Newborn Individualized Developmental Care and Assessment Programme (NIDCAP)

Islamic Republic of Iran
2013 – 2018

External final evaluation

EVALUATION TEAM
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The evaluation team appreciates the time that every single stakeholder has granted us for the interviews. The evaluation team wishes to convey their admiration for the work of all those who protect children's rights, assist communities in need and promote humanitarian principles as well as universal values under challenging circumstances.

ACRONYMS

AAP	American Academy of Paediatrics
APIB	Assessment of Preterm Infants' Behaviour
Cool cap	Temporary Reduction Of Body Temperature In The Neonate In Order To Reduce Secondary Adverse Effects Of Birth Asphyxia
CO	Country office
DAC	Development Assistance Committee
FTE	Full-time equivalent
HRIF	High Risk Infants Follow
IUGR	Intrauterine Growth Restriction
KMC	Kangaroo Mother Care
NFI	NIDCAP Federation International
NIDCAP	Newborn Individualized Developmental Care and Assessment Program
NICU	The Neonatal Intensive Care Unit
NMR	Neonatal Mortality Rate
NRP	Neonatal Resuscitation Programme
MOHME	Ministry of Health and Medical Education
OECD	Organization for Economic Co-operation and Development
ROP	Retinopathy of the Premature
RDS	Respiratory Distress Syndrome
ToC	Theory of Change
TOR	Terms of reference
TPN	Total Parenteral Nutrition
UNEG	United Nations Evaluation Group
UNICEF	United Nations Children's Fund
WHO	World Health Organization

EXECUTIVE SUMMARY

BACKGROUND

The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) is an approach to newborn infant care that was developed in the 1980's by Professor Heidlise Als. It is a multifaceted way of handling premature or sick newborns that focuses on the needs of the infant and involves the parents in the treatment of their child. NIDCAP aims to prevent the iatrogenic side-effects of the intensive medical care that a newborn infant may need to undergo in order to survive. Some studies have shown NIDCAP to enhance neurobehavioural function, also helps to enhance the intimate connection between the parents and their child and empower families in a very fragile time of their lives.

The UNICEF Strategic Plan 2014 – 2017 included newborn infant health and health systems strengthening as part of programmatic areas. To achieve expected outcomes, capacity development of national systems and service delivery of essential services were part of the implementation strategies of this Strategic Plan. These two implementation strategies were adapted to the national context and constituted the core activities of UNICEF support of NIDCAP in Iran.

The reconstruction of the intervention, based on different documents and fragmented data, shows that UNICEF support of NIDCAP aimed to include 70% of the preterm infants of the four selected hospitals to receive treatment in accordance with the NIDCAP principles. In addition, in close collaboration with the MoHME, the establishment of a NIDCAP National Training centre and of 4 NIDCAP Centres of Excellence (in the four pilot NICUs) was planned. The selected pilot NICUs are located in Mahdieh and Valiasr Hospitals in Tehran, Al Zahra Hospital in Tabriz and Hafez Hospital in Tabriz.

EVALUATION PURPOSE, OBJECTIVES AND SCOPE

The purpose of the evaluation is dual, including accountability as well as learning. As stated in the ToR, the evaluation supports: i) the generation of knowledge on the successes and challenges of NIDCAP to inform future programming; ii) accountability of the programme towards partners as well as for the beneficiaries.

The objectives of the evaluation are to determine the relevance, efficiency, efficacy, and sustainability of the UNICEF-supported implementation of NIDCAP in four public hospitals in Iran. The evaluation is structured according to the DAC criteria.

The primary audience for this evaluation is UNICEF Iran Country Office, the MoHME and the public hospitals network in Iran. UNICEF's partners, notably other development actors, will serve as a secondary audience.

The project period examined starts in 2013, when the training of NICU staff was first initiated, and runs until the end of 2018, when the pilot phase of the UNICEF-supported implementation of NIDCAP ended.

EVALUATION METHODOLOGY

The purpose of the evaluation is to address to what extent the first phase of the UNICEF NIDCAP intervention in Iran was relevant, efficient, effective, and sustainable. Despite limitations, the evaluation highlights successes, challenges and lessons learnt with the aim of using this experience in order to scale up the NIDCAP programme in the years to come.

The evaluation has mainly relied on qualitative data, drawing on primary and secondary sources. Data collection methods for this evaluation include a documentary review (around 90 documents, of which 60 are internal UNICEF documents and 30 are external sources) and semi-structured key informant interviews (19 remote interviews). The national evaluator had the opportunity to conduct a visit to the Valiasr Hospital in Tehran. A literature review about NIDCAP in Iran has allowed for documenting the contributions and challenges of NIDCAP in Iran and to reinforce triangulation. In a context of critical limitations, measures were adopted to mitigate the scarcity of data.

