Optimizing neonatal care at the Saint Camille Hospital, Ouagadougou (HOSCO), Burkina Faso

The impact of the Neonatal Essential Survival Technology (NEST) continuous quality improvement (QI) program.

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On behalf of the NEST Team



Neonatal Essential Survival Technology



Disclosure statement

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Employees of Chiesi Foundation Onlus were involved in the creation of the NEST program and its implementation at HOSCO.

The following authors have relevant conflicts to disclose:

- Merran Thomson undertakes paid consultancy work for Chiesi Farmaceutici S.p.A.
- Carmen Dell'Anna is an employee of Chiesi USA (an affiliate of Chiesi Farmaceutici S.p.A)
- Cecilia Plicco is an employee of the Chiesi Foundation Onlus and Chiesi Farmaceutici S.p.A
- Maria Paola Chiesi is a member of the Board of Directors and Coordinator of the Chiesi Foundation Onlus, and is a shareholder of Chiesi Farmaceutici S.p.A

The following authors have no relevant conflicts to disclose:

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Outline of this presentation

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 - Bukina Faso
 - Saint Camille Hospital, Ouagadougou (HOSCO)
 - The Nest program
- Interventions
 - Theory of Change
 - QI methodology
 - "Action plan"
- Progress (results)
 - Improvements
 - Challenges
 - Mortality
- What we've learnt
- What's next?

Neonatal mortality – "global health emergency"

- Sustainable Development Goals (SDG 3.2) - all countries should reduce neonatal mortality (NMR) to 12 deaths per 1000 livebirths or less by 2030
- Global NMR decreased by 51% from 36.6 in 1990 to 18.0 in 2017 (decreased from 5.0 million deaths per year to 2.5 million deaths per yr)
- West and Central Africa and South Asia - highest NMRs
- Between 2018 and 2030, it is project that 27.8 million neonates will die if the current rate of reduction in NMR is maintained



- More than 60 countries need to accelerate their progress to reach the neonatal mortality SDG target by 2030
- Accelerated improvements are most needed in sub-Saharan Africa and South Asia



Neonatal mortality – "global health emergency"









WE COULD PREVENT 2/3 OF NEONATAL DEATHS BY 2030

World Health Organization

Burkina Faso

- Landlocked country in West Africa (surrounded by six countries)
- 274,200 square kilometers
- Population 19,751,651 (UN estimate 2018)
 - Rural 70%
 - Population growth is high (3%)
 - 45% population <15yrs
- Recurring drought, food insecurity, limited natural resources = poor economic prospects for the majority
- Human Development Index rank 183 out of 188 countries (2014)
- Political and social unrest / violence including terrorist attacks in Ouagadougou (2014 onwards)
- Government introducing free healthcare in public hospitals for pregnant women and children <5 years
- Maternal mortality (2015) 371 per 100 000 live births [Range of uncertainty 257 - 509 (UI 80%)]
- Lifetime risk of maternal death 1 in 48 (cf 1 in 4900 developed regions)





Burkina Faso – Neonatal mortality (2017)

Solution IGME UN Inter-agency Group for Child Mortality Estimation



https://childmortality.org/data



Burkina Faso – Neonatal mortality (estimated reduction 1970-2017)

Section 1997 Section 2017 Secti

NEONATAL MORTALITY RATE - TOTAL

CHART ESTIMATES SOURCE DATA

NMR per 1000 live births (90% uncertainty intervals)



Saint Camille Hospital, Ouagadougou (HOSCO)



- Founded in 1967 by the Order of St. Camillus (Camillian Fathers)
- Neonatal unit opened in 1974
- By 2004
 - ~ 5000 births per year
 - ~900 admission to NNU
 - NNU 2 rooms equipped with 9 incubators (donated in early 1980s) and 50 cots
 - Mortality ~44%





Saint Camille Hospital, Ouagadougou (HOSCO)



- By 2010 1500 admissions (only NNU in BF)
 - 82% outborn
 - Oxygen, pulse oximeters, day-time lab and xray, phototherapy, weighing scales, breast pumps
 - Staff 1 head nurse + 5 nurses and 16 nursing assistants (ancillaries)
 - No medical staff day time cover if required from trainees on paediatric ward
 - Mortality 39%
 - 12 "training missions" between 2005-2010 by Italian neonatologists and nurses
- By 2014 1900 admissions (880 VLBW)
 - 86% outborn
 - Staff 2 senior paediatric trained nurses + 11 nurses and 26 nursing assistants (ancillaries)
 - 1 general physician day time cover
 - Mortality 43% (VLBW mortality 67%)

