Chiesi FOUNDATION

nest
Neonatal Essential Survival Technology

Document on the Implementation of the **NEST Model**

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Section 1

INTRODUCTION

The Chiesi Foundation's path has been marked by a profound reflection on the role and potential of a corporate foundation in today's complex world.

The Foundation was created in 2005 as a testament of Chiesi Farmaceutici's commitment to social responsibility. Chiesi Farmaceutici is a research-based international biopharmaceutical company, founded in 1935 and focused on the treatment of respiratory, neonatal and rare diseases (*www.chiesi.com*).

From its inception, the Chiesi Foundation has dedicated itself to alleviating the suffering of patients afflicted by chronic respiratory conditions and enhancing access to quality neonatal care in middle and low-income countries, where the founding company does not have commercial reach. At the basis of this endeavour is the idea to leverage the parent company's extensive expertise and network in pulmonology and neonatology to transfer knowledge and means in Global South countries. After our first years of experience, we developed a reflection on the existing difficulties in accessing appropriate neonatal care, which led to a strategic review of the Foundation itself.

The year 2014, a pivotal moment in the Foundation's history, marked a transformative shift from a grant-making entity to a proactive agent of social progress, taking leadership and responsibility in the implementation of projects. The Chiesi Foundation aspires to be a game-changer foundation.

This evolution heralded the birth of the NEST (Neonatal Essential Survival Technology) Model, an innovative initiative to combat neonatal mortality and improve the care of sick, premature, and Low Birth Weight (LBW) babies within underserved communities.

Since then, the NEST Model has been implemented in partnership with various stakeholders through international cooperation projects. In particular, at the advocacy level in Senegal in collaboration with the PMNCH and at the clinical level in the following hospitals:

- St. Camille Hospital in Ouagadougou (Burkina Faso)
- St. Jean de Dieu Hospital in Tanguiéta (Benin)
- Ngozi Regional Hospital (Burundi)
- Regional Hospital Centre in Abobo (Ivory Coast)
- Children of Yendube Hospital in Dapaong (Togo)

The experiences made so far allowed us to further improve the model itself, rethink it in some parts and enlarge the number of stakeholders and partners involved.

The objective of this document is to comprehensively outline the NEST Model and its practical application, aiming to empower healthcare facilities and providers with actionable insights to enhance essential neonatal care within their specific contexts

Section 2

THE GLOBAL FRAMEWORK

At the beginning of 2016, the United Nations established 17 Sustainable Development Goals (SDGs) within the 2030 Agenda for Sustainable Development[1]. The SDG 3 "Ensure healthy lives and promote well-being for all at all ages" specifically targets ending preventable deaths of newborns and children under five years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births by 2030 (target 3.2), which can be reached only if stakeholders globally encourage and strengthen local partnerships (SDG 17).

Throughout the years, significant progress has been made in reducing under-five mortality. However, progress has not been as rapid in reducing neonatal mortality rate (NMR). The first 28 days of life – the neonatal period – is the most vulnerable time for a child's survival. Labour and the immediate period after birth are the times during which the risk of death for a newborn is at its highest: 1 million babies take their first and last breaths on their day of birth. Greater attention must be focused on pre-term, small and sick babies who are at the greatest risk of death and disability.

As published in the 2022 report of the United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME)[2], the global NMR fell by 51 per cent from 1990 to 2021, meaning a reduction from 37 to 18 deaths per 1,000 live births. Despite these efforts, in 2021 approximately 2.3 million children died during the first month of life (about 6,400 babies every day). These deaths constituted nearly 47 per cent of the under-five deaths that took place that same year.

Furthermore, newborn survival has been characterized by significant geographical inequalities: while the global NMR in 2021 was 18 deaths per 1,000 live births, regionally, sub-Saharan Africa had the highest NMR in the world at 27 deaths per 1,000 live births. A child born in sub-Saharan Africa is 11 times more likely to die in the first month of life than a child born in the region of Australia and New Zealand (lowest regional NMR in the world).

1 *http://www.un.org/sustainabledevelopment*

2 United Nation Inter-Agency Group for Child Mortality Estimation, 2022. Level and Trends in child mortality. Report 2022. *https://childmortality.org/wp-content/uploads/2023/01/UN-IGME-Child-Mortality-Report-2022.pdf*

FIGURE 1.
Under-five, 1-59 months, and neonatal mortality rates, 1990-2021, UN IGME 2022

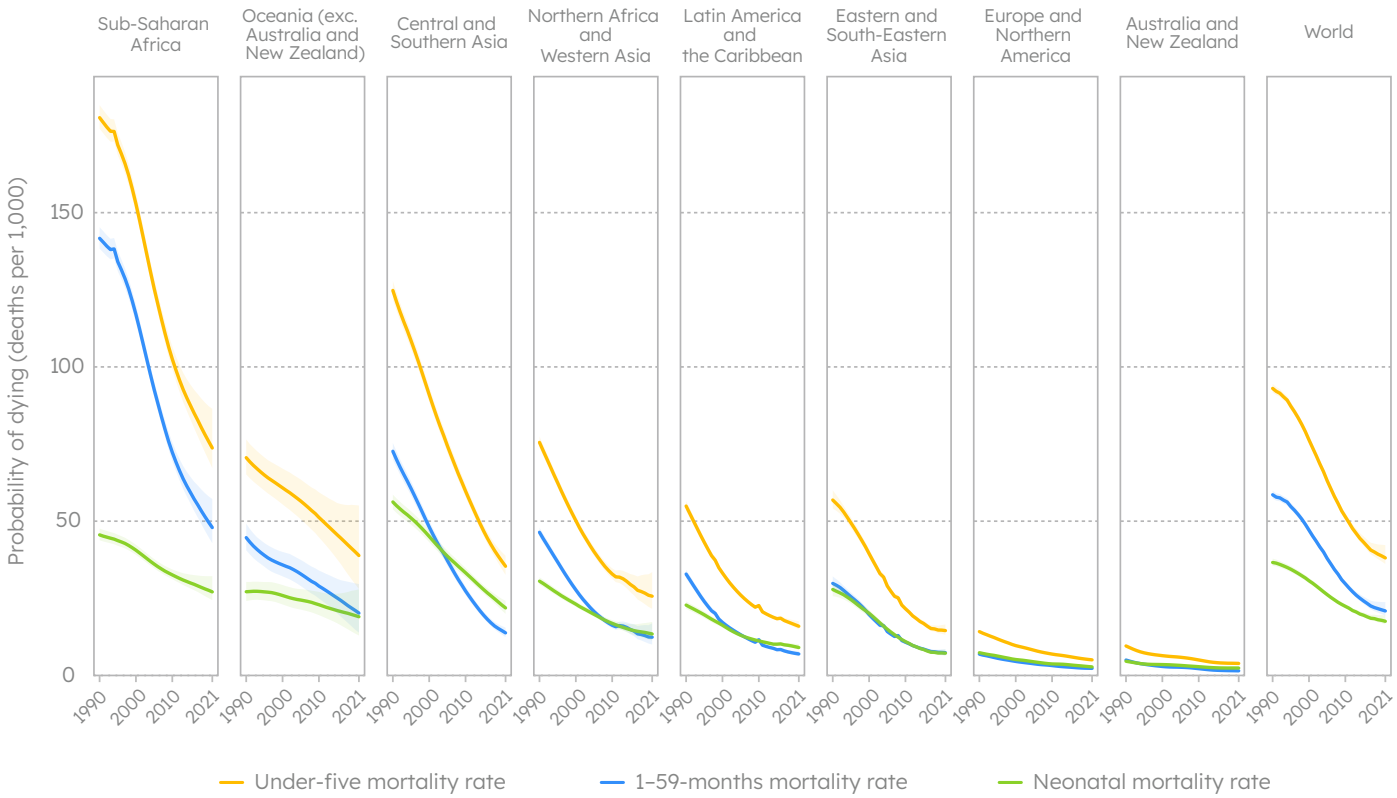
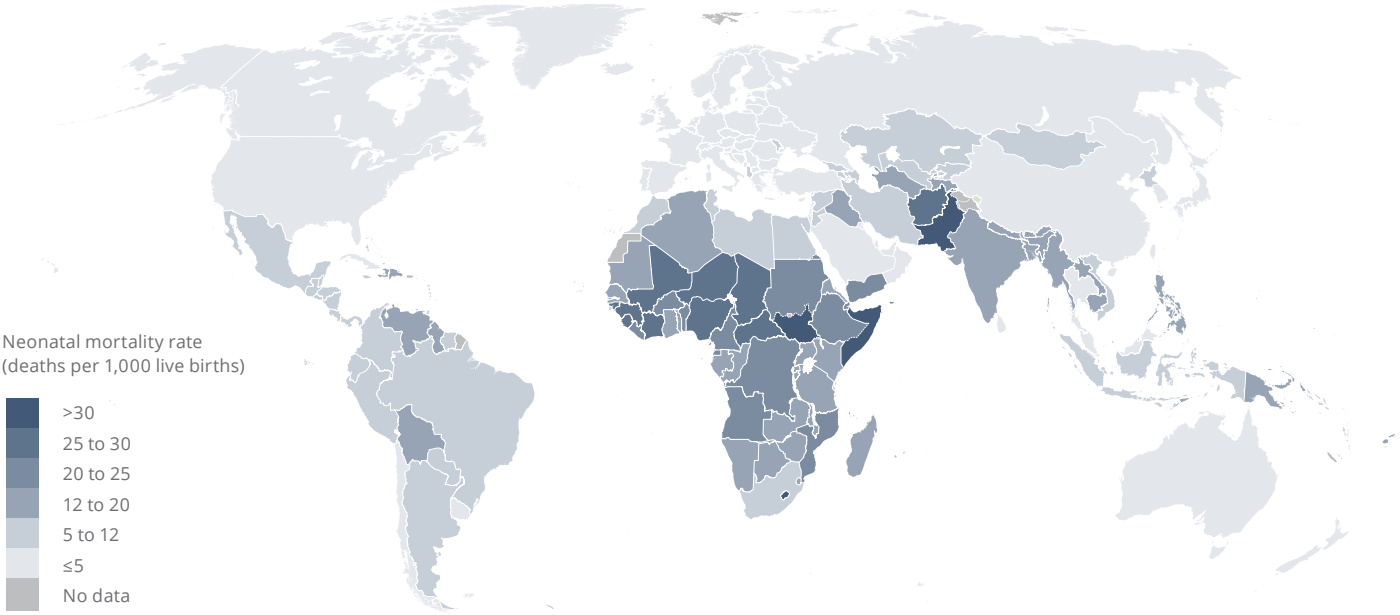


