



**NEO FOR
NAMIBIA**
HELPING BABIES
SURVIVE

AUTHORS

Prof. Thomas M. Berger, MD

Windhoek, 02.03.2023

MISSION REPORT

Mission 2021–3

October 21, 2021 to November 28, 2021

NEO FOR NAMIBIA
HELPING BABIES SURVIVE

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1. INTRODUCTION

The 13th mission of NEO FOR NAMIBIA – Helping Babies Survive lasted from October 21 to November 18, 2021 (Prof. Thomas M. Berger) and from October 31 to November 28, 2022 (Salome Waldvogel, MD, Katharina Mäder, RN). Until the arrival of the other two team members, Prof. Thomas M. Berger focused on clinical work in the Prem Unit at Rundu State Hospital.

On November 6, 2021, the three-member-team travelled to the Riverdance Lodge near Divundu. Because of the enormous workload at Rundu State Hospital, it was decided that Salome Waldvogel, MD, and Katharina Mäder, RN, would return to Rundu to support the local team while Prof. Thomas M. Berger and Brenton Titus would continue to Katima.

On November 10, 2022, the team again met at Riverdance Lodge for a handover. The following day, Prof. Thomas M. Berger and Brenton Titus returned to Windhoek (via Rundu and Otjiwarongo) where meetings with representatives of the Ministry of Health and Social Services (MHSS) had been scheduled. Salome Waldvogel and Katharina Mäder continued to work for another 3 and 9 days at Katima Hospital and Rundu State Hospital, respectively.

Fig. 1. Mission XIII: with two teams on the ground, a total of 30 full days of on-site support could be provided (Rundu State Hospital: 25 days with 1 – 3 team members present; Katima Hospital: 5 days with 1 – 2 team members present).

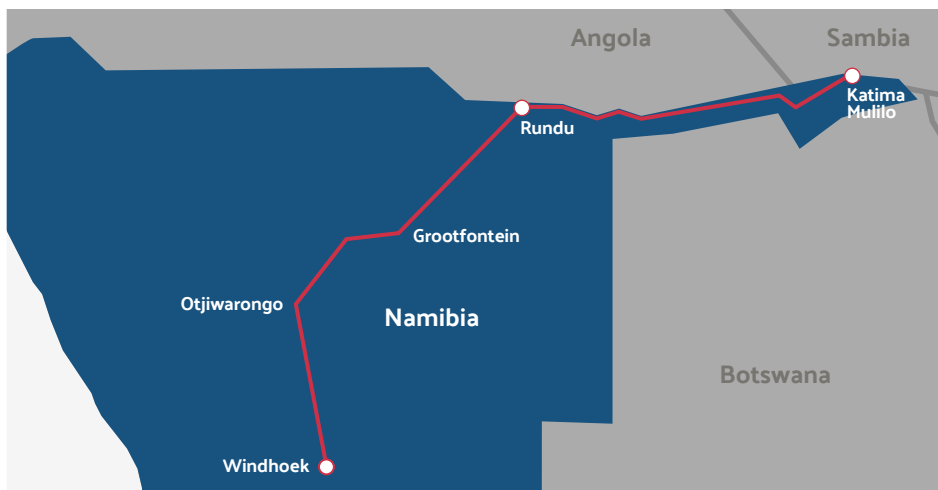


Fig. 2. Despite clocking more than 260'000 km, our Toyota Hilux (year 2000) was still going strong – day and night!



Fig. 3. Slowing down: sharing the roads with various animals.

Fig. 4. Kids at a woodcarver's road stand in the Kavango East region of Namibia (45 km north of the Mururani Veterinary Control Gate).



2. MAIN MISSION GOALS

The goals of the 13th 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 evaluate the quality of care at Katima Hospital after moving into the new neonatology unit
3. To train nurses at both hospitals in basic neonatal nursing skills, with a particular focus on proper positioning of sick babies
4. Finally, to review 2021 annual statistics at both Rundu State Hospital and Katima Hospital

3. HOSPITALS VISITED

As planned, Prof. Berger spent 16 and 5 days working at Rundu State Hospital and Katima Hospital, respectively. Given the high caseloads at these hospitals, work was intense but nevertheless rewarding. Neonatal patients aside, local doctors were busy with overall high numbers of pediatric inpatients with bronchiolitis, bronchitis, and gastroenteritis; this, unfortunately, limited daily interactions with the doctors.