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According to UNICEF's Procedure for Ethical Standards in Research, Evaluations and Data Collection and Analysis, the Ethical Review Board of the methodology was required and approved (see annex 4). Common guiding principles were used to ensure ethical safety during the evaluation: (i) Privacy and confidentiality, (ii) Informed consent, (iii) Harm and benefits, and (iv) Conflict of interest. The participation of children was not required in this evaluation.

EVALUATION FINDINGS

Relevance

UNICEF support towards NIDCAP was well aligned with MoHME strategies and priorities. NIDCAP was also coherent to respond to newborns' and parents' needs and the development of health professionals' skills. Improving neonatal care has been a priority for the MoHME; the healthcare reforms that have been put in place since 2014 prioritised maternal and child health, including neonatal health. At NICU level, willingness to make professional practices evolve and the commitment of healthcare staff seem to have facilitated the introduction of NIDCAP approach and principles. Overall, NIDCAP benefited from national leadership and an enabling environment, despite some resistances to change at NICUs level. NIDCAP is a gender- and culturally-sensitive intervention.

Effectiveness

The evaluation has a good level of evidence regarding the improvements brought about by NIDCAP in terms of focus and conception of neonatal care for preterm newborns, upgrade of physical spaces and equipment, as well as adoption of new protocols and clinical procedures in the pilot NICUs. Previously, ad hoc programmes like KMC were implemented in a few wards, but NIDCAP resulted in relevant changes; health professionals got involved in developmental care and interest on this field emerged. Today, the presence of mothers round the clock in all wards is considered normal – before they were only allowed to be there during visiting hours.

The evaluation only has partial evidence – and through secondary sources – regarding the improvement of the quality of the care and the reduction in morbidity in preterm newborns. However, the publications in specialised medical journals regarding the benefits of the introduction of NIDCAP in Iran constitute a source of rigorous information that attest to a generally positive appreciation of the introduction of NIDCAP in the country.

Efficiency

With a modest level of external funding, NIDCAP has had a positive leverage effect on promoting the developmental care approach in Iran; the introduction of NIDCAP helped 4 NICUs to adopt a family- and baby-centred approach and better newborn care standards but also it stimulated biomedical research and scientific publications on this field. However, the absence of a logical framework for the programme and a structured planning, reporting, and monitoring system has hampered capturing progress and bottlenecks; NIDCAP, as a "pilot project", has missed the opportunity to capitalise on and showcase learnings and good practices emanating from its implementation.

Sustainability

Overall, the MoHME and the four hospitals have the capacities and means to maintain NIDCAP standards of care without external support. However, the high workload in the four NICUs seems to affect the performance of health professionals, in particular those who work in nurseries, which may result in variability of care and a gradual decline in NIDCAP standards of care. Under a health system perspective, in Iran NIDCAP has not reached the maturity required to allow for scalability and to continue developing local capacities.

CONCLUSIONS

C1 The absence of essential planning documents (logical framework), management, monitoring and reporting have prevented capitalising on the learning that should have been inherent to NIDCAP as a pilot project.

C2 From a health system perspective, NIDCAP has contributed to change mindsets about neonatal care and reinforce national capacities in developmental care in Iran. One of the major achievements of NIDCAP in Iran is the positive impact on new-born care givers. As part of broader efforts, NIDCAP has helped to transition from "classical" NICU care (protocol-based tasks) to newborn - and family-centred, developmentally supportive care in the four piloted NICUs. Although the NIDCAP pilot phase focused only on four NICUs, national workshops and the coaching provided by NIDCAP-certified professionals to other neonatal care teams have contributed to expanding the NIDCAP approach and standards to other NICUs.

C3 The programme has fallen short of NIDCAP full standards and meeting the initial ambitions (e.g.: creation of the NIDCAP Training Centre in Iran and establishment of Centres of Excellence), despite MoHME's leadership and involvement from early stages of the programme.

C4 In terms of the four pilot NICUs, there seems to be variability between the standards and the clinical practice associated with NIDCAP due to infrastructural factors (old installations difficult to adapt to NIDCAP requirements), medical care factors (low number of NICU beds and high pressure on medical care) and human factors (insufficient staff trained in NIDCAP, lack of nursing staff).

C5 Scientific production generated in Iran forms part of the added value of the programme and contributes to documenting both the experience of implementing NIDCAP in the country and to expanding knowledge about the benefits of NIDCAP in preterm newborns.