FIGURE 2.
Neonatal mortality rate by country, 2021, UN IGME 2022



Moreover, within sub-Saharan African countries, fundamental differences have been underlined between anglophone and francophone territories. Due to their economic and social development indicators, the two regions are facing different epidemiological challenges. As shown in the 2019 systematic analysis published in The Lancet Global Health by Charbel El Bcheraoui and colleagues[3], French-speaking African countries bear the highest burden of disease compared to the non-francophone countries. According to the analysis, the number of deaths in French-speaking African countries remains too high (779 deaths per 100,000 total population) with the leading causes of death mainly related to a poor health care system and services. Indeed, while in anglophone countries HIV/AIDS has become the leading cause of death, the burden of disease registered in the francophone region is mainly due to malaria, lower respiratory infections, neonatal disorders, and diarrhoeal diseases. In 2017, neonatal disorders were the main cause of years of life lost (YLL)[4]. Overall, the analysis highlights other inequalities between anglophone and francophone countries arising from a lack of development assistance for health and isolation from the wider global health community, especially because of the language barrier and the dominance of English.

The chances of a newborn surviving are also linked to demographic factors. A baby born to a young mother – less than 20 years old – is 1.5 times more likely to die in the first 28 days of life, while a baby born less than two years after the previous birth is 2.7 times more likely not to survive. Education represents another powerful tool for challenging mortality rate, as a baby born to a mother without an education is 6 times more likely to die before their fifth birthday.

According to the 2018 United Nations Children's Fund (UNICEF) report 'Every Child Alive'[5], this trend can be explained by considering two factors. Firstly, although the principal causes of newborn deaths are mostly preventable – prematurity, complications around the time of birth, infections such as sepsis, meningitis and pneumonia – they are often not treatable with a single drug or intervention, but rather by a system-wide approach. Secondly, it seems that in the past, ending newborn mortality had not been considered a primary challenge within the global agenda.

Based on these trends, UN organizations are claiming that 63 countries will not be able to meet the SDG target on neonatal mortality, and of these, 43 (68%) are in sub-Saharan Africa.

3 El Bcheraoui C, Mimche H, Miangotar Y, et al. Burden of disease in francophone Africa, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet Glob Health 2020; 8: e341–51.

4 According to the World Health Organization: "The total number of deaths from specific causes does not provide a good metric for informing public health priorities. Such a measure, for example, assigns the same weight to a death at age 80 as it does at age 30 or even at 1 year of age. Years of life lost (YLL) is a measure of premature mortality that takes into account both the frequency of deaths and the age at which it occurs." Global Burden of Disease (WHO Website).

5 Fonds des Nations unies pour l'enfance (UNICEF), 2018. EVERY CHILD ALIVE. L'urgence de mettre fin aux décès de nouveau-nés.

For this reason, many UN agencies, together with international organizations, published urgent calls for action to end preventable newborn deaths.

According to the WHO (World Health Organization) publication "SURVIVE AND THRIVE: Transforming care for every small and sick newborn"[6], improving the quality of neonatal care is nowadays a prerequisite to achieving the health-related SDG. To undertake this path and transform the quality of care, every newborn and mother must be put at the centre of care and receive assistance from specialized healthcare workers and family members.

It is with the aim to help children survive and thrive, that the WHO published the "Nurturing Care for Early Childhood Development"[7] in 2018, a framework proposing five strategic actions:

1. Lead and invest
2. Focus on families and their communities
3. Strengthen services
4. Monitor progress
5. Use data and innovate

The *Every Newborn Action Plan* (ENAP) and *Ending Preventable Maternal Mortality* (EPMM) are a roadmap for action and they chart the path towards ending preventable maternal and newborn mortality, reducing disability and ending preventable stillbirths. The ENAP and EPMM call on all stakeholders to take action to improve access to quality services, setting out recommendations for countries on how to reduce mortality and morbidity and bridge the equity gaps. The ENAP and EPMM, together with country governments, have outlined coverage targets and milestones to 2025 to accelerate solutions and ensure mothers and babies both survive and thrive.

It is with the same aim that the first biennial International Maternal Newborn Health Conference (IMNHC) brought together more than 1,800 stakeholders from over 95 countries and 28 country delegations in Cape Town (South Africa), in May 2023. Hosted by Align MNH and the Government of South Africa, and in partnership with the maternal newborn health community, including the Chiesi Foundation as a sponsoring partner, the IMNHC marked a crucial moment as we are at the midpoint of the SDGs and must expedite the change to reach ENAP's and EPMM's goals.

In line with these strategic actions, the Chiesi Foundation has revised its implementing model, as outlined in the following chapters.

6 Survivre et s'épanouir : transformer les soins pour chaque nouveau-né malade ou de petite taille. Principales conclusions. Genève : Organisation mondiale de la santé ; 2018 (WHO/FWC/MCA/18.11).

7 Organisation mondiale de la santé, Fonds des Nations unies pour l'enfance, Groupe de la Banque mondiale. Soins attentifs

pour le développement de la petite enfance : un cadre pour aider les enfants à survivre et à s'épanouir afin de transformer la santé et le potentiel humain. Genève : Organisation mondiale de la santé ; 2018. Licence : CC BY-NC-SA 3.0 IGO.

Section 3

THE NEST MODEL

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Neonatal Essential Survival Technology

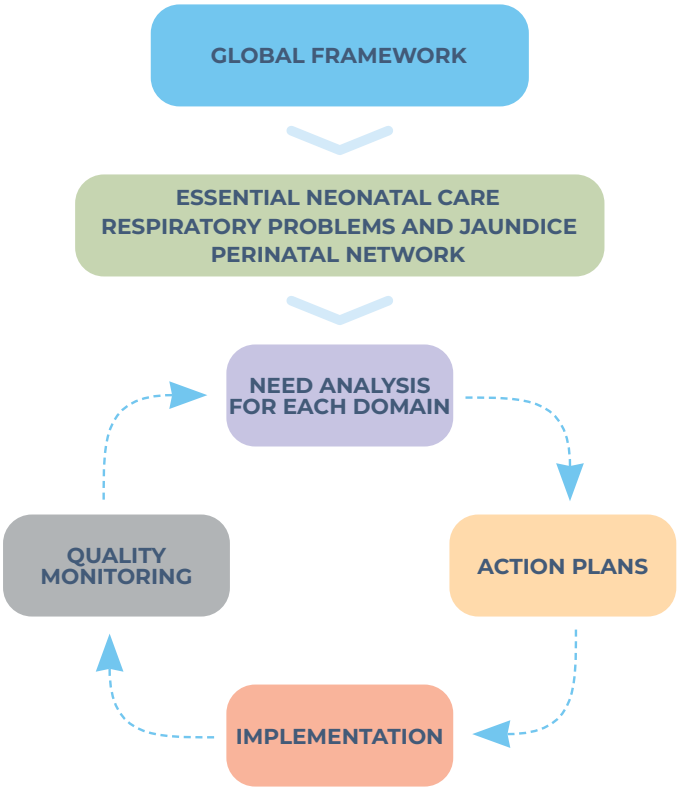
Within this global context, the Chiesi Foundation has been implementing the NEST – Neonatal Essential Survival Technology – Model since 2014, a long-term program aimed at **reducing neonatal mortality (0-28 days) of premature, low birth weight or sick babies** in sub-Saharan African countries, with a major focus on the French-speaking ones.

The NEST Model intends to give a practical methodology to address the mortality and morbidity problems, starting from recognizing the barriers to quality newborn care, analysing them and finding suitable and sustainable solutions. It is, therefore, a guide to translating the theoretical framework into practice.