3.1 Rundu State Hospital

3.1.1 Overall impression

The Prem Unit at Rundu State Hospital continued to function well. The caseload could hardly be managed by the current level of staffing. The following topics would need to be addressed soon: 1) hospital water supply, 2) nosocomial infection rates, 3) refresher training regarding invasive mechanical ventilation, and 4) helping to improve nursing skills.

3.1.2 Challenging clinical cases

During the first 10 days, Prof. Berger did rounds in Block A of the Prem Unit. Once again, he was impressed by the wide spectrum of diseases encountered. Regardless of one's experience, knowledge, and skills, managing many of these patients was very challenging under the given restraints.

Extremely low birth weight (ELBW) infants continued to have a high mortality rate. None of the incubators could provide adequate humidification (up to 80% would be required), leading to rapid and severe dehydration (Fig. 5).



Fig. 5. In extremely low birth weight (ELBW) infants, fluid and nutrition management remained challenging because of large insensible water losses and the lack of parenteral nutrition: this infant had a weight loss of 36% from birth weight.

Pediatric surgery still was not available at Rundu State Hospital. Babies with obvious or suspected surgical conditions were assessed by general surgeons to arrange transfer to Windhoek (Fig. 6 – 8). Unfortunately, referrals were often delayed for various reasons (no transport available, lack of parental consent, non-acceptance by specialists in Windhoek). This would undoubtedly have a significant impact on the infants' prognosis.

Fig. 6. Term infant with suspected (upper) gastrointestinal tract obstruction (nasogastric tube draining greenish, i.e., bile-stained fluid) awaiting referral to Windhoek Central Hospital.



Fig. 7. Term infant with lumbosacral myelomeningocele (MMC): the patient was initially not accepted by the specialists at Windhoek Central Hospital because the lesion was not leaking cerebrospinal fluid.

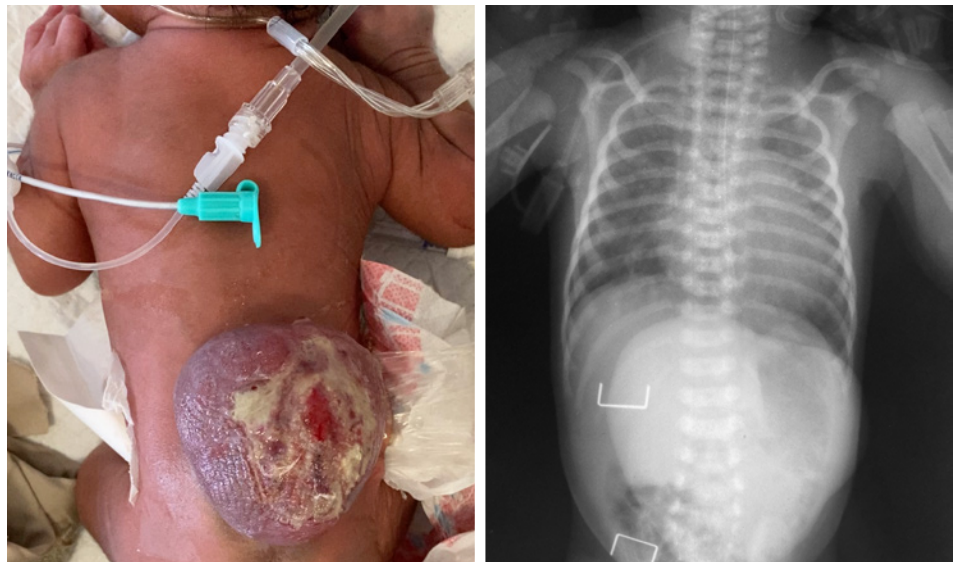
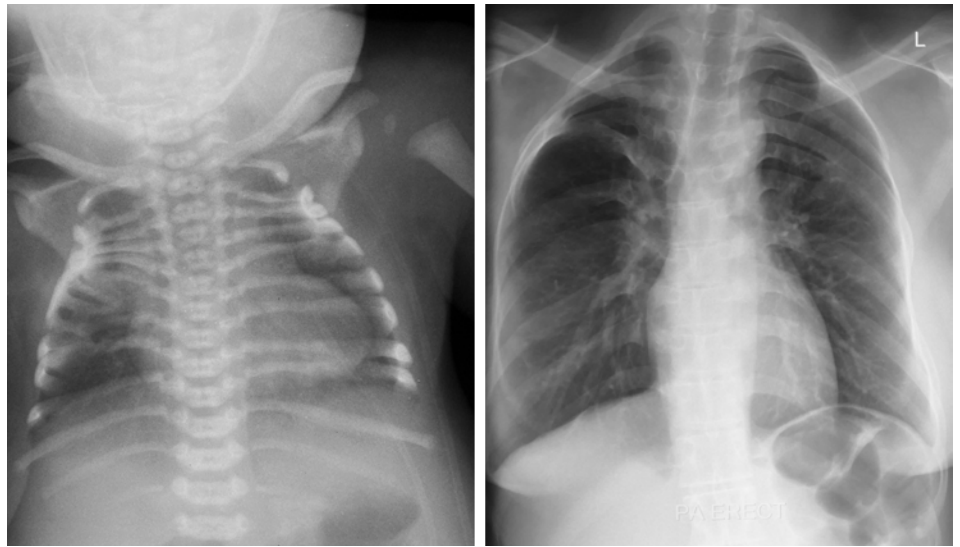


