. Thomas M. Berger will provide literature evidence for such an approach (Fig. 10) and help to develop internal guidelines.

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ARTICLES | FEBRUARY 01 2008

Prevention and 18-Month Outcomes of Serious Pulmonary Hemorrhage in Extremely Low Birth Weight Infants: Results From the Trial of Indomethacin Prophylaxis in Preterms

Khalid Alfaleh, MD; John A. Smyth, MD; Robin S. Roberts, MSc; Alfonso Solimano, MD; Elizabeth V. Asztalos, MD; Barbara Schmidt, MD; for the Trial of Indomethacin Prophylaxis in Preterms Investigators

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Pediatrics (2008) 121 (2): e233–e238.
https://doi.org/10.1542/peds.2007-0028 **Article history**

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CONCLUSIONS. Extremely low birth weight infants with serious pulmonary hemorrhage have an increased risk for poor long-term outcome. Prophylactic indomethacin reduces the rate of early serious pulmonary hemorrhage, mainly through its action on patent ductus arteriosus. Prophylactic indomethacin is less effective in preventing serious pulmonary hemorrhages that occur after the first week of life.

Fig. 10. Evidence-based medicine: could prophylactic indomethacin decrease clinically significant pulmonary hemorrhage in a resource-limited environment?

3.1.5 Lectures and teaching sessions

Prof. Thomas M. Berger was able to give several lectures to a group of highly motivated interns, covering important neonatal topics:

- Fetal physiology and pathophysiological aspects of neonatal resuscitation
- Respiratory support – What lessons can be learned from history?
- Neonatal ventilation
- Interpretation of chest X-rays
- Peripartal asphyxia
- Neonatal sepsis

For the nurses in them Prem Unit, important aspects of neonatal respiratory support were presented in an early morning session (shift change). The nurses were encouraged to set appropriate oxygen saturation (SpO_2) targets and swiftly respond to alarms: for patients who are receiving supplemental oxygen, the lower and upper SpO_2 targets should be set at 88% and 97%, respectively, to decrease the risk of oxygen toxicity. While the incidence of bronchopulmonary dysplasia (BPD) is low (in part because of low survival chances for extremely low birth weight infants (< 1'000 g), the incidence of retinopathy of prematurity (ROP) is unknown, because there are no screening examinations. BPD and ROP are known to be caused (in part) by oxygen toxicity.

The physicians working in the Department of Pediatrics expressed an interest in publishing case reports. They asked Prof. Thomas M. Berger for support. It was decided that interesting cases with high quality images should be sent to him for editing and submission to the Case of the Month collection of the Swiss Society of Neonatology. At a morning meeting, Prof. Thomas Berger explained the main points that authors should be focusing on when writing up a case report.

3.1.6 Feedback from interns

It was a true pleasure to teach the new interns. They proved to be a highly motivated group of young physicians. Given the fact that only a fraction of medical students can be accommodated at the University of Namibia (UNAM) Medical School, many had to travel abroad to study medicine (i.e., Russia, Ukraine, China, Cuba) (Fig. 11).

Prof. Thomas M. Berger asked them if they could provide some feedback regarding their experience in the Prem Unit and with the work of NEO FOR NAMIBIA – Helping Babies Survive.

Fig. 11. Medical interns currently rotating through the Department of Pediatrics at Rundu Intermediate Hospital: Hileni Haingura (A), Penehafo Matheus (B), Martha N. Frans (C), Alexander Maya (D), Hilen Haihambo (E), Raphael Haingura (E).