The following figure is a graphic representation of the NEST Model, which can be divided into two main phases:

1. The strategy: inspired by the global framework, it outlines the model working areas.
2. The tactic: the operational side of the model which describes how the strategy is translated into implementation to overcome the needs identified on the ground.

FIGURE 3.
The NEST Model



3.1 The strategy of the NEST Model

The basic needs of the neonates can be schematically summarized as follows:

- WARM – thermal protection
- SWEET – nutrition
- SAFE – hygiene
- PINK – respiratory support

To satisfy these needs, it is crucial to ensure that quality essential care is provided at facility level. This cannot abstract from the involvement of the family in the newborn's care. This approach known as Family Participatory Care is at the foundation of the entire NEST Model.

Family Participatory Care promotes a partnership between the family and the neonatal unit staff. This shared care model encourages the family's constant presence at their babies' bedside, enables them to deliver essential nursing care and to participate in medical decision-making. Successful implementation requires a change in both healthcare facility culture and health worker behaviour.[8]

This approach includes the adoption of the Kangaroo Mother Care (KMC) method, defined by the WHO as early, continuous, and prolonged skin-to-skin contact between the mother (or another caregiver) and the baby, with exclusive breastfeeding[9] which confers essential immune and nutritional advantages for small and sick newborns. Chiesi Foundation prefers to adopt the term Kangaroo Care (KC) rather than Kangaroo Mother Care to underline the importance of the engagement of all family members in the care of newborns.

Another basic principle at the foundation of the NEST Model strategy is the empowerment of local healthcare professionals, not only for understanding the context and for better targeting the interventions, but also to increase the motivation and satisfaction of the healthcare providers. Therefore, the NEST Model foresees full involvement of hospital staff to discuss and test training programs, technologies and equipment suitable for the context, and to uphold the participatory care.

8 Ibidem

9 WHO recommendations for care of the preterm or low birth weight infant. Geneva: World Health Organization; 2022. License: CC BY-NC-SA 3.0 IGO.

FIGURE 4.
The strategy of the NEST Model

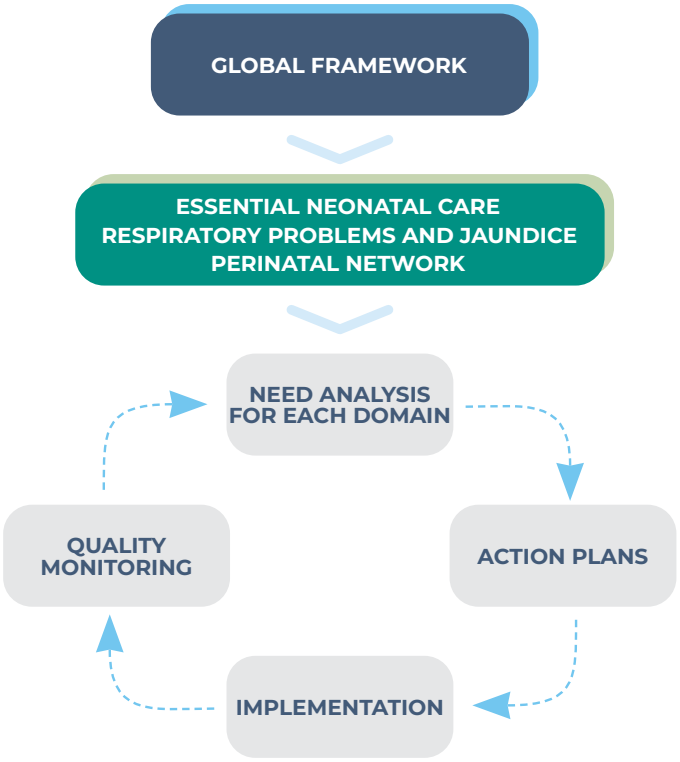
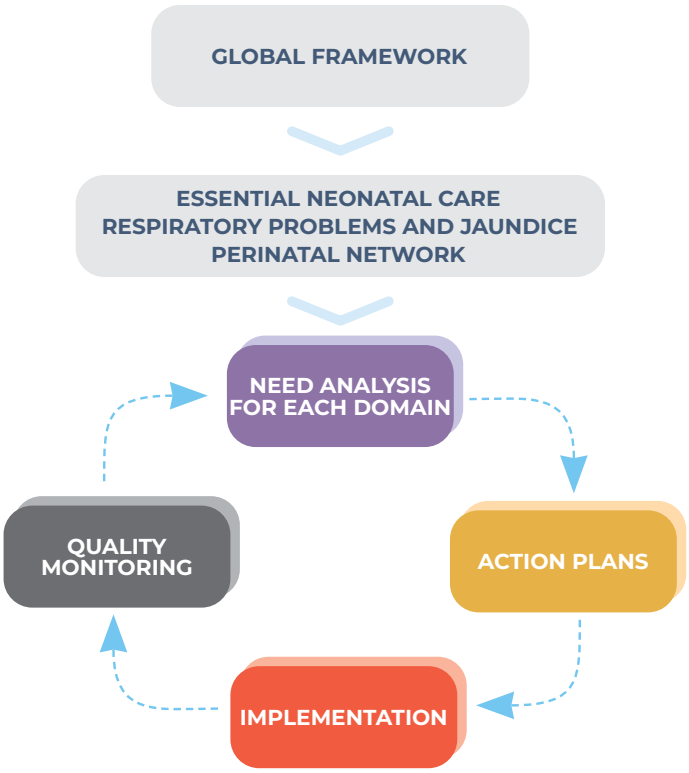


FIGURE 5.
The implementation of the NEST Model



The NEST Model adopts a gradual approach to addressing the complexity of care provided to infants. The first step ensures that preventive and nurturing care practices are fully integrated and established as the standard of care in everyday clinical practice. Only afterwards more advanced care strategies can be introduced. The Chiesi Foundation is committed to facilitating this transition by assisting health systems in caring for infants with respiratory issues, asphyxia, or jaundice, employing a Family Participatory Care approach.

Moreover, a comprehensive perspective on perinatal care must be embraced in every stage of the perinatal period, which covers pregnancy, delivery and postpartum. Quality care and improved newborn outcomes require a partnership between midwifery (nursing), obstetric and neonatal teams. Therefore, it is essential to involve midwifery and obstetric personnel at the facility level and beyond. Establishing hub & spoke networks involving facilities at different levels, to set up referral and back-referral mechanisms, ensuring appropriate care for all babies. Successful networks engage all stakeholders working in the maternal newborn care, including local institutions, civil society organizations and professional associations to promote health through a systemic approach, as well as families. When health is promoted during pregnancy and at birth, long-term consequences are reduced, and the quality of life is improved.

In summary, the NEST Model strategy revolves around Family-Centred Care and Zero-Separation, principles that the Chiesi Foundation integrates across its three **primary working areas**, catering to the needs of neonatal infants:

1. **Essential neonatal care, which includes:**
   a) immediate and sustained human milk
   b) infection prevention and control
   c) thermal care
   d) Kangaroo Care
   e) Neonatal resuscitation
2. **Extra care for babies with complications:**
   a) Respiratory problems
   b) Asphyxia
   c) Jaundice
3. **Perinatal network**

3.2
The implementation of the NEST Model

To address the premature or sick newborns' needs (warm, sweet, safe, pink), several key steps are essential. Firstly, local healthcare staff must comprehend training to acquire specific competencies in newborn care. Secondly, the establishment of a Neonatal Care Unit with appropriate layout, equipment, and staffing is imperative. Thirdly, the implementation of standard procedures and protocols within each neonatal hospital setting is crucial.

These efforts are underpinned by data-driven quality improvement and advocacy, driving the transformation of neonatal care. These principles are applicable across all the Foundation's working areas, each of which comprises various **domains**, outlined in this document as follows:

a) **Human Resources**
b) **Infrastructures**
c) **Equipment & Commodities**
d) **Data System**
e) **Communication**
f) **Protocols & Guidelines**

3.2.1
The need analysis for each domain

Before any implementation, a thorough needs analysis is essential to assess the skills and identify areas for improvement within hospitals and among partners involved in neonatal care.

This analysis can take various forms, such as focus group discussions, bilateral discussions with the hospital partners and multilateral exchanges among them. It is typically conducted by multi-disciplinary teams comprising local healthcare professionals (including neonatal doctors, nurses, midwives, and obstetricians), or with the assistance of other stakeholders, such as NGOs.

Useful resources:

- Assessment checklist: Perinatal Healthcare Indicators – NEST Project's Hospitals
  https://www.chiesifoundation.org/wp-content/uploads/2024/11/Chiesi_Foundation_Indicateurs_Benin_Togo_Burkina_2024.pdf

To streamline the needs analysis process, the Chiesi Foundation, in collaboration with Prof. Ousmane Ndiaye, has developed various checklists to assess existing resources, identify areas of deficiency, and prioritize interventions effectively.

The following paragraphs are devoted to thoroughly describe each domain of the key working areas of the NEST Model. .

Practice Box 1

Assessment of maternal and neonatal care services in Ngozi Province

In 2021, the Chiesi Foundation funded an assessment to understand the needs, constraints and reality on the ground in the healthcare facility with a delivery service in Ngozi Province. The assessment was crucial to lay down the basis to design the Pilot Project for the diffusion of the Kangaroo Care (KC) method in the Ngozi Province (Burundi).