Fig. 8. Term infant with lumbosacral myelomeningocele (MMC): after days of dressing changes, the meninges ruptured, and cerebrospinal fluid started leaking from the lesion.



Diagnostic options often remained limited: one infant with respiratory distress was found to have mid-facial hypoplasia and anteriorly fused ribs on chest X-ray. Interestingly, an alert obstetrician noted that the mother had similarly malformed ribs, suggesting a genetic disorder. Prof. Berger tried to get advice from Swiss colleagues, but telemedicine ultimately failed (Fig. 9).

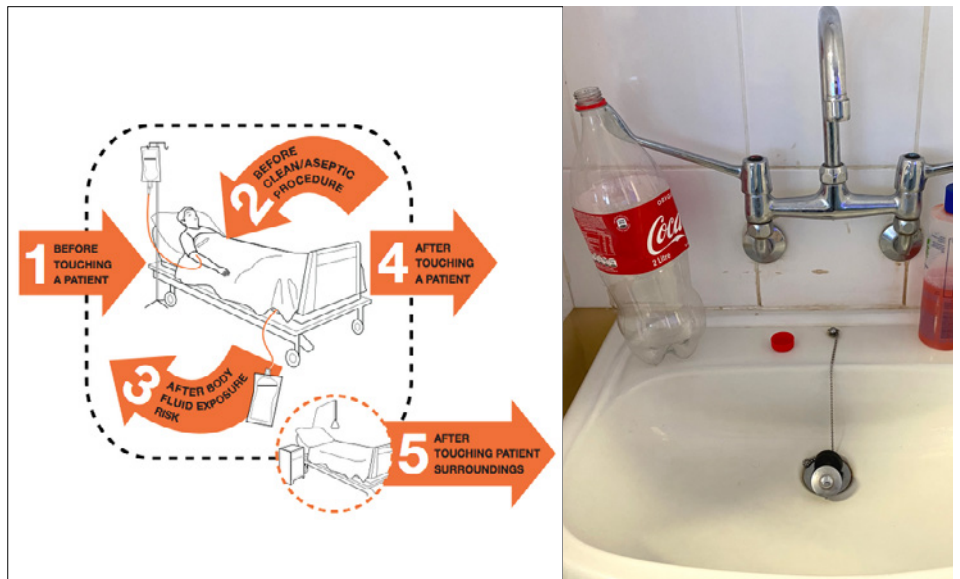
Fig. 9. This term baby was noted to have respiratory distress and mid-facial hypoplasia. Interestingly, several anteriorly fused ribs were noted both on the infant's (left) and mother's (right) chest X-rays.



3.1.3 Hospital water supply crisis

Unimaginable but true: because the town council had not paid its water bills (apparently for several months), NamWater Ltd. decided to cut the water supply in Rundu. The Rundu State Hospital had no running water! Water could only be filled into portable containers and then had to be brought to the units in small plastic bottles (Fig. 10). An outrageous decision that would clearly cause avoidable deaths.