BUT no additional space





HOSCO and NEST partnership – 2014 onwards

Need a more structure approach to improve neonatal outcomes

- Current model of basic neonatal care would not impact mortality given the increasing complexity of case mix
- Need to develop "semi-intensive care"
- Referral centre for the city
- Severe overcrowding no space for babies, mothers, staff etc.
- HOSCO General Director Italian trained paediatrician and neonatologist
- New building
- New approach to neonatal care

Formalise the partnership between HOSCO and CFO to implantation the NEST model of care



What is NEST? Neonatal Essential Survival Technology Project

Long term program (2014)

- Improve the quality of care for sick, unwell, preterm and low birth weight babies in low resource countries
- "Model for Neonatal Care Unit" in suitable facilities
- Effective, sustainable, replicable, adaptable, adequate to the local context
- Provide appropriate "technologies"
 - Suit local context
 - Comprehensive and tailored training programs neonatal nurse
 - Empowerment of local staff
- Partnership with local health providers and governments
 - Collaboration
 - technical experts (e.g. neonatologist, nurses, engineers etc.)
 - non-profit organisation
 - private actors with relevant expertise





Theory of change

- Used by government agencies, international NGOs, the UN, and many other major organizations to promote social change in high, mid and low income countries.
- Defines long-term goals and then maps backward to identify necessary preconditions (actions / interventions).
- Causal analysis based on available evidence helps explain how a given intervention(s) are expected to lead to a specific change.



https://www.theoryofchange.org

HOSCO – assessment of need 2014-15

- Buildings and facilities
- People staff, mothers and families
- Equipment and drugs
- Networking and Collaboration
- Involvement of higher-level institutions within Burkina Faso



2015 – Cause and effect diagram (fish bone)





What did we want to achieved?

Guarantee an essential level of quality newborn care, in particular for sick, premature and low birth weight neonates, at birth, in the neonatal care unit and during the follow up at home

r∖est

Progress (results) – the building

June 2015 – March 2017

- Intensive room (5 cots)
- Semi-intensive room (10 cots)
- Pre-discharge room (15 cots)
- KMC room (6 cots)
- Triage (4 cots)
- Breastfeeding room
- Milk Kitchen
- Area for the staff
- 2 bathrooms for mothers

Each cot

- Centrally generated oxygen, air and vacuum
- Minimum 4 electric sockets (8 in intensive room)

Progress – the building

NNU relocated for 20 months into one room in the paediatric ward Difficult time – only space for 15 cots (pushed to 20)

Progress – the building

"Preparing to move in" – KMC chairs have arrived

Progress – the building April 2017

Progress - People

- Nurses
 - 2015 one nurse per shift (shared with paediatrics) + 24 nursing aids
 - 2019 phased increase dedicated nurses, 个2 per shift (14 total) +24 nursing aids (3-4 per shift)
 - Average occupancy = 35 babies and 3 admissions per day
 - Time for training
 - Staff turn over hard work leave for public hospital
 - Aim 4 dedicated nurses per shift (24 total) +24 nursing aids
- Doctors
 - 2015 1 general practitioner weekday mornings only
 - 2018 1 general practitioner weekday mornings only
 - Struggling to increase to 2 general practitioner and 1 paediatric specialist
 - Reliant on HOSCO Director
- Mothers and Families
 - ✓ KMC fully implemented
 - ✓ 2019 mothers 24/7 access to the NNU
 - Family centred care a work in progress

Progress – KMC, mothers and families

Progress – KMC mothers and families 2017-2019

2017 - dedicated KMC room 2018- dedicated staff "Beds" – a working progress

2017 - NNU KMC chairs 2019 – mothers 24/7 access

Progress - Equipment

- Identified appropriate equipment
- Analysis of existing equipment and creation of partnership with manufacturing companies
- List of appropriate equipment
 - Proved efficacy
 - Low need for maintenance
 - User friendliness
 - Low cost
 - Adaptability to local conditions