> **"My name is Hileni Sheya. I am a medical intern at Rundu Intermediate Hospital, currently rotating in the Department of Pediatrics. I obtained my MBBS degree in Beijing, China. It was such a lovely week for me to have met Prof. Berger. It was a very productive week. He taught us a lot about neonates. I appreciate his enthusiasm and effort; he is doing a lot for our Prem Unit, which I really appreciate."**
> Hileni Sheya

> **"My name is Penehafo Matheus. I am a medical intern at Rundu Intermediate Hospital, currently rotating in the Department of Pediatrics. I have obtained my MBBS at Vinnytsia Medical University in the Ukraine. I want to express my heartfelt gratitude for the opportunity to delve more deeply into neonatal care under Prof. Berger's guidance. His expertise and passion for neonatology have not only expanded my clinical knowledge but also inspired me to approach every tiny patient with greater confidence and compassion. I would like to thank him for sharing his time, insights, and encouragement so generously."**
> Penehafo Matheus

> **"My name is Alexander Maya. I studied medicine at UNAM in Windhoek, Namibia. I am a medical intern, currently in the final month of my pediatric rotation. I have had the privilege of working with Prof. Berger who has shared his extensive knowledge since his arrival. The organization NEO FOR NAMIBIA – Helping Babies Survive has left a massive footprint in improving health care at our hospital. Thank you."**
> Alexander Maya

> **"My name is Martha N. Frans. I am a medical intern at Rundu Intermediate Hospital rotating in the Pediatric Department. I have obtained a MBBS degree in the Ukraine. It was a pleasure to have Prof. Berger in our hospital. His teachings that were very pre-eminent, and I really learned much from his skills and knowledge. I wish him all the best in all aspects of life, especially physical wellness so he can continue his valuable work. Thank you very much for what he taught us. His legacy will be eternal."**
> Martha N. Frans

> **"My name is Hilen Haihambo. I am a first-year medical intern trained in Havana, Cuba. Working as an intern has been both challenging and rewarding. Despite the numerous difficulties, we as a team if interns find moments of joy, such as bonding with babies during ward rounds, and witnessing improvements in patient conditions."**
> Hilen Haihambo

> **"I am Raphael Haingura, a medical intern at Rundu Intermediate Hospital. I studied and graduated from the medical school in Havana, Cuba. The experience in Rundu with neonatology is challenging due to the number of patients and the wide array of different medical conditions. However, it is always a good feeling to save even one life."**
> Raphael Haingura

3.1.7 Next steps

To facilitate equipment maintenance and repair, Prof. Thomas M. Berger will take the following steps:

- Send a detailed list of equipment purchased to Steffen Reschwamm, MTTS Vietnam, including year of manufacture, serial numbers, and their current condition
- Provide both user and service manuals for all equipment donated by NEO FOR NAMIBIA – Helping Babies Survive (recipients: Leonardo Sandalio Sànchez de la Cruz, Cuban medical engineer, Emilie Nangura, RN, Cecilia Ndepavali, RN, Isha Kamara, MD, Johannes Helaria, MD)
- To finance replacement parts needed to repair the MTTS Dolphin® bCPAP device (heater control board: 1) and the MTTS Wallaby® open warmers (heating elements: 3)

Prof. Thomas M. Berger will propose a modified data collection form for DR and Prem Unit statistics. Ultimately, the Department of Pediatrics should take ownership and regularly analyze this data. There is also an urgent need to analyze circumstances and precise causes of death; this will help to define quality improvement initiatives that have the potential to improve survival rates. NEO FOR NAMIBIA – Helping Babies Survive is willing to pay the salary for the data collector (Eleotelia Hamutenya), however, better data quality can only be achieved with the help of senior physicians and nursing leadership.

Finally, it is hoped that the Department of Pediatrics will benefit from monitors and other equipment that will be donated by the Zuger Kantonsspital (ZGKS) and Anandic, Switzerland (Fig. 12, 13).

Fig. 12. Medical equipment offered to be donated by the Zuger Kantonsspital (ZGKS).

Fig. 13. Medical equipment offered to be donated by Anandic, Switzerland.

3.1.8 Case observations

3.1.8.1 Baby dumping

This male baby was found on the roadside near the village of Bunya, 45 km west of Rundu. Apparently, he had been abandoned and was only found when a cattle herder heard the baby moaning. The baby had obviously been beaten, and when the police picked him up, he was covered with maggots. The baby was first brought to a nearby clinic, then transferred to Rundu Intermediate Hospital. There, the baby was stabilized with CPAP. Multiple injuries were documented (Fig. 14). Chest X-ray revealed a radiolucent area above the diaphragms next to the right heart border, interpreted as either pneumomediastinum or herniated small bowel. In addition, on a limited ultrasound examination, Prof. Thomas M. Berger demonstrated a liver lesion (Fig. 15).