Fig. 10. Man-made water supply crisis (left: standard precautions: hand hygiene (source: OpenWHO); right: every morning, water in small plastic bottles was brought to the unit to be used for handwashing.



Prof. Thomas M. Berger tried to intervene (both locally and in the MHSS). Ultimately, the crisis was addressed, and a water borehole was drilled on the hospital grounds. Finally, after several months, the water supply to the hospital was reestablished (Fig. 11).



Fig. 11. Drilling for water on the hospital grounds in Rundu to secure uninterrupted water supply.

3.1.4 Nosocomial infections

It remained difficult to quantify the rate of nosocomial infections because the diagnosis relied on the clinical picture (non-specific) and unreliable laboratory results. Blood, urine, or CSF (cerebrospinal fluid) cultures were not available. However, the rate likely continued to be very high, particularly among preterm infants.

Physicians were still reluctant to limit the duration of antibiotic therapy based on clinical evolution and negative biomarkers (i.e., C-reactive protein concentrations); thus, most patients continued to receive a 7-day-course of antibiotics (amoxicillin and gentamicin). They strongly believed that stopping antibiotics too early would increase the risk of late-onset sepsis, while published data in the literature indicates that the contrary is true.

The concept of CRP-guided antibiotic therapy (part of antibiotic stewardship) (Fig. 12) would be difficult to introduce as long as the performance of the hospital laboratory run by the National Institute of Pathology (NIP) remained unreliable. On several occasions, Prof. Berger had meetings with the local head of NIP explaining the catastrophic consequences of the poor services rendered.

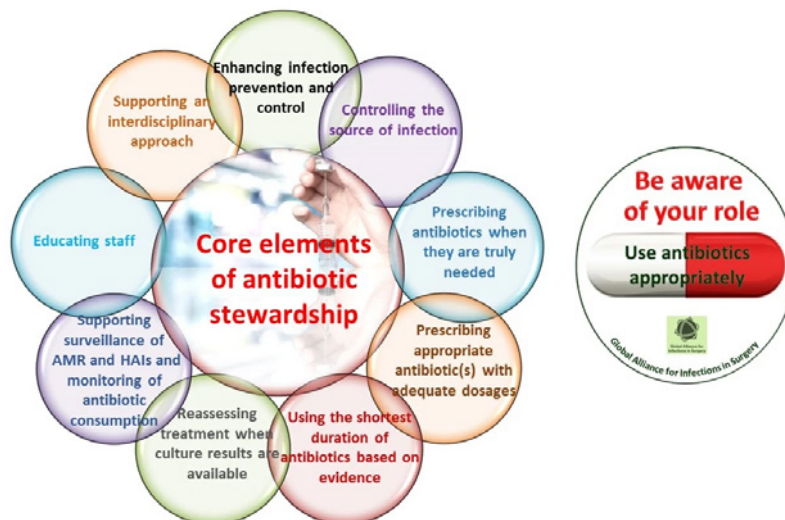


Fig. 12. Core elements of antibiotic stewardship (from: Global Alliance for Infections in Surgery).

Clearly, the introduction of point of care testing (POCT) devices would have the potential to dramatically improve the inappropriate use of antibiotics. Apart from the rapid availability of results, the low sample volumes required would benefit all babies.

3.1.5 Invasive mechanical ventilation

Invasive mechanical ventilation was introduced at Rundu State Hospital in 2019. Many babies had since then benefited from this treatment option. However, this treatment modality has its own risks, and successful invasive mechanical ventilation requires knowledge and skills (Fig. 13). Ultimately, success will depend on proper training of both doctors and nurses, and ongoing supervision.

Fig. 13. Invasive mechanical ventilation: it can save lives if done properly, but it can also harm patients if knowledge and skills are insufficient.



3.1.6 Nursing skills

Excellent nursing skills are of paramount importance in neonatal care. More complex interventions can only be successful if all the basics are covered. Simple interventions, like securing a peripheral IV line or keeping nasal prongs for oxygen administration in place, require meticulous attention. Provided that appropriate consumables are available, it must be done (Fig. 14, 15).