The Foundation has undertaken the following steps:

- Definition of the assessment's objective and expected results
- Definition of the assessment's targets
- Definition of a workplan and chronogram
- Definition of the budget
- Selection of the implementing partner(s) with the capacity to conduct a need assessment in the context and to develop a report: WeWorld-GVC (WWGVC), an Italian NGO, with a health background and working in the Ngozi Province; Amahoro Pro-Africa, an Italian NGO working in the Ngozi Hospital with strong expertise in newborn care
- Signature of the MoU with the abovementioned partners to define responsibilities
- Development of the assessment tool (questionnaire). Tool prepared by an Italian neonatal doctor who works for Amahoro Pro-Africa
- WWGVC conducted data collection, while a statistician partner of the Chiesi Foundation analysed the data
- The report was then developed by Amahoro Pro-Africa with the support of the Chiesi Foundation

Finally, the Chiesi Foundation presented the assessment report to the local authorities, including the Provincial Medical Chief and the directors of the provincial hospitals.

To read the assessment report, please check the Chiesi Foundation website: Fondation Chiesi : Evaluation des soins materno- néonatals dans la Province Sanitaire de Ngozi

https://www.chiesifoundation.org/wp-content/uploads/2024/11/Chiesi_Foundation_Assessment_Ngozi_Province.pdf

A. HUMAN RESOURCES

A care quality gap remains in many healthcare facilities, particularly for small and sick newborn care. Specialized human resources are vital in closing this quality gap and ending preventable deaths.

AIM: To build capacity of the local healthcare staff, at different levels.

HOW: The Chiesi Foundation supports **structured and continuous training**, rather than the spot and sporadic ones. Indeed, training needs to start in the neonatal wards, but it must be part of a larger program to ensure continuity. It needs to be delivered both to the hub and the spokes and tailored according to the level of care.

Family Participatory Care: health workers at all levels must support family involvement in the routine care of their babies and basic newborn-care practices. Training can also include a focus on well-being strategies for managing stress, anxiety, and self-efficacy. This can be provided also by peer parents.

More complex care: when appropriate, support training to enable NEST Partners' hospitals to deliver high-quality complex care. It is important to use standardized packages for training, supervision, and monitoring, as recommended by the WHO.

The Chiesi Foundation promotes/fosters South-to-South learning. To do so, initial Training of Trainers (ToT) is carried out together with the Foundation's partners to identifying local champions among healthcare professionals who will ensure continuity and sustainability. Local champions will be encouraged and supported to attend international conferences to broaden their knowledge about Global Health.

Chiesi Foundation also cooperates with local authorities to establish centres of excellence and formation (starting from the NEST Partners' hospitals), and formally recognize the trainings.

To summarize, training should be:

- Appropriate to the context (matching the reality on the ground)
- Formally recognized within country
- Continuous / part of a wider program
- South-to-South

Practice Box 2

Kangaroo Care (KC) Training of Trainers in Ngozi Province, Burundi

To strengthen and improve the coverage of the KC as a support to the newborns' development, contributing both to the baby's survival and thrivingness, the Chiesi Foundation and its partner Amahoro Pro-Africa have developed a Pilot Project on the diffusion of the KC in the Ngozi Province, Burundi, which consists of the following steps:

- Development of the training materials (KC Manual) based on the international guidelines and framework, including the Fundación Canguro. The Manual is intended for training the trainers to enhance the capacity of the local healthcare personnel and promote South-to-South learning.
- The efficacy of the training materials was tested together with the Ngozi Hospital healthcare personnel, in one training session held in December 2022, where the local staff could give the inputs to improve the materials.
- The process of training cascading was launched in early 2023: once the Ngozi Hospital was trained as the centre of excellence for KC, its staff is now training the KC responsible staff of other hospitals.
- The training foresees theoretical training as well as practical work experience at the Ngozi Hospital.
- The KC responsible staff of the birth centres, together with the Ngozi Hospital mentors, will acquire the leadership and develop a strategy on how to implement the KC in their facility.
- A shorter version of the training materials has also been developed by the local staff to adapt the training to the context.

Furthermore, the Chiesi Foundation sponsored the Ngozi Hospital's Chief of Neonatal Unit to attend the XIII International Congress on Kangaroo Mother Care in Madrid, a 4-day congress held at University Hospital 12 de Octubre in October 2022. The International Conference on Kangaroo Mother Care is the only international event entirely focused on Kangaroo Mother Care. Here, the Chief of the Neonatal Unit of Ngozi Hospital had the chance to interact and exchange knowledge with both members of the clinical and academic communities from across the world and presented the fieldwork through a scientific poster.

As capacities can be built in diverse ways and at different levels, the Chiesi Foundation will also support its partners in their **organizational development** to enhance their efficiency and the impact of their work.

Practice Box 3

Organizational Development – the African Neonatal Association

To contribute to the development of local networks and associations, the Chiesi Foundation has supported the establishment of the African Neonatal Association (ANA), a not-for-profit voluntary professional organization that acts as an important voice for neonatal care in Africa, with active membership across the continent. Thanks to the support of the Chiesi Foundation, the ANA developed and launched its website, registered its office in Kigali, Rwanda, started the recruitment of a professional administrator and launched a scientific journal, both in English and French.

https://africanneonatal.org

NEST Partners' Hospitals will be encouraged to embed data-driven quality improvement to enable them to monitor progress and identify ongoing development interventions.

Finally, to enhance the capacities of the local healthcare personnel, it is also crucial to break down the language barriers and guarantee equal access to learning resources to non-English speakers (see paragraph 5. Equitable access to resources).

Useful resources:

- NEST360 SSNC Implementation Toolkit: Human Resources – Workforce education
  https://www.newborntoolkit.org/toolkit/human-resources/workforce-education?tab=overview&language=en
- WHO Essential Newborn Care Course 2
  https://www.who.int/tools/essential-newborn-care-training-course

B. INFRASTRUCTURES AND SPACES

AIM: To improve the functionality of the neonatal service, in terms of infrastructure and spaces.

HOW: Majority of the units and wards had been created with the idea that keeping the newborns separated from their families would reduce the infections. However, it is actually the contrary: it has been proved that a crucial practice for safe and healthy birth is keeping mothers and newborns together, which ensures unlimited opportunities for skin-to-skin care (SSC) and breastfeeding.[10] Therefore, it is paramount to shift from this idea to the zero-separation and continuity of care. When possible, the organization concentrates its efforts on re-organizing the existing spaces rather than financing renovations and constructions.

Infrastructure has to ensure that families have access to beds, food, bathing, and toilet facilities throughout the baby's hospital stay. Services need to be planned as mother-baby wards, as the goal is to keep the baby warm and fed. Only babies who need special care should be in the NICUs. This would allow the creation of more room in the special units to ensure zero-separation between the family and the newborns and be organized as maternal-newborn intensive care units (M-NICUs).

Involvement of the decision makers is fundamental to setting up the hub & spoke model, instituting a referral and back-referral system, crucial to decongesting the spaces and allowing more room for family-centred care. Referral implies transport to and from the hub. Although the Chiesi Foundation will not concentrate its resources on the transportation itself, training and sensitization on zero-separation and the golden hour[11] must be carried out.

Useful resources:

- NEST360 SSNC Implementation Toolkit: Infrastructure – spaces and design
  https://www.newborntoolkit.org/toolkit/infrastructure/space-and-design?tab=overview&language=en
- WHO Standards for improving quality of care for small and sick newborns in health facilities (EN/FR)
  https://apps.who.int/iris/bitstream/handle/10665/334126/9789240010765-eng.pdf?sequence=1&isAllowed=y

10 Jeannette T. Crenshaw, DNP, RN, IBCLC, NEA-BC, LCCE, FACCE, FAAN. Healthy Birth Practice #6: Keep Mother and Newborn Together—It's Best for Mother, Newborn, and Breastfeeding. J. Perinat Educ. 2019 Apr 1; 28(2): 108 -115.

11 Recommendations made by several scientific bodies advocate for adoption of evidence-based interventions during the first 60 min of postnatal life, also known as the 'Golden Hour', to better support the fetal-to-neonatal transition.

C. EQUIPMENT & COMMODITIES

As mentioned in the Implementation Toolkit for Small & Sick Newborn Care, when implementing quality small and sick newborn care, the following considerations in relation to medical supplies and devices must be taken:

- Requirements. Essential medicines, supplies and devices need to be selected in the right quantities to meet the needs of the target population.
- Planning & Management. Medicines, consumables and medical devices need to be procured correctly and require specialized training for hospital managers, clinicians and biomedical engineers. Input from clinicians, biomedical engineers, and nursing staff must be cardinal prior to procuring the medication and devices.
- Operation and Maintenance. Medical supplies and devices require strong supply chains to be established with stock management procedures in place so that they are readily accessible. Furthermore, tools to monitor device usage and longevity need to be established to ensure the medical devices are in the right condition to be utilized.
- Innovation. Research has shown that the existing market lacks affordable, rugged technologies to meet clinical needs, especially in low-resource settings. Efforts are needed to continually assess the evolving technology landscape and prioritize the development of innovations to fill technology gaps. Often, multi-disciplinary partnerships are required for effective technological innovation with contextual needs factored into the planning behind the innovations.[12]

AIM: To evaluate basic equipment for neonatal care, in terms of simplicity, adaptability, costs and maintenance.