NEWS IN SHORT

Newborn baby survives attempted murder in Bunya

Police in Bunya village are investigating a shocking case of attempted murder and domestic violence after a newborn baby was found abandoned and injured in the bush.

According to the Kavango West police, an unknown suspect – believed to be the baby's mother – allegedly left the infant in the wilderness shortly after birth and placed a large brick on the baby's head in an apparent attempt to kill the child. The baby's cries were heard by a cattle herder, who discovered the infant in a dense thicket near the local hospital and immediately alerted the authorities. The newborn baby boy, just a few hours old, was rushed to Rundu State Hospital, where he is currently in stable condition. The suspect remains unknown and has not been arrested. Police are appealing to the public, particularly community members and teachers in Bunya and surrounding villages, to assist in identifying any woman who was recently pregnant but is now without a baby. Authorities urge anyone with information to come forward as investigations continue

- STAFF REPORTER

Fig. 14. Baby dumping: obvious external injuries (face, chest); in a newspaper article, the case was described as attempted murder.

Fig. 15. Baby dumping: liver lesion documented by bedside ultrasound examination (left); baby recovering from exploratory laparotomy (right).

By the time the mission team returned from Katima, the baby had been weaned off CPAP support. A few days earlier, exploratory laparotomy had been performed because C-reactive protein concentrations had increased despite second line antibiotic therapy, and the liver lesion (again demonstrated on another abdominal ultrasound examination) had been interpreted as a possible abscess. Intraoperatively, no lesions were identified (no abscess, intact bowel and diaphragm).

According to a paper entitled "Framing of the baby dumping phenomenon by the Namibian print media" by Eno Akpabio and Fred Mwilima, published in 2017, "Baby dumping is regarded as a significant problem in Namibia and stakeholders have identified public awareness about contraceptives and options for dealing with unwanted pregnancies such as foster care, adoption and institutional care as solutions to this heart-rending phenomenon."

3.1.8.2 Air leak syndrome

This baby required resuscitation after birth with bag-mask ventilation and, ultimately, intubation. Prof. Thomas M. Berger was asked for help in the interpretation of the babygram that was obtained after admission to the Prem Unit (Fig. 16): there were several manifestations of air leak syndrome, including small bilateral pneumothoraces, pneumomediastinum, and, possibly, pneumopericardium. Fortunately, the baby could rapidly be weaned from invasive mechanical ventilation and ultimately made a full recovery.

Currently, no continuous suction devices are available in the Prem Unit. Therefore, if a pneumothorax would require drainage, this could only be done by repetitive manual aspiration through a venous cannula placed into the pleural space.

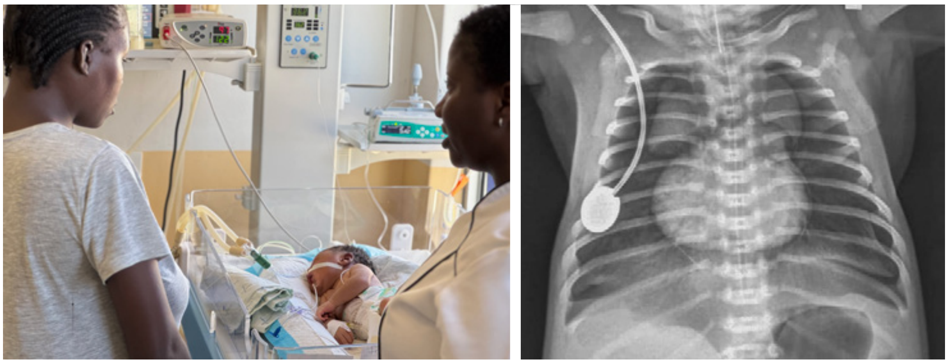


Fig. 16. Air leak syndrome: A nurse explains the condition of the baby to the mother (left); a babygram revealed small bilateral pneumothoraces (left > right), pneumomediastinum (spinnaker sign), and questionable pneumopericardium (right).