Fig. 14. Poorly secured peripheral venous catheters, displaced nasal cannula: availability of appropriate dressing tape and attention to detail will help to avoid such mistakes.



Fig. 15. Properly secured and positioned endotracheal tube (left), adequately taped nasogastric tube (right): covering the basics is essential.

Katharina Mäder, RN, trained the local nurses in proper positioning of sick babies. Health care professionals should understand, that this is not merely a question of comfort, but has the potential to increase cardiovascular stability and improve neurodevelopment (Fig. 16 – 18). In addition, skin care in preterm babies, proper fixation of peripheral intravenous catheters and endotracheal tubes, as well as the importance of minimal handling were explained.



Fig. 16. Proper positioning of babies is important (top row: no support, no boundaries; bottom row: linen rolls and gentle boundaries should be used to build a nest to provide containment and promote tactile stimulation).

Fig. 17. Prone positioning: a support roll (also known as a prone roll) is placed under the torso from the chin extending to the umbilicus with the infant arms tucked along the sides; the prone roll should allow the shoulders to be rounded forward to prevent extension of the shoulders.



Fig. 18. Prone positioning in a baby on CPAP: even with Hudson prongs, babies can be placed on their bellies.



The provision of Kangaroo Mother Care (KMC) was still not prevalent. Health care professionals should understand the many benefits of KMC, both for mothers and infants (Fig. 19).

Fig. 19. Reemphasizing the importance of Kangaroo Mother Care (KMC) at Rundu State Hospital.



3.2 Katima Hospital

3.2.1 Overall impression

This was our 5th visit of Katima Hospital. For the first time, we met Dr. Cristy Victor, a young and energetic Namibian doctor. She had taken over the responsibility for the neonatal ward from Dr. Xiamara, a Cuban pediatrician. Dr. Victor seemed enthusiastic about the prospect to further advance neonatal care at Katima Hospital.

3.2.2 Bedside teaching

During daily rounds, many positive changes were noted (Fig. 20, 21). Nevertheless, more support on-site would be required to move the unit to the level that had been achieved at Rundu State Hospital. Simple things, like timely detection and management of jaundiced neonates, or targeted oxygen therapy still needed to be improved (see below).



Fig. 20. A very low birth weight (VLBW) infant is nursed in an incubator in the new neonatal ward at Katima Hospital.



Fig. 21. Twins share an incubator in the neonatal ward at Katima Hospital.

During their stay at Katima Hospital, the team addressed many additional topics: proper positioning, use of incubators, use of infusion pumps, and the concept of minimal infant handling.

3.2.3 Neonatal jaundice and fluid and nutrition management

To aid with the management of neonatal jaundice, Salome Waldvogel, MD, and Katharina Mäder, RN, came up with the idea to distribute laminated pocket cards describing the essentials of jaundice management and the calculation of adequate provision of fluid and nutrition (Fig. 22, 23).

Fig. 22. Pocket cards (Katima): neonatal jaundice management.

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Bilirubin threshold values (in $\mu\text{mol/l}$) for phototherapy

Age in hours	Birth weight > 2500 g	Birth weight 1500 g - 2500 g	Birth weight < 1500 g
0 - 24 h	150	150	100
24 - 48 h	250	BW/10	BW/10
48 - 72 h	300	BW/10	BW/10
> 72 h	350	BW/10 + 50	BW/10 + 50

Salome Waldvogel, Katharina Mäder
12.11.2021

Measure bilirubin concentrations routinely in VLBW infants (< 1500 g) on day of life 2, 3, 4 and 5

If bilirubin concentration is above the threshold value for phototherapy (PT) start PT for 24 hours, then check bilirubin concentration again. Obtain a rebound bilirubin concentration 24 hours after stopping PT, many babies require PT more than once.

You need to follow bilirubin concentrations until it decreases spontaneously. Thereafter, you can stop checking bilirubin concentrations unless the baby is jaundiced again.

Fig. 23. Pocket cards (Katima): fluid and nutrition management.