C6 The costs associated to NIDCAP certification do not explain why the programme was not capable of completing the process to certify the NICUs (or at least one of the NICUs). Most NIDCAP-certified professionals continue working in different NICUs and represent a capital that the health system can continue to leverage to relaunch NIDCAP both in pilot hospitals and in other hospitals.

LESSONS LEARNED

- The design of knowledge capitalisation mechanisms that pertains to any pilot project, complementing the essential programme management tools (planning, monitoring, reporting and evaluation frameworks), is essential for documenting learnings and making decisions based on evidence.

- UNICEF technical support to the implementation of a pilot project led and resourced by the MoH has proven to be an effective cooperation modality to run the first phase of NIDCAP and set up the bases for an eventual scale-up.

- NIDCAP training and developmental care must be perceived as a continuous process and be integrated in basic or specialised health system training so as to ensure a constant critical mass of trained professionals and to respond to the inevitable losses and changes resulting from personal circumstances.

RECOMMENDATIONS

Strategic level

- R1 MoHME and UNICEF jointly develop and implement a comprehensive newborn infant care strategy aligned with current national priorities (eventually as part of a broader perinatology strategy).

    - Learnings from NIDCAP and other newborn infant care and maternal health interventions are integrated into the MoHME – UNICEF collaborations.

- A clear evaluation, monitoring and accountability framework on new born care integrating NIDCAP evaluation is established.
- The National Iranian Committee on NIDCAP is reactivated and its composition reflects the diversity of stakeholders engaged in developmental care (health officials at central and regional level, practitioners -medical and paramedical staff-, health managers, researchers and parents). Considering the eventual scale-up of NIDCAP to other regions of the country and based on learnings from the pilot phase, a clear articulation between the central and regional level (e.g: NIDCAP regional focal points) could be envisaged. In addition, key alliances could be developed (e.g: national neonatal association, parent's associations, other national and international stakeholders). The National Iranian Committee on NIDCAP has the legitimacy and expertise to define the strategy and next steps for the scale-up of NIDCAP, based on an sound assessment of needs (particularly in deprived regions) and national means.

Programmatic level

- R2 NIDCAP achievements during the "pilot phase" are consolidated; at least 1 NICU engages in a NIDCAP certification process to serve as 3rd level NICU reference and "model" for other hospitals.

  - A plan to support 2nd level NICUs and homogenise standards of neonatal care for premature newborns (based on essential elements of developmental care/ NIDCAP), particularly in remote and deprived provinces is defined (building on the recommendations from the Mid-Term Review conducted by UNICEF in 2019 concerning neonatal health in deprived provinces).

- R3 A structured research agenda on developmental care and NIDCAP is defined and implemented (engaging MoHME, universities, hospitals, UNICEF and, eventually, NFI experts).

- R4 A NIDCAP national training centre is established and developmental care and NIDCAP principles are integrated into medical, nursing, midwifery education and the national action plan on human resources for health.

  - Developmental care and NIDCAP approach are integrated into annual training programmes for health professionals (as part of undergraduate and postgraduate education, as well as continuing education programmes).
  - NIDCAP principles and standards are part of integration trainings for new staff working in NICUs.

- R5 Communication and awareness raising actions about NIDCAP and developmental care among hospital staff (management and multidisciplinary teams) and parents accompany the renewed efforts for the consolidation of NIDCAP in Iran.

  - A communication plan and education actions aiming at the involvement of parents in the care of their premature babies are defined and implemented in the four hospitals.
  - Other health professionals (e.g: physiotherapists, psychologists, paediatric residents) are integrated into NICU teams.

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1 BACKGROUND

1.1 THE CONCEPT OF NIDCAP

1. The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) is an approach to newborn infant care that was developed in the 1980's by Professor Heidlise Als. It is a multifaceted way of handling premature or sick newborns that focuses on the needs of the infant and involves the parents in the treatment of their child. NIDCAP aims to prevent the iatrogenic side-effects of the intensive medical care that a newborn infant may need to undergo in order to survive. Some studies have shown NIDCAP to enhance neurobehavioural function, also helps to enhance the intimate connection between the parents and their child and empower families in a very fragile time of their lives. The most important components of NIDCAP are:

    - Direct observation of the infant's behaviour using a standardised observation sheet to determine whether the infant is relaxed or under distress, tired or alert. The infant's behaviour will then guide the hands-on management of the child (e.g., allowing the child to wake up at its own pace before having blood samples taken, being fed or assessed by the staff, etc.) This will increase the autonomy of the child and also promote self-regulatory behaviour such as sucking and grasping.