HOW: In partnership with the NEST partner hospitals, the Chiesi Foundation will support the provision of simple, low-cost, easy-to-use-and-maintain equipment, which is appropriate for the context and the level of the facility. It is crucial to be aware of the level of care the facility can offer, to understand the technological package needed in each facility.

To encourage Family Participatory Care, the NEST Partners' Hospitals in partnership with the Chiesi Foundation identifies local providers of resources to support the comfort of the mother, the baby and the family (e.g., reclining bed and chairs, stools to lift the feet,

12 The Implementation Toolkit for Small and Sick Newborn Care *https://www.newborntoolkit.org/toolkit/equipment-commodity/overview?tab=Overview*

Practice box 4

Kangaroo Care beds in Burkina Faso

In the Kangaroo Care Unit of the Saint Camille Hospital of Ouagadougou (HOSCO), Burkina Faso, mothers used to lay down on mattresses on the floor, with consequences of discomfort for those who were reluctant to keep their babies on their chest and exacerbating hygiene issues.

To solve the issue the Chiesi Foundation supported the HOSCO for the purchase of 10 kangaroo beds. The Hospital has commissioned the production to a local craftsman who built washable and reclinable beds of which 8 have been placed in the KC Unit and 2 in the nursing room where mothers go to feed their babies.

This is an example of cost-efficient activity: with a very limited budget (approx. €1,500).

Mothers tend to spend more hours practicing KC.

Practice box 5

Producing equipment suitable to the context – the NaCLO30 in Benin

Infections are the main pathology among the newborns in the Saint Jean de Dieu Hospital of Tanguiéta, Benin. With this awareness, the Chiesi Foundation and the Hospital started a 3-year hygiene program to prevent and control nosocomial infections and reducing baby mortality. It is within this project that the Chiesi Foundation has begun its collaboration with Medivac to finance the purchase of two NaCLO30 systems to be donated to the Hospital, with the aim of countering the rapid spread of infections.

The NaCLO 30 is an innovative machine to produce sodium hypochlorite, one of the most widespread and effective disinfectants. This machine is particularly suitable for contexts with limited resources, as it is simple to use and transport, and based on a few resources (water, salt and electricity).

binder to keep the baby in skin-to-skin contact and Kangaroo Mother Care kits).

If necessary, the Chiesi Foundation can fund some basic and appropriate technologies, but only when it is justified by the needs assessment and with the understanding that the NEST Partners' Hospitals will provide ongoing maintenance and repair to ensure the longevity of the technology.

Every time a technology is acquired, it is necessary for the supplier to provide training to the NEST Hospital staff, this training will include the correct use and maintenance of the equipment. NEST Partners' Hospitals have to identify the technicians/clinical engineers who will be responsible for the maintenance and repair of the equipment. This will ensure accountability and sustainability.

Useful resources:

- NEST360 SSNC Implementation Toolkit: Medical Devices & Supplies - Overview (EN/FR)
  https://www.newborntoolkit.org/toolkit/medical-supplies-and-devices/requirements?tab=overview&language=en
- WHO. Interagency List of Priority Medical Devices for Essential Interventions for Reproductive, Maternal, Newborn and Child Health (EN/FR)
  https://www.who.int/fr/publications/i/item/9789241565028
- WHO Medical device technical series. Needs assessment for medical devices (EN/FR)
  https://www.who.int/fr/publications/i/item/9789241501385
- WHO Medical device technical series. Medical equipment maintenance programme overview (EN/FR)
  https://www.who.int/publications/i/item/9789241501538
- PATH Oxygen Delivery Toolkit
  https://www.path.org/our-impact/resources/oxygen-delivery-toolkit-user-guide/

D. DATA SYSTEM

AIM: To implement a system of data recording and management (statistics, medical records, etc.) to monitor progress.

HOW: Data collection is important to monitor progress, improve care, learn from their own practice, collaborate efficiently with other health centres, and advocate for resources.

Quite often, in the Global South, data are scarce and the understanding of the importance of data is missing. The Chiesi Foundation works towards a cultural/behavioural change, empowering the local healthcare workers to collect and use data accurately.

E. COMMUNICATION: ADVOCACY & SENSITIZATION

AIM: To enhance communication at different levels: within the hospital, with families, and with institutions.

HOW: At the hospital level, it is important that healthcare professionals communicate effectively and systemically, not only within the same ward but also among different services to ensure the continuum of care. The concept of Maternal, Newborn and Child Health (MNCH) continuum of care assumes that the health and well-being of mothers and newborns are closely linked and should be managed in a unified way.

An effective continuum of care connects essential maternal, newborn, and child health packages throughout adolescence, pregnancy, childbirth, and the postnatal and newborn periods, building upon their natural interactions throughout the lifecycle. To do this,

Practice box 6

The IMProving qUaLity and uSE of newborn indicators (IMPULSE study)

The IMPULSE study focuses on improving the quality and use of newborn and stillbirth indicators. The project is currently ongoing in four African countries: Central African Republic, Ethiopia, United Republic of Tanzania, and Uganda.

The project is coordinated by The London School of Hygiene & Tropical Medicine (LSHTM), in collaboration with Doctors with Africa CUAMM, the WHO Collaborating Center in Maternal and Child Health IRCCS Burlo Garofolo Trieste Italy (WHO CC Trieste), Makerere University School of Public Health, Uganda (MAKSPH), Ifakara Health Institute, Tanzania (IHI), in collaboration with WHO and UNICEF, and it is funded by the Chiesi Foundation.

The IMPULSE study aims at improving newborn routine data quality and use in low- and middle-income countries for Every Newborn to survive and thrive. Specific aims are as follows:

- To analyse the current data systems to generate evidence on effective, sustainable tools and methods to assess and improve the availability, quality, and use of newborn data in four countries in sub-Saharan Africa, with an emphasis on small and sick newborns (SSN) care.
- To promote data use in national and international policies to contribute to improving the health and well-being of newborns including SSN in neonatal intensive care.

Our partnership will generate evidence which can be used by national governments. international agencies, and development partners, to develop strategies to improve the use of high-quality newborn data, and by that, contribute to reducing newborn mortality as for the Sustainable Development Goal 3.2 so *Every Newborn survives and thrives.*

IMPULSE
IMProving qUaLity and uSE of newborn indicators

the Chiesi Foundation and its partners must strengthen the linkages between the home, first-level facilities, and hospitals, assuring that appropriate care is easily accessible.

Good communication with health workers is essential to enable parents and staff to understand their respective roles and facilitate parents' involvement in caring for the baby.

To amplify its voice, in 2023 the Chiesi Foundation joined the Partnership for Maternal, Newborn & Child Health (PMNCH). PMNCH is a global alliance that works to advance the health and well-being of women, newborns, children, and adolescents. Advocacy within PMNCH focuses on various aspects to promote the health and rights of these populations:

- Policy Advocacy: PMNCH engages in advocacy efforts aimed at influencing policies at national and global levels. This includes advocating for policies that prioritize maternal, newborn, and child health, ensuring that they receive adequate attention, funding, and resources.
- Global Health Agendas: PMNCH participates in shaping global health agendas, advocating for the inclusion of maternal, newborn, and child health priorities in international initiatives, such as the Sustainable Development Goals (SDGs), global health forums, and various health-related conventions.
- Stakeholder Engagement: The partnership fosters collaboration among diverse stakeholders, including governments, NGOs, healthcare providers, academia, civil society, and the private sector. Advocacy involves engaging these stakeholders to work collectively towards improving maternal, newborn, and child health outcomes.
- Resource Mobilization: PMNCH advocates for increased investment and resource mobilization in maternal, newborn, and child health programs. This includes advocating for funding from governments, donors, and other sources to support initiatives focused on these populations.
- Evidence-Based Advocacy: PMNCH uses evidence and research to advocate for effective interventions and policies. It promotes the dissemination of data and research findings to highlight the impact of various interventions on maternal, newborn, and child health outcomes.
- Community Empowerment: Advocacy efforts within PMNCH also aim to empower communities by promoting health education, raising awareness about maternal and child health issues, and encouraging community participation in advocating for improved healthcare services.

Practice box 7

PMNCH has launched the Collaborative Advocacy Action Plans (CAAPs) initiative

The CAAPs are focused on creating more effective and impactful information sharing and engagement among a wide range of stakeholders.

In order to help facilitate this process, PMNCH has also launched a series of Digital Advocacy Hubs (DAH) as the world's most comprehensive digital advocacy platform for Women's, Children's and Adolescent's Health, ensuring partners have continuous access to high-quality, timely knowledge and information, along with opportunities to bolster their skills, networks, sharing resources and capacities for effective advocacy.

Since 2024, Chiesi Foundation is supporting the CAAP in Senegal, which is led by Amref.

A country hub will be especially created for Senegal.