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Fluid and nutrition therapy

On day of life (DOL) 1 start with

- Total fluids (TF) of 40-60 ml/kg/d for **term babies**
- Total fluids (TF) of 60-80 ml/kg/d for **preterm babies**
- Start enteral feedings in all infants with 10-20 ml/kg/d in all infants
- Give the difference to the TF as IV fluids (remember: Neolyte® contains only glucose and electrolytes, but no protein, no fat)

Increase TF by 20-30 ml/kg/d every day (**whenever possible by increasing enteral feedings by 20-30 ml/kg/d**) until a TF goal of 160-200 ml/kg/d is reached

IV fluids can be started to be reduced when TF of 160-200 ml/kg/d is reached

Salome Waldvogel, Katharina Mäder
12.11.2021

Remember to use birth weight to calculate the fluid requirements as long as the current weight is less than birth weight, thereafter us the current weight!

4. MEETING WITH THE EXECUTIVE DIRECTOR OF THE MHSS

Prof. Thomas M. Berger again had the opportunity to meet with representatives of the MHSS, including the Executive Director, Dr. Ben Nangombe. While highlighting the great impact NEO FOR NAMIBIA – Helping Babies Survive has had on survival rates both at Rundu State Hospital and Katima Hospital (50% reduction and 40% reduction, respectively), Prof. Thomas M. Berger also pointed out several persisting challenges:

- Ongoing, serious staff shortage (nurses and doctors)
- Risk of physician burn-out (above all Dr. Isha Kamara)
- Need for replacement of old and malfunctioning incubators
- Unreliable supply chains
- Poor performance of National Institute of Pathology (NIP)

He asked for better administrative support from the MHSS, particularly with regards to obtaining VISA and work permits for qualified mission team members, as well as getting VAT exemption papers without undue delays. Finally, he emphasized the importance to make sure that true local leaders are supported regardless of their nationality; this would be the only way to avoid brain-drain with potentially grave consequences.