3.1.8.3 Sectio in mortua

Another tragic case occurred the day before the mission team left for Katima (Fig. 17). Apparently, the mother of this baby had collapsed at home in her village. When she arrived in the emergency department (ER) at Rundu Intermediate Hospital, she had no pulse. She was resuscitated and the baby was delivered by Cesarean section (so-called Sectio in mortua) in a desperate attempt to at least save the baby's life. The infant was successfully resuscitated but later died in the Prem Unit.

Fig. 17. Baby born by Sectio in mortua (left): the baby was resuscitated in the ER, received chest compressions and two doses of adrenaline. Despite return of spontaneous circulation (ROSC), the baby later died (right).

There are many conflicting stories of the first successful Cesarean section in which both mother and baby survived. Historically, Cesarean sections performed upon a live woman usually resulted in the death of the mother. It was considered an extreme measure, performed only when the mother was already dead or considered to be beyond help (source: Wikipedia).

3.2 Katima State Hospital

3.2.1 Overall Impression

Over the past five years, the Neonatal Unit at Katima State Hospital has made enormous progress. NEO FOR NAMIBIA – Helping Babies Survive first visited the unit in December 2019. In their report, the team noted: “The Neonatal Ward is nested within the labor & delivery ward but lacks most of the equipment that would be needed to care for sick babies. There are several types of incubators (used without humidification), no open units and only a few cot beds. The two pulse oximeters are only equipped with reusable adult sensors. Oxygen is administered via face mask from wall oxygen sources. Babies are not positioned well. Nasogastric tubes are used as umbilical venous catheters. Daily progress notes are largely absent, and orders are rudimentary. In total, as many as 12 neonates can be cared for in this room. Usually, there is 1 nurse per shift to look after them.”

Since then, a new Neonatal Unit has been opened with a capacity of up to 24 patients. Staffing has improved with teams of dedicated nurses and physicians. Since Dr. Cristy Victor had left for additional training in Cape Town, Dr. Yurisleydi Valdes, a Cuban neonatologist and wife of the head of obstetrics and gynecology (Dr. Manolo Berbe), has been the responsible neonatologist. These two physicians have been instrumental in the unit’s progress. Very recently, Dr. Cindy Sinyenga, a motivated physician from Zambia with an interest in neonatology, has joined the team.

3.2.2 Equipment inventory

Over the years, NEO FOR NAMIBIA – Helping Babies Survive was able to donate the following pieces of equipment:

- Pumani® bCPAP devices (total 9, functional 6)
- MTTS Dolphin® bCPAP devices (total 5, functional 5)
- MTTS Wallaby® warming tables (total 10, functional 10)
- MTTS Colibri® phototherapy units (total 6, functional 5)
- Masimo® Rad-5 (total 3, functional 1)
- Masimo® Rad-8 (total 6, functional 6)
- Masimo® Rad-G (total 2, functional 2)
- MTTS Koala® bassinets (total 5, functional 5)

While the MTTS Dolphin® CPAP device are their first choice, physicians and nurses indicated that the Pumani® bCPAP devices are still being used in term and near-term babies (in an attempt to prolong the life span of the MTTS Dolphin® devices); there were still sufficient stocks of consumables for both devices.

The light intensity of all of the MTTS Colibri® phototherapy units was checked: following cleaning of the contacts, five of the six units performed as recommended (light intensity > 20 – 30 μW/cm²/nm) (Table 3).