    - Creating an appropriate environment in the NICU (imitating the intrauterine life as much as possible) in order to facilitate the growth and neurodevelopment of the child (i.e., using covers for incubators in order to reduce bright lights, reducing the level of noise around the infant, and using boundary support such as 'nests' to wrap around the child for physical comfort).

    - Involving the parents in the care of their child allowing them to build a strong relationship. This will enhance the care of the child, as the parents help the child express its needs. It also allows the parents to take active part even in the medical treatment of their child. This is done by teaching the parents about how their newborn infant communicates, informing the parents about medical treatments, and by encouraging active participation in caring for their infant, skin-on-skin care and breastfeeding.

1.2 NIDCAP CERTIFICATION CRITERIA

2. According to the NFI, it will usually take 5 years for a NICU to be able to provide newborn infant intensive care in accordance with the NIDCAP principles and reach certification as a NIDCAP nursery. NIDCAP nursery development includes training and certification of professionals as well as implementation and integration of the developmental care into the nursery. The process includes (7):

    - Training of minimum 2 NIDCAP professionals and one NIDCAP trainer
    - Assuring salaried positions for the NIDCAP professionals (2 full-time equivalents)
    - Training of a multidisciplinary leadership support team and institutional system support.
    - Training a core group of nursing staff.
    - Development of a parent council and parent-to parent support.
    - Development of reflective process and continuing education opportunities

3. NIDCAP nursery certification is defined as both a goal and a process. Some wards take longer to reach the certification. Some wards may only use it as a guide in their daily work and do not aim to apply for certification. The criteria for NIDCAP nursery certification are further elaborated by Smith et al.

4. The training of a NIDCAP professional takes approximately 2 years and certification requires the assessment by a NFI certified trainer. Details of the training are described by Westrup et al. The different levels of NIDCAP involvement as staff include:

    - Neonatal health care providers familiar with the NIDCAP approach. These are supported and guided by a certified NIDCAP professional, who can be:

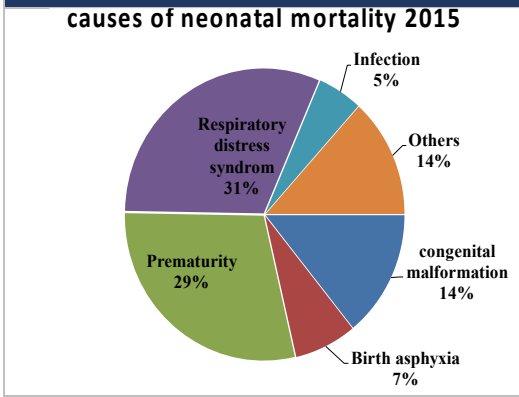
- APIB professional (staff trained to use the tool "Assessment of Preterm Infants' Behaviour").
- NIDCAP trainer (advanced level experienced developmental specialists who, aside from APIB certification, achieve the certification components required for NIDCAP trainers)
- APIB trainer (NIDCAP trainer + has met the APIB trainer requirements)
- NIDCAP Master Trainer (is an APIB trainer as well as having met all the NFI criteria for becoming a master trainer. The NIDCAP Master Trainer supports the education of the NIDCAP trainer)

1.3 NEWBORN INFANT HEALTH IN IRAN

5. Neonatal medicine was officially initiated in Iran in 1988 with the building of the country's first NICU and the initiation of a neonatology fellowship programme. With the foundation of the Iranian Associations of Neonatology and of Perinatology in 1998 and 2003 respectively, the speciality became established. The associations have since supported the continuous expansion of the number of NICUs[1], as well as trained and perinatal health care providers. In the past decades, Iran has made substantial progress in neonatal health; neonatal mortality has declined from 27 deaths/1000 live births in 1990 to 8.6/1000 in 2017 (see figure 3). However, with a global NMR of 18/1000 in the world (2018), Iran reaches an average placement at international level, with room for improvement, especially considering that neonatal deaths constitute the majority of the under-5 deaths in the country (57% in 2017).

6. The following table shows the main neonatal health indicators for Iran in 2015 (national averages). The total number of babies born prematurely was estimated at 191,400 babies in 2015.