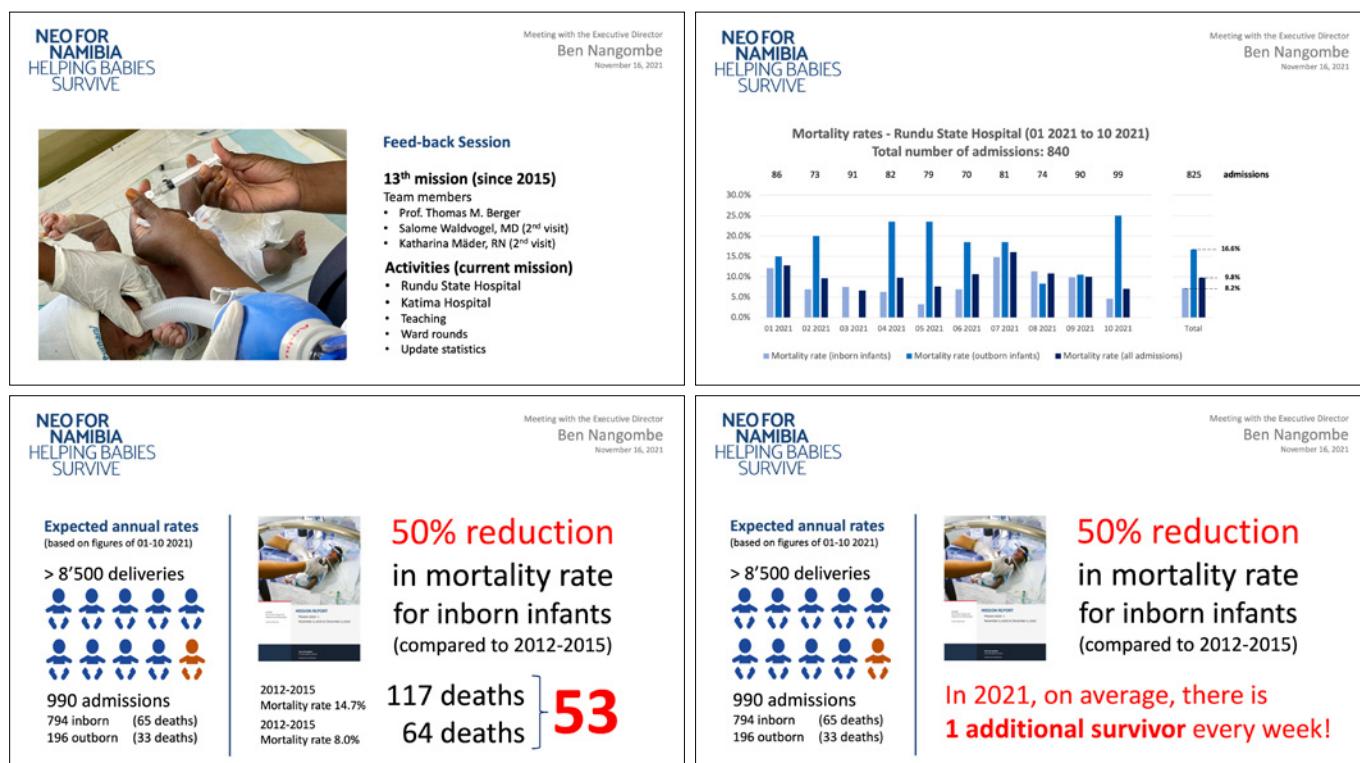


Fig. 24. Slides from the feedback session with the Executive Director, Dr. Ben Nangombe (part 1: Rundu).

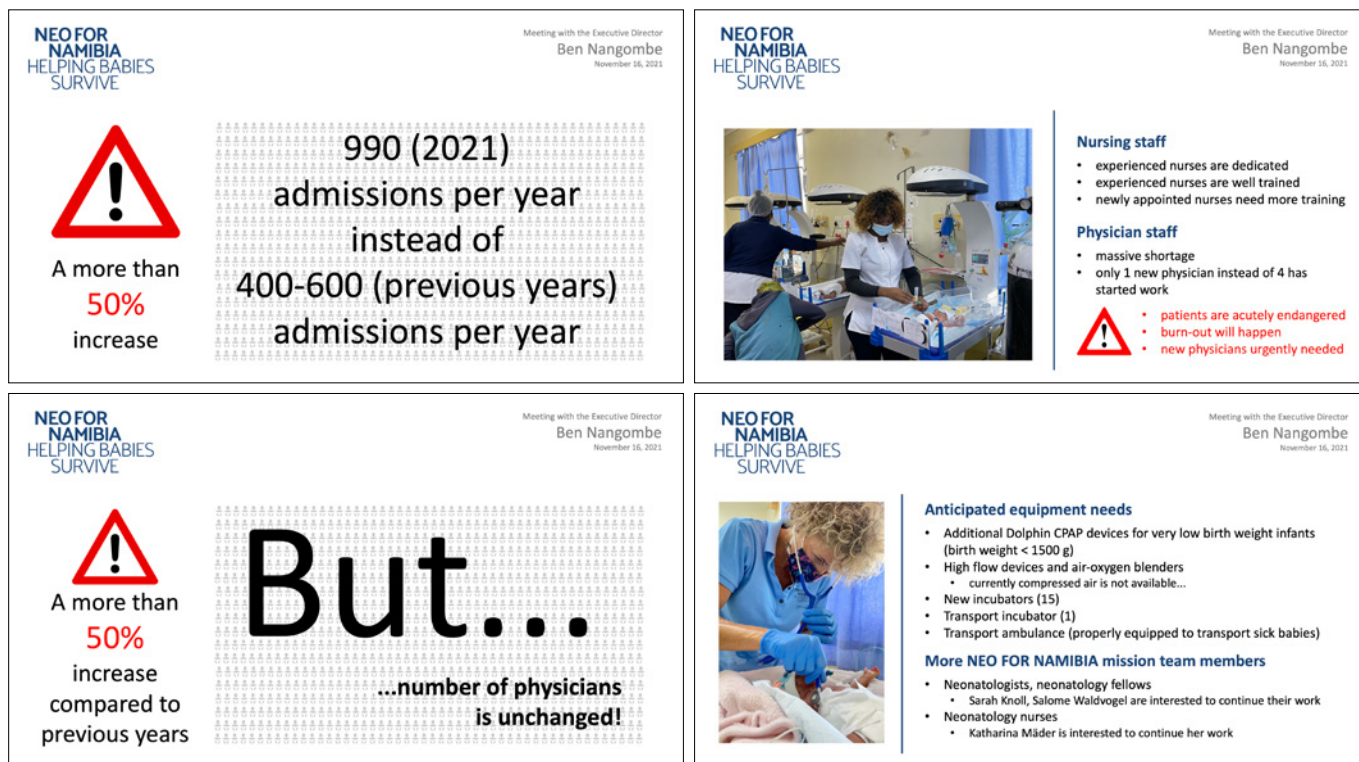


Fig. 25. Slides from the feedback session with the Executive Director, Dr. Ben Nangombe (part 1: Rundu).