Unit Nr.	Year - Month	Serial number	Date checked	Hours used	Irradiance (μW/cm²/nm) in normal mode	Irradiance (μW/cm²/nm) in boost mode
1	2019-10	O19151029	16.04.2025	7'658 hrs	35	48
2	2021-03	O21186010	16.04.2025	7'509 hrs	32	47
3	2021-03	O21186019	16.04.2025	4'745 hrs	16	25
4	2022-10	O21207079	16.04.2025	2'682hrs	48	54
5	2022-06	O21207034	16.04.2025	1'819 hrs	32	43
6	2024-09	O21207012	16.04.2025	265 hrs	35	49

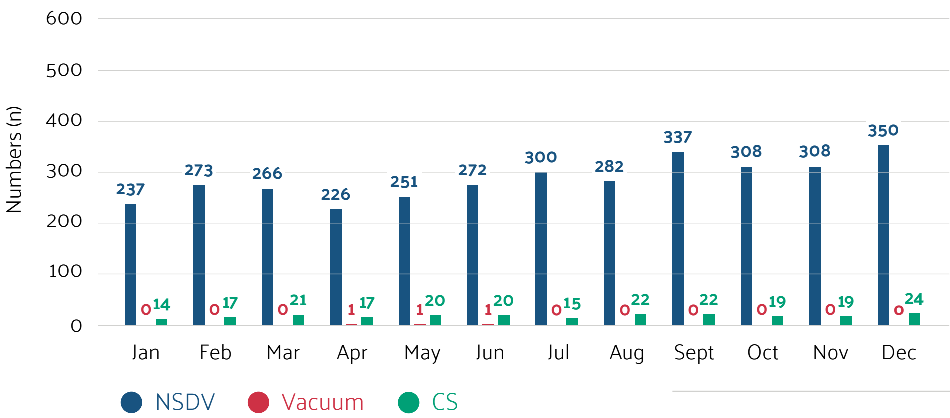
Table 3. MTTS Colibri phototherapy units available in Katima: following maintenance (cleaning of various contacts), five of six units are now fully functional.

3.2.3 Installation of ultrasonic oxygen sensors (MTTS Dolphin® bCPAP)

With the help of Isaak Boois, Prof. Thomas M. Berger replaced the old electrochemical oxygen sensors with the new ultrasonic oxygen sensors in three of the five MTTS Dolphin® CPAP machines (two had been delivered with the new sensors in place). In addition, a software update was performed in all of the devices.

3.2.4 Statistics

From January 1, 2024, to December 31, 2024, a total of 3'646 babies were born alive at Katima State Hospital. In addition, there were 28 and 45 fresh and macerated stillbirths, respectively. The Cesarean section rate was 6.3% (much lower than at Rundu Intermediate Hospital); due to lack of equipment, vacuum-assisted deliveries were very rare (3 in 2024). (Fig. 18)



Total	**3'643**
NSDV	3'410
Vacuum	3
CS	230

Fig. 18. Katima State Hospital: Delivery Room (DR) statistics (January 1, 2024, to December 31, 2024).

From January 1, 2024, to December 31, 2024, there were 566 admissions to the Neonatal Unit. Of these, 44 died before discharge (mortality rate 7.8%).

To better understand the observed overall mortality rate, birthweight-specific data was analyzed. Extremely low birthweight infants (birth weight < 1'000 g) contributed 3.2% to the total number of admissions but were responsible for 31.8% of all Prem Unit deaths (mortality rate 77.8%). Infants with a birthweight of 1'000 g – 1'500 g contributed 7.4% to the total number of admissions and were responsible for 15.9% of all Prem Unit deaths (mortality rare 16.7%). In contrast, babies with a birthweight > 1'500 g contributed to 89.4% of all admissions, but only 52.3% of all deaths (mortality rate 6.3% and 3.6% for infants with a birthweight of 1'501 – 2'500 g and > 2'500 g, respectively (Fig. 19).