Through these advocacy strategies, PMNCH works to drive political commitment, mobilize resources, and create supportive environments that prioritize the health and well-being of women, newborns, children, and adolescents globally.

F. GUIDELINES AND PROTOCOLS

AIM: To develop a set of protocols, manuals and guidelines for the NEST Partners' Hospitals and their perinatal network.

HOW: It is important that the Foundation supports the NEST partner hospitals and the other healthcare facilities within the area to develop practical protocols or procedures that can be summarized in user-friendly tables and schemes.

To do so, the local team should prioritize subjects according to what emerged from the need assessment (e.g., nutrition, thermal protection, infections, etc.) and a set of indicators should be developed for each topic. Where possible, this process has to be informed by international guidelines and standard documents.

To harmonize local policies with international guidelines, the Chiesi Foundation collaborates with local stakeholders (e.g., the African Neonatal Association) to strengthen their voice while advocating towards the institutions.

3.2.2 The Action Plan

In the second step of the NEST model's approach, we focus on the Action Plan. This plan is a structured method that outlines the necessary steps to respond to the needs, gaps, and challenges identified during the needs analysis for each domain. It serves as a roadmap for prioritizing, addressing, and implementing solutions in a systematic manner. Below is the framework for developing an action plan based on a needs analysis:

1. Review the Needs Analysis Findings

OBJECTIVE: Understand the key insights and data gathered in the needs analysis.

ACTIONS:

- Revisit the needs analysis report and summary to clarify the problems or areas requiring attention.
- Identify the most pressing needs and prioritize them based on factors such as urgency, impact, and resources required.

2. Set Clear Objectives, expected results and activities to develop the solutions

OBJECTIVE: Define what you want to achieve by addressing the identified needs and outline the specific interventions in order to do so.

ACTIONS:

- Brainstorm and evaluate potential interventions for addressing each priority need. Choose evidence-based, practical, and sustainable interventions.
- Develop the intervention by establishing Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) goals.
- Develop a set of activities that will allow to achieve the goals and outline the expected results from the implementation of these activities.
- Define a realistic timeline for the implementation of the activities and set clear deadlines.

3. Identify Resources and Stakeholders

OBJECTIVE: Determine what resources, people, and support are needed to implement the plan.

ACTIONS:

- Identify the key stakeholders (e.g., team members, departments, external partners) involved in the implementation process.
- Assess available resources (e.g., budget, time, materials, skills).
- Identify any gaps in resources and make plans for acquiring them.

3.2.3 The implementation

After the development of the Action Plan, the third step is to implement the activities, and the strategies laid out in the Action Plan. It is crucial to ensure clear accountability for the implementation of each aspect of the action plan:

- Begin executing the tasks, ensuring adherence to timelines and responsibilities.
- Monitor the implementation process to ensure it stays aligned with the overall objectives.
- Address any unforeseen challenges that may arise during execution.

During the implementation it is pivotal to continuously track the progress of the action plan and adjust it as needed and communicate progress to key stakeholders involved.

3.2.4 Quality monitoring

To successfully implement the action plan and achieve the set objectives, it is essential to ensure continuous improvement through evaluation and feedback. During the development of the action plan, it's important to create a detailed timeline that outlines key milestones, deadlines, and metrics for tracking progress. This will enable effective monitoring of the implementation process. **Monitoring** involves the ongoing collection of data regarding project activities, outputs, and outcomes to assess progress toward the planned goals and objectives. It is a continuous, real-time activity that helps project teams stay on track and make necessary adjustments as needed.

Below are the key components of Monitoring:

- **Indicators:** Define measurable indicators that reflect the project's goals. These can be quantitative (e.g., number of patients reached) or qualitative (e.g., participant satisfaction).
- **Data Collection Tools:** Choose appropriate tools and methods for collecting data (surveys, interviews, focus groups, observation, etc.).
- **Frequency:** Establish a schedule for collecting data (daily, weekly, monthly, etc.)
- **Responsibility:** Assign roles for data collection, reporting, and analysis to ensure accountability.
- **Data Management:** Ensure proper storage, management, and analysis of data to support decision-making.

Once the implementation is complete, it is essential to conduct an Evaluation. This process involves assessing the outcomes and impacts of a project or program to determine its effectiveness, relevance, and sustainability.

The findings from both the monitoring process and the evaluation will provide stakeholders with insights into best practices and lessons learned. This final phase of quality monitoring is referred to as "Learning." It involves using the data and insights gathered during monitoring and evaluation to adapt, improve, and enhance future project implementation. This ensures that the knowledge gained during the project is integrated into future activities and decision-making.

3.3
Chiesi Foundation's role

National and sub-national contexts shift and vary. Each country includes territories with diverse healthcare facility characteristics, and levels of financial and human resources.

Therefore, the NEST model is developed by taking a context-specific approach, and it can be tailored to different needs, capacities, and priorities, with a multi-level approach:

- Hospital level: working with healthcare professionals and the directors of the hospitals.
- Institutional level: involving local and national institution, including the departments of the Ministry of Health in charge for maternal and newborn health.
- WHO and UN agencies: different relationships at central, regional and local levels.
- Chains and networks: engaging with different stakeholders, including Key Opinion Leaders, professional associations and civil society organizations to create perinatal networks.

The development of the NEST Model is based on a collaborative approach, involving groups of technical experts (e.g., neonatologists, nurses, etc.) to support the scientific aspects of the project, nonprofit organizations and other stakeholders with expertise in the field.

The Chiesi Foundation collaborates with numerous partners within both the private and the public sectors. It also leverages its network of international neonatologists and healthcare professionals with long-lasting experiences in low-resource neonatal settings.

The most important and direct partners for the implementation of the interventions are the local hospitals which decide to embrace NEST, as well as local associations (e.g., the African Neonatal Association), who have a representation across the entire African continent.

Even though the Chiesi Foundation does not directly implement the NEST, it has an active role in the application of the model: in addition to being a grant-making organization, the Foundation accompanies its partners in their path towards change.

To accelerate change and address gaps in quality care for every newborn, a coordinated approach is essential. As said, the Chiesi Foundation serves as a catalyst, bringing together various stakeholders at different levels to foster connections and create opportunities, with the long-term goal of establishing a structured Community of Practice of Experts working in the Global South that can also contribute to overcoming language barriers and bridging the gap between the anglophone and francophone communities in Africa.

3.4
The NEST Model and the climate crisis

Climate change is a most relevant environmental crisis which entails also economic, social, and cultural issues. It is a systemic emergency threatening social justice, peace, security and global health. The World Health Organization defines climate change as the single biggest health threat humanity is facing (WHO 2021). The climate crisis is undermining global health strategies to reduce neonatal mortality, as it is significantly associated with serious adverse pregnancy outcomes, such as preterm birth, low birth weight and stillbirth.[13]

Furthermore, climate change has multifaceted impacts on newborn health, primarily through its influence on environmental conditions, healthcare systems, and community well-being.

1. Environmental Risks: Climate change contributes to extreme weather events, such as heatwaves, floods, and storms, which can directly affect newborn health. These events may disrupt healthcare services, damage infrastructure, and compromise access to essential care during critical periods for newborns.
2. Air Quality: Poor air quality due to increased pollution and wildfires associated with climate change can negatively impact newborns' respiratory health. Exposure to air pollutants can lead to respiratory illnesses and exacerbate conditions such as asthma, affecting the vulnerable respiratory systems of newborns.
3. Vector-Borne Diseases: Changes in temperature and precipitation patterns affect the distribution and prevalence of vector-borne diseases like malaria, Zika virus, and dengue fever. Newborns are particularly vulnerable to these diseases due to their developing immune systems.
4. Food and Water Security: Climate change affects food and water security, potentially leading to malnutrition and waterborne diseases among newborns and their mothers. Limited access to clean water and nutritious food compromises newborns' health and development.
5. Healthcare System Challenges: Extreme weather events and changes in disease patterns strain healthcare systems, impacting their ability to provide adequate care for newborns. Disrupted infrastructure and overwhelmed facilities may lead to delays or a lack of essential care.
6. Mental Health Impact: Climate-related disasters and uncertainties can have long-term mental health effects on caregivers and families, indirectly impacting newborns' well-being through disrupted caregiving and stress.

Addressing the intersection of newborn health and climate change requires a multi-pronged approach:

- Adaptation and Resilience: Strengthening healthcare systems' resilience to climate-related challenges is crucial. This includes disaster preparedness, infrastructure improvements, and ensuring continuity of care during crises.
- Mitigation Efforts: Implementing strategies to reduce carbon emissions and mitigate climate change can indirectly benefit newborn health by preserving environmental conditions.
- Community Empowerment: Educating communities about climate-related risks and promoting adaptive measures can help protect newborns and caregivers from climate-related health threats.