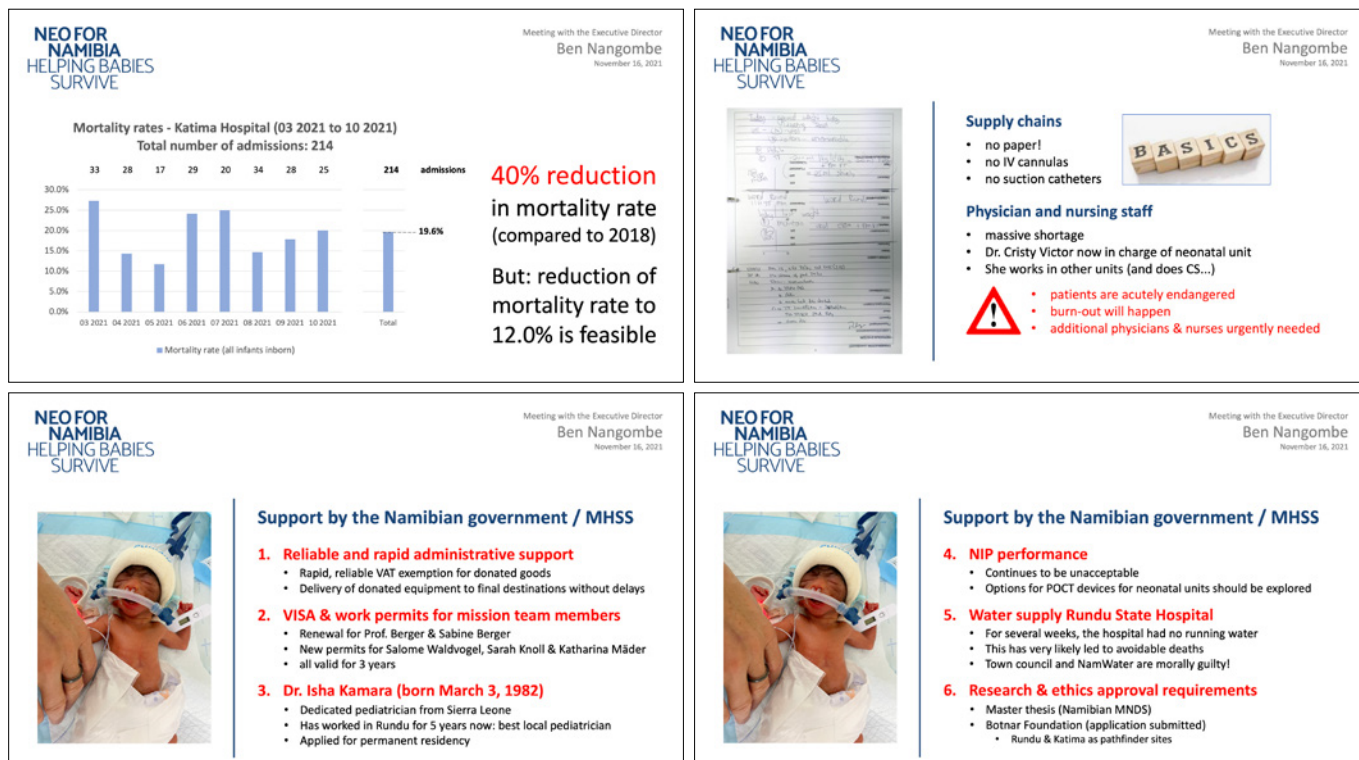


Fig. 26. Slides from the feedback session with the Executive Director, Dr. Ben Nangombe (part 2: Katima, and part 3: request for support).

5. FUTURE DIRECTIONS

5.1 Next mission

The 14th mission of NEO FOR NAMIBIA – Helping Babies Survive will take place in April 2022. Prof. Thomas M. Berger will then again be accompanied by his wife, Sabine Berger, a pediatric nurse.

Donate and help babies survive

neo-for-namibia.org/donate

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