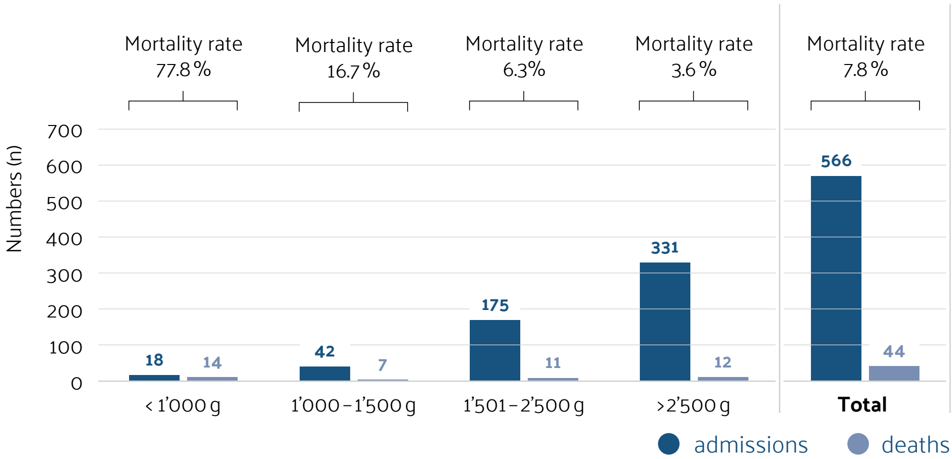


Fig. 19. Katima State Hospital: Neonatal Unit statistics (January 1, 2024, to December 31, 2024): as could be expected, mortality rates correlate strongly with birthweight (i.e., infant maturity).

Reduction in mortality rate of infants admitted to the Neonatal Unit (2019: 33%, 2024: 7.8%) has been impressive and sustained. It is noteworthy that the level of neonatal care provided at Katima State Hospital is now similar to the level of neonatal care provided at Rundu Intermediate Hospital (Fig. 20), even though certain treatment modalities are not available (e.g., invasive mechanical ventilation). However, for several reasons (data quality, hidden mortality), caution in such a comparison is warranted.

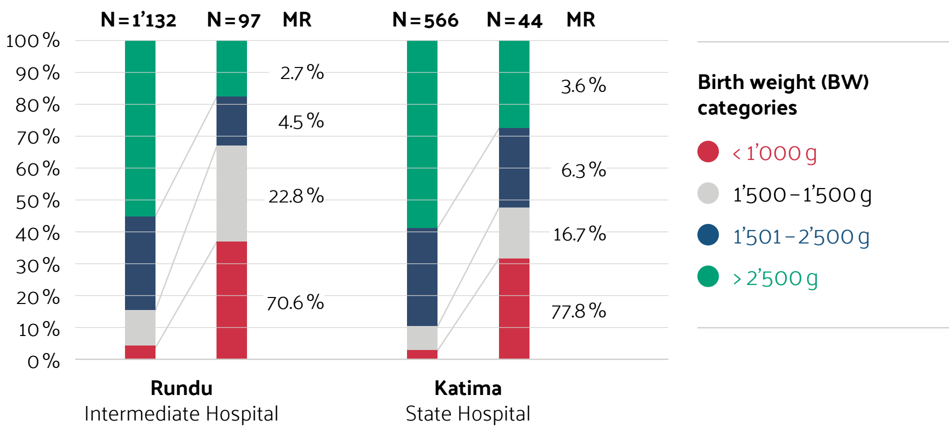


Fig. 20. BW-specific contributions to the total number of admissions and the total number of deaths (comparison between Rundu Intermediate Hospital and Katima State Hospital).

3.2.5 Lectures and teaching sessions

Prof. Thomas M. Berger was able to give lectures on fetal physiology and pathophysiological aspects of neonatal resuscitation, as well as practical training sessions on neonatal resuscitation with the use of a manikin. The teaching sessions were attended by newly appointed nurses and staff physicians.

3.2.6 Next steps

Katima State Hospital has recently appointed a new Head of Maintenance, Selma Onwuzulike-Madiba. To facilitate equipment maintenance and repair, Prof. Thomas M. Berger will provide both user and service manuals for all equipment donated by NEO FOR NAMIBIA – Helping Babies Survive to her team.

Once again, the mobile X-ray unit was not functioning. Together with Mrs. Onwuzulike-Madiba, Prof. Thomas M. Berger discussed how this situation could best be approached. The X-ray technicians promised to contact the Siemens representatives in Namibia. It must be clarified rapidly if the unit can be repaired and at what costs (incl. warranty).

Finally, as outlined above for Rundu Intermediate Hospital, it is hoped that the Department of Pediatrics at Katima State Hospital will benefit from donations by the Zuger Kantonsspital (ZGKS) Anandic, Switzerland (Fig. 12, 13).