Develop a training package to ensure safe use and maintenance for each device

Accountable nurse

DOLPHIN A bubble CPAP machine for **neonatal patients** requiring **respiratory suppor**

Progress – Equipment 2019

Analysis, selection and validation of appropriate equipment to local context

Basic		Advanced		
•	 Thermal protection ✓ WATER HEATED MATTRESSES – KANMED ✓ RADIANT WARMER MTTS 	•	Respiratory support ✓ OXYGEN ADMINISTRATION (blender, HUMIDIFIER, etc.) ✓ CPAP – MTTS (2019)	
•	Hygiene ✓ HAND SANITIZATION OPTIMA - MTTS ✓ REUSABLE NAPPIES— TOTSBOTS	•	Neonatal transport TRANSPORT INCUBATOR AMBULANCE 	
•	 Oxygen, measurement and respiratory support ✓ PULSE OXIMETER— LIFEBOX ✓ LOW FLOW METER and NASAL PRONGS 	•	Other equipment ✓ INFUSION PUMPS ✓ CARDIO-RESPIRATORY MONITORS	
•	Jaundice ✓ JAUNDICE DIAGNOSTIC KIT ✓ PHOTOTHERAPY FIREFLY MTTS ✓ OVERHEAD PHOTOTHERAPY COLIBRI MTTS 		 ✓ INCUBATORS ✓ … 	
•	Resuscitation and stabilization at birth ✓ UP-RIGHT RESUSCITATOR and MASK, PENGUIN SUCTION DEVICE - LAERDAL		Acquired equipment – effectiveness test completed	

Equipment under evaluation

Research of partners/manufacturers

- ✓ NASOGASTRIC TUBES
- Neonatal transport
 - ✓ EMBRACE WARMER
- Breastfeeding
 - ✓ BREAST PUMPS, PLASTIC BAGS FOR STERLIZATION MEDELA

Progress – Essential Drugs

Objective

- To ensure availability of "appropriate and safe" essential drugs for neonatal care use
- To implement effective treatment protocols

Activities

- 1. Implementation of an appropriate supply chain for essential drugs, when not available
- 2. Development of the protocols for the correct use of essential drugs

Glucose/sucrose for pain	Nystatin
Caffeine for oral use	Antibiotics
Paracetamol for pain control	Vitamin K

- 3. Scientific validation of the protocols
- 4. Staff training

Current status:

Verification of the presence of these drugs in Burkina Faso - complete Testing of the effectiveness of the protocols Parental costs: Neonatal kit (~30 USD) Basic drugs N-g tubes, IV cannula Nappies Linen etc.

Plus "daily charge" 8.5UDS every 5 days

Progress – Guidelines and Protocols

- No written guidelines
- In 2016 the HOSCO NNU doctor with the support and mentorship of the NEST training team developed a set of guidelines
 - Resuscitation
 - Neonatal apnea
 - Use and dilution of antibiotics
 - Neonatal convulsions
 - Neonatal asphyxia
 - Nutrition volumes for small (< 1250g)
 and sick babies
 - Neonates with mothers with Hepatitis B
 - Hypocalcemia

- Recognition and treatment of jaundice
- Neonatal infection
- Solutes and electrolytes
- Oxygen therapy
- Indication for discharge
- Blood transfusion

<u>Develop + delivery of targeted program</u> Language - French (NEST multilingual) Specific focus on the role of nurses

- Essential Care*: (Warm, sweet, pink and safe)
- ✓ Resuscitation (HBB)
- Immediate care after birth
- ✓ Thermal care*
- ✓ Kangaroo Mother Care
- ✓ Breast feeding*
- Family-centred care/developmental care*
- Hygiene in healthcare *
- Triage and admission in the neonatal care unit
- Basic respiratory support (SO2, pulse oximeter, use of oxygen, etc.)
- Neonatal transport and referral

*developed in partnership with Birthlink

Procedures: IV cannulation, umbilical catheterization, etc.

BirthLink

External Training Visits

Targeted training and assessments covering clinical topics and equipment etc.