13 Bruce Bekkar, MD1 ; Susan Pacheco, MD2 ; Rupa Basu, PhD3,4 ; et al, JAMA Netw Open. 2020;3(6) : e208243. doi : 10.1001/jamanetworkopen.2020.8243

Section 4

COUNTRIES

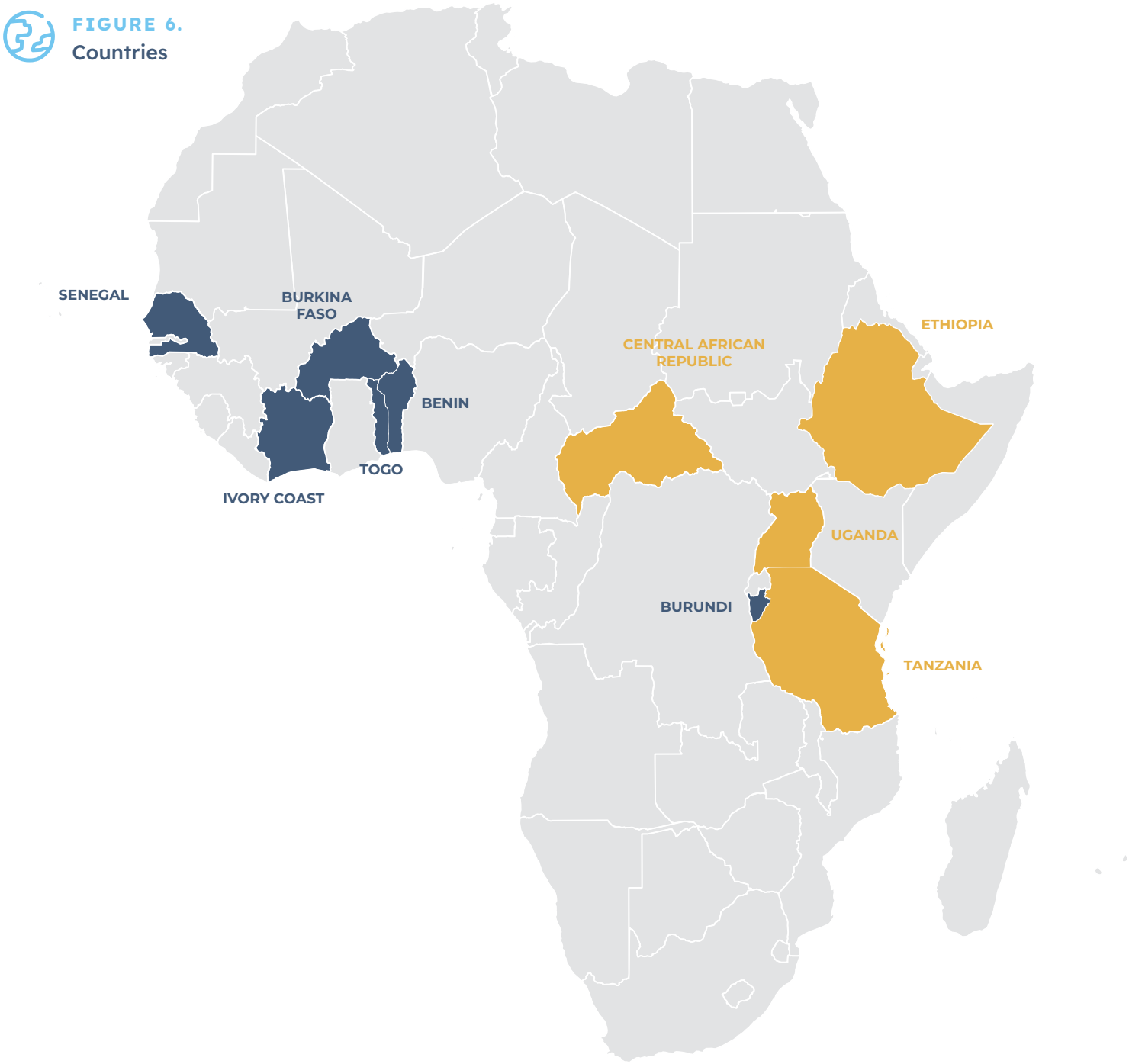
The Chiesi Foundation and its partners implement the NEST Model in five sub-Saharan French-speaking African countries, namely: **Benin, Burkina Faso, Burundi, Ivory Coast, and Togo.**

A specific advocacy initiative, in line with the NEST Model, is supported in Senegal through a partnership with PMNCH.

Furthermore, in line with the principles set out in the NEST Model, the Chiesi Foundation is funding a 5-year study to improve the quality and use of newborn data in sub-Saharan Africa. The IMPULSE study is carried out by the London School of Hygiene and Tropical Medicine, CUAMM and the WHO Collaborating Centre Burlo Garofolo in Central African Republic, Ethiopia, Tanzania, and Uganda (see Practice Box No. 6).

The implementation of the NEST Model, in the above-mentioned countries, leverages the lessons learned and good practices gained through the path conducted by some exemplar countries in Africa, such as Senegal.

FIGURE 6.
Countries



Practice box 8
Senegal, an exemplar in neonatal mortality reduction

Exemplar countries for neonatal mortality are defined as those having demonstrated exceptional progress at reducing the Neonatal Mortality Rate.[14] Senegal has made remarkable strides in reducing neonatal mortality, setting an example for other nations.

The estimated Neonatal Mortality Rate in Senegal shows an average annual reduction rate (AARR) of 2.8% from 2000 to 2021,[15] almost halving from 38 to 21 neonatal deaths per 1,000 live births.[16]

Although the leading causes of neonatal death in Senegal remain prematurity, birth asphyxia/trauma, and sepsis/infections, they have seen a drastic reduction since 2000.

To achieve these remarkable improvements, Senegal has been concretely prioritizing reproductive, maternal, and newborn health, implementing new policies, and enhancing access to quality care, through a combination of strategic interventions, community engagement, and improved healthcare infrastructure. Key factors contributing to this success include:

A. Healthcare Initiatives: Senegal implemented various healthcare programs focusing on maternal and child health, specifically:

- In-facility delivery: it has increased to 80.4%.[17]
- Skilled birth attendance: it has increased up to 74.5%[18], thanks to community engagement.
- Cesarean section reached 6.9% nationally in 2019.
- Maternal postnatal and neonatal care: 71.5% newborns are receiving care within the first hour of life[19], increasing breastfeed.

Simultaneously, the country put into action programs on antenatal care coverage and quality, contraception access and post-abortion.

B. Community Involvement: Senegal fostered partnerships with local leaders, traditional birth attendants, and community health workers. Senegal engages local communities by training and employing community health workers, making healthcare more accessible at the grassroots level. These workers provide education and basic healthcare services, and facilitate referrals when necessary.

14 Exemplars in Global Health *https://www.exemplars.health/topics/neonatal-and-maternal-mortality/senegal/why-is-senegal-an-exemplar*

15 Healthy Newborn Network, 2023 *https://www.healthynewbornnetwork.org/country/senegal/*

16 United Nations Inter-agency group for Child Mortality Estimation (UN IGME), 2022.

17 US Agency for International Development. The DHS Program STATcompiler, 2022

18 Healthy Newborn Network, 2023

19 Ibidem

C. Health Infrastructure Improvement: Senegal invested in upgrading healthcare facilities, especially in rural areas, ensuring better access to essential maternal and neonatal health services. This led to increased institutional deliveries and access to medical care for mothers and newborns. Infrastructure improvements were made also in terms of Human Resources: the number of practicing nurses and midwives grew up to 8,807 while doctors were 1,435 in 2019.[20]

D. Education and Awareness: Senegal invests in health education initiatives aimed at empowering caregivers, mothers, and communities with knowledge about neonatal health practices, encouraging early care-seeking behaviour and adherence to essential healthcare routines. Senegal emphasized education about maternal and child health, promoting prenatal and antenatal care, breastfeeding, and hygiene practices. This increased awareness among caregivers and families, leading to better care for newborns.

E. Policy Implementation: as mentioned in the previous points, the Senegalese government enacted policies aimed at reducing neonatal mortality, emphasizing the importance of skilled birth attendance, immunizations, breastfeeding, and early detection of neonatal illnesses. Furthermore, Senegal has taken steps to reduce financial barriers by implementing policies such as subsidizing healthcare costs for vulnerable populations, offering free or low-cost services for maternal and neonatal care, and providing health insurance coverage to expand access.

It is important to outline that Senegal has made concerted efforts to promote equity in neonatal care, aiming to ensure that all individuals, regardless of socio-economic status or geographic location, have access to quality healthcare services for newborns.

For more information, please visit: https://www.exemplars.health/topics/neonatal-and-maternal-mortality/senegal

20 World Health Organization, Global Health Observatory

Section 5

EQUITABLE ACCESS TO RESOURCES

As mentioned in the above chapters, the ability to access resources is unequal across countries of the Global South, with particular reference to sub-Saharan nations. Various factors contribute to this inequity, one of them being the language barrier. Indeed, due to the dominance of English in global health approaches, many resources are available only in English, while only 24 out of 54[21] African countries use English as one of their main languages. This implies that a large part of the African population cannot access widely available resources and tools, thus missing opportunities for learning and exchange, and exacerbating the inequalities between English-speaking and French-speaking African countries.