4. CONCLUSIONS AND OUTLOOK

The 23rd mission of NEO FOR NAMIBIA – Helping Babies Survive was overall very successful, and most mission goals were achieved. Because the focus of the work was put on equipment assessment, upgrade and repair, direct patient contacts (e.g., on daily rounds) were limited. Nevertheless, formal teaching sessions were organized and well attended by motivated young physicians and nurses.

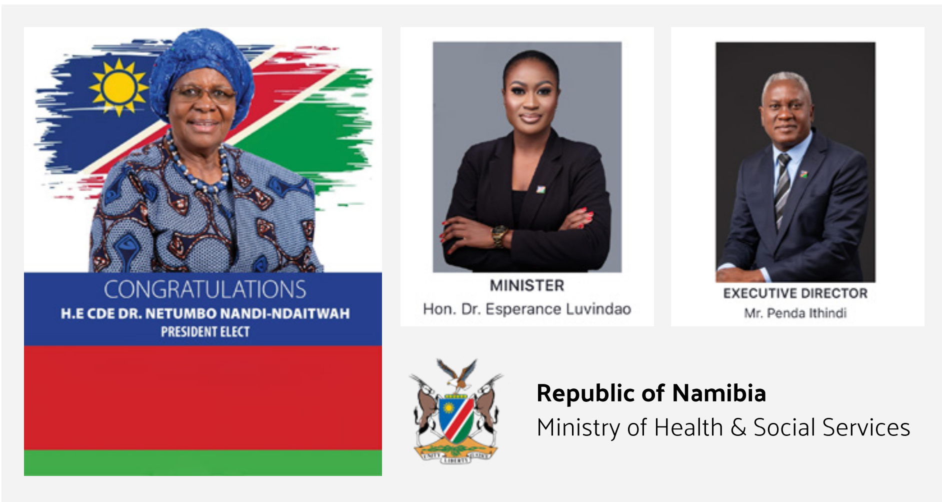


Fig. 21. Following the election of the new President of Namibia (left), new ministers and executive directors were appointed (right).

Given recent changes in the government (new President: Her Excellency Netumbo Nandi-Ndaitwah; new Minister of Health: Hon. Dr. Esperance Luvindao, new Executive Director of the Ministry of Health and Social Services: Mr. Penda Ithindi) (Fig. 21), it will be important to define the new contacts for our future collaboration.

5. IMPRESSIONS FROM THE 23RD MISSION

On their journey, driving more than 3'200 km by road, Prof. Thomas M. Berger and Isaak Boois were once again deeply impressed by the African scenery and the people they met (Fig. 22–29).

The return flights to Switzerland were calm and yet spectacular; within less than a day, they took Prof. Thomas M. Berger from one world into another (Fig. 30, 31).

Fig. 22. At David's place (woodcarver, 50 km north of the Mururani Veterinary Control Gate): as promised, the team brought some food and bought some of David's work.

Fig. 23. Sunsets at Kaisosi River Lodge.

Fig. 24. This year's rainy season (November to April) brought unusually heavy rainfalls: the Kavango River, separating Namibia from Angola, had developed into a majestic, wide river.

Fig. 25. Rainy season in Namibia: large and impressively deep potholes made driving tricky

Fig. 26. Scenes from Unique Sister's preschool: Otilia "Unique" Hamutenya and her pupils (left); rules and birthday chart (right).

Fig. 27. Scenes from Unique Sister's preschool: the preschoolers were initially shy; their faces started to light up when they received some fruit and cookies.

Fig. 28. Scenes from a sundowner cruise on the Kavango River at Riverdance Lodge.

Fig. 29. Back in Windhoek, Prof. Thomas M. Berger met Werner, a 42-year-old homeless man; together, they went to buy some fruit from a street vendor.

Fig. 30. Returning home: leaving the unusually green Windhoek area (top left), flying south (top right), stopover in Cape Town (bottom).

Fig. 31. Returning home: stopover in Cape Town (left), crossing the Alps after an 11.5-hour-flight before landing at Zurich airport (right).

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