2017	2018
January	January
May	June
June	October
November	
	2017 January May June November

2019 January

"Training the trainer" model

Currently heighted level of security in BF has placed further visits on temporary hold

Admission of baby Image: Species of the same essential, basic care Warm, Sweet, Pink & Safe

SETTLING the baby after care

- The best place to settle your baby is resting against your chest (kangaroo care).
- If you are settling your baby in the bed rest your hands gently on your baby's head, shoulders or feet, keeping still until your baby is asleep.
- If your baby is awake after care and wants to be sociable this is a good time to talk softly and make eye contact.

BirthLin

The

Chiesi

Small group / large group Formal / bedside

Referring hospitals and birth centres now sending staff for training

Assess breathing – Look and listen

Is breathing noisy grupting Is there nasal flaring Is baby pink, dusky or pale Measure oxygen What is the breathing saturations rate Is there chest recession

Positioning

www.birthlinkuk.org

 \times Hands off the breast $\sqrt{}$

Progress – Training "Bite size"

- Training broken down into small sections
- Delivered in 10-15mins
- Packed in a "box"
- Instant education
 - Anywhere
 - Any time

Current status: ongoing

Pre and post testing

Nurses - improve

Nursing Associates - less so

Progress – Networking, Communication, Data

Records and Data analysis

- Case records standardised and kept (some of the time)
- Nurses record observations
- Annual data report (basic)
- ✓ All babies birth and death certificates
- ✓ 2018 hospital statistician appointed and contributing to national statistics

Internal communication and collaboration

- ✓ Improved with Labour Ward and Maternity
- ✓ Daily NNU meeting to plan workload etc.
- ✓ Handover

All interaction, initiated and lead by HOSCO Director with support of NEST if required

"External Perinatal Network" (>80% admissions outborn)

- ✓ Began to talk to local referral hospitals and birth centres in 2017 (initiated by HOSCO Director)
- ✓ Now informal network established with a referral process, joint NEST training, data collection
- X No transport (private car / taxi) often brought by family
- Meeting planned this month to "formalise" and discuss priorities for joint working i.e. shared guidelines, teaching and staff training etc.
- Ministry of Health may taken on Leadership and co-ordination

Progress – Higher level institutions

Professional bodies

All interaction, initiated and lead by HOSCO Director with support of NEST if required

- ✓ Société Burkinabe de Pediatriè (SOBUPED)— "endorsed HOSCO training, referral centre and network"
- Ministry of Health engaged (but not finance)

Formal neonatal nurse qualification (attaché de santè)

- Recognition = salary
- ✓ Discussion with University started in 2017 (with President of SOBUPED)
- Agreement to establish "Masters in Perinatology" but no start date as need to better define the program and faculty

Ministry of Health

- ✓ Interactions with NEST and HOSCO began in 2017
- ✓ Support for HOSCO as "referral centre" within a city wide network
- No Money provided

Challenges – the view of the HOSCO team

- Keep the project going given the "instability" within BF Contributes to nursing and medical shortages and many other functions of the neonatal service and wider hospital
- Establishing a functional Perinatal Network in Ouagadougou
- Continuing and expanding the training program at HOSCO and for the network
- How best to equip the NNU

Mortality

What has been achieved?

Guarantee an essential level of quality newborn care, in particular for sick, premature and low birth weight neonates, at birth, in the neonatal care unit and during the follow up at home

What next?

- CPAP complete training and roll out
- Better understand why babies die
 - Inborn
 - Data, Audit
 - ? Hypothermia ? Nutrition ? Infection? Insufficient staff ? Inexperienced staff
- Improve outcomes for outborn babies
 - Network
 - Training and support
 - Transportation
- > Engage institutions (Ministry of Health, University)
- Focus on the neonatal nurse and the family

What next?

Survive and Thrive Key findings document published in 2018

Awaiting publication full document

In development:

- Standards
- Clinical guidelines
- Outcome framework + matrix

✓ NEST program is well positioned for the future direction

Thank you

Staff at HOSCO

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IN development

- Management of jaundice
- Feeding of preterm newborns including intravenous fluids
- Treatment of infections, including management of fever and NEC
- Family cantered care (as a further development of kangaroo mother care)
- Respiratory distress, Oxygen therapy, neonatal apnoea and use of pulse oximeters
- Advanced/non-invasive respiratory support and introduction to CPAP (Continuous Positive Airway Pressure)
- Management of neonatal complications such as convulsions, neonatal asphyxia, etc