To reduce this gap, the Chiesi Foundation is committed to breaking down barriers and ensuring equitable access to resources, not only by advocating towards key stakeholders on the importance of engagement of non-English speaking countries, but also funding the translation of useful resources:

- To ensure Francophone African countries access to the "Implementation toolkit for small and sick newborn care" promoted by the NEST360 in partnership with Unicef, the Chiesi Foundation supported the translation of the toolkit into French. In 2021, NEST360 and UNICEF launched the Small and Sick Newborn Toolkit, bringing together tools, readings, and learnings to provide a one-stop site for implementers to learn, act, and share. The Toolkit is an open-access, online resource hub and is intended as a global good hosted on a neutral domain. The SNNC Toolkit, however, was only available in English, therefore in 2022, the Chiesi Foundation partnered with the London School of Hygiene and Tropical Medicine (LSHTM), one of the major promoters of the SSNC Toolkit, to translate the Toolkit into French. The translation was supervised by Professor Ousmane Ndiaye, a Senegalese neonatologist and vice-president of the African Neonatology Association, at the head of a technical working group of over one hundred actors, including doctors, nurses and key opinion leaders, operating in the neonatal sector in Africa. The group provided important strategic insights on the French-speaking African context, which enabled effective translation of the toolkit. The French version of the SSNC Toolkit was officially launched in May 2023 during the International Maternal and Newborn Health Conference, while Professor O. Ndiaye has supported the promotion of the French-language toolkit within the French-speaking neonatal fora.
- The Chiesi Foundation took another significant step towards equitable access to resources by funding and supporting the translation of the "WHO recommendations for care of the preterm or low-birth-weight infant" and the essential document "Kangaroo Mother Care: a transformative innovation in healthcare." These documents, published by the World Health Organization in 2022 will be available in French at the beginning of 2024. Recognizing that disseminating critical information is essential for enhancing care and survival for premature newborns globally, the Chiesi Foundation's commitment extends to making WHO recommendations accessible to both Anglophone and Francophone communities. The translated documents will act as a bridge, narrowing linguistic gaps and fostering collaboration, which is necessary to achieve the goals set by the 2030 Agenda.

21 Number of countries recognized by the United Nations

Section 6

GLOSSARY

1. **CAAPs (Collaborative Advocacy Action Plans)**
   Initiatives led by the PMNCH focused on creating effective information sharing and engagement among different constituencies of stakeholders pursuing accountability for Women's, Children's, and Adolescents' Health.
2. **ENAP (Every Newborn Action Plan)**
   A roadmap for action to end preventable maternal and newborn mortality, reduce disability, and end preventable stillbirths.
3. **EPMM (Ending Preventable Maternal Mortality)**
   A plan that sets out recommendations for countries to improve access to quality services and reduce maternal and newborn mortality.
4. **Family Participatory Care**
   A care model that promotes a partnership between the family and neonatal unit staff, encouraging the family's constant presence and involvement in the baby's care.
5. **Golden Hour**
   The first 60 minutes after birth, considered crucial for supporting the fetal-to-neonatal transition.
6. **IMNHC (International Maternal Newborn Health Conference)**
   A conference that brings together stakeholders to discuss and promote maternal and newborn health.
7. **IMPULSE (IMProving qUaLity and uSE of newborn indicators)**
   A research project financed by the Chiesi Foundation and aimed at improving the quality and use of newborn and stillbirth indicators in sub-Saharan Africa.
8. **KC (Kangaroo Care)**
   A method of care involving early, continuous, and prolonged skin-to-skin contact between the mother (or another caregiver) and the baby, with exclusive breastfeeding.
9. **LBW (Low Birth Weight)**
   Low birth weight is defined by the WHO as a birth weight of an infant of 2,499 g or less, regardless of gestational age. LBW newborns have added health risks which require close management, often in a neonatal intensive care unit (NICU).
10. **M-NICUs (Maternal-Newborn Intensive Care Units)**
    Specialized units that provide intensive care for both mothers and newborns.
11. **NaCLO30**
    An innovative machine, suitable for low-resource settings, that produces sodium hypochlorite an effective disinfectant.
12. **NEST (Neonatal Essential Survival Technology)**
    The NEST Model is a program developed by the Chiesi Foundation and carried out in collaboration with various hospitals, NGOs, institutions and universities, that aims to reduce neonatal mortality, particularly of premature, low birth weight or morbid babies in the Global South.
13. **NMR (Neonatal Mortality Rate)**
    The number of deaths of newborns within the first 28 days of life per 1,000 live births.
14. **PMNCH (Partnership for Maternal, Newborn & Child Health)**
    A global alliance that works to advance the health and well-being of women, newborns, children, and adolescents.
15. **Preterm birth**
    Preterm is defined as babies born alive before 37 weeks of pregnancy are completed. There are sub-categories of preterm birth, based on gestational age: extreme preterm (less than 28 weeks), very preterm (28 to less than 32 weeks), moderate to late preterm (32 to 37 weeks).
16. **SDGs (Sustainable Development Goals)**
    A set of 17 global goals established by the United Nations in 2016 to promote sustainable development, including ending preventable deaths of newborns and children under five years of age.
17. **SSNC (Small and Sick Newborn Care)**
    Care provided to small and sick newborns, including essential interventions and specialized treatments.
18. **Stillbirth**
    A baby who dies after 28 weeks of pregnancy, but before or during birth, is classified as a stillbirth.
19. **UN IGME (United Nations Inter-Agency Group for Child Mortality Estimation)**
    A group established by the United Nations that publishes reports on child mortality trends and levels.
20. **Zero-Separation**
    A principle that emphasizes keeping parents and newborns together to ensure continuous care and bonding.

Section 7

ANNEXES

The table[22] below shows the requirements for newborn care at various levels of a health system.

LEVEL OF CARE	PRIMARY	SECONDARY	TERTIARY
	ESSENTIAL NEWBORN CARE	**SPECIAL NEWBORN CARE**	**INTENSIVE CARE**
STANDARDS OF CARE & EVIDENCE-BASED INTERVENTIONS	> Immediate newborn care through: • Drying • Skin-to-skin contact of the baby with the mother or caregiver • Delayed cord clamping • Hygienic cord care > Neonatal resuscitation (for those who need it) > Early initiation and support for exclusive breastfeeding > Routine care: • Vitamin K • Eye care and vaccinations • Weighing and clinical examination > Prevention of mother-to-child HIV transmission > KMC > Assessment, management, and referral of: • Bacterial infections, including treatment of Possible Severe Bacterial infection (PSBI) where referral is not possible • Jaundice and diarrhoea • Feeding problems • Birth defects and other problems > Pre-discharge advice on maternal and baby care and follow-up	> Thermal care > Comfort and pain management > KMC > Assisted feeding for optimal nutrition (cup feeding and nasogastric feeding) > Safe administration of oxygen > Prevention of apnoea > Detection and management of neonatal infection > Detection and management of hypoglycaemia > Detection and management of jaundice > Detection and management of anaemia, including blood transfusion > Detection and management of encephalopathy > Seizure management > Safe administration of intravenous fluids > Detection and management of birth defects *Transition into intensive care* > CPAP > Exchange transfusion > Detection and management of necrotizing enterocolitis (NEC) > Specialized follow-up of high-risk babies (including preterm)	> KMC > Advanced feeding support (e.g., parenteral nutrition) > Mechanical/assisted ventilation, including intubation > Screening and treatment for retinopathy of prematurity > Surfactant treatment > Investigation and management of birth defects > Paediatric surgery > Genetic services
HEALTH TECHNOLOGIES	> Linen/towels for drying and warming > Bag and mask resuscitation > Radiant heater, warmth source > Vitamin K, eye ointment > Thermometer > Immunization commodities > Oxygen > Pulse oximeter	> Oxygen supply, pulse oximetry and newborn oxygen accessories (e.g., oxygen concentrator and blenders) > Syringe pump and accessories (e.g., neonatal cannulae) > Feeding equipment (nasogastric tubers, cups/spoons) > Basic diagnostics (e.g., glucometer, urine dipsticks) and micro-methods > Medicines (e.g., antibiotics, caffeine, IV fluids, phenobarbital) > Mobile X-ray system > Warmers and cots > Effective phototherapy equipment (e.g., LED) > CPAP	*In addition to special care equipment and commodities* > Intermittent positive-pressure > ventilation, high flow oxygen via nasal cannula > Monitoring equipment > Surfactant therapy > Advanced medicines > Supplies for advanced nutrition support (e.g., total parenteral nutrition) > Specialist equipment and accessories

22 Human resource strategies to improve newborn care in health facilities in low and middle-income countries. Geneva: World Health Organization; 2021. License: CC BY-NC-SA 3.0 IGO

Chiesi Foundation is a philanthropic organization founded as an expression of the social responsibility of Chiesi Farmaceutici. The Foundation aims to support local-led development programs to reduce the neonatal mortality rate in French-speaking sub-Saharan African countries and improve the health of patients affected by chronic respiratory diseases in the Global South.

The Foundation supports international scientific research and develops programs to transfer medical-scientific knowledge at a local level and to empower families in the healthcare process, promoting sustainable development and ownership of local communities.

Founded in Parma (Italy) in 2005 and operational since 2010, the Foundation today operates in Benin, Burkina Faso, Burundi, Central African Republic, Ethiopia, Guyana, Ivory Coast, Nepal, Peru, Senegal, Tanzania, Togo, and Uganda.

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