Figure 1: Key neonatal health indicators in Iran – national average (2015)

Causes of neonatal deaths 2015	Key neonatal health indicators (2015)	
	Low birth weight rate (<2500 g)	7.06%
	Very low birth weight rate (<1500 g)	1.36%
	Prematurity rate (<37w)	7.59%
	Extreme Prematurity rate (<32w)	1.45%
	Institutional deliveries	97%
	Skilled attendants at birth	97.3%
	Early initiation of breastfeeding	57%
	Exclusive breastfeeding at 6 months	53.1%

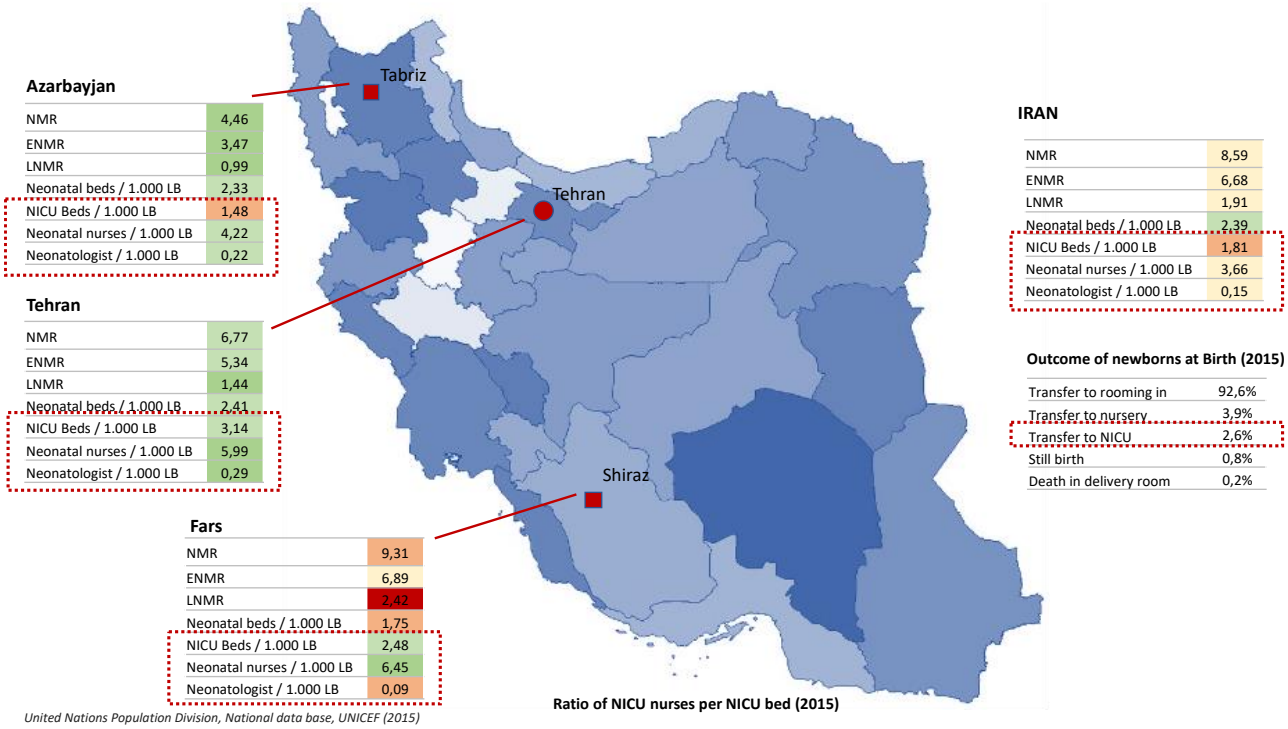
Source: Neonatal health care in IRAN (2015) – MoHME (poster)

7. Causes for the continuous challenges in neonatology and perinatology in Iran are varied, including smoking during pregnancy, intrauterine growth restriction (IUGR), congenital anomalies, preterm births and the related respiratory distress syndrome (RDS) and birth asphyxia. Adding to this, a range of logistic challenges play an important role, (e.g.: insufficient numbers of trained health care providers, insufficient developmental care, mismanagement of neonatal resuscitation as well as an inappropriate triage of neonatal admissions resulting in less sick newborns taking up space in the NICUs – leaving the sicker ones without access to treatment. Furthermore, important health disparities exist in Iran, as under-5 mortality rates are 3 times higher in low-income regions compared to high-income regions.

[1] Including appropriate equipment and treatments introduced in the majority of NICUs, i.e., mechanical ventilation devices, incubators, phototherapy, TPN, surfactant therapy, management of ROP, assessment of neurocerebral development, improved transportation of unwell neonates, KMC and cool cap.

8. The following map shows the newborn health indicators for 2015 at a national level and for each of the three provinces where the pilot NICUs involved in NIDCAP are located. The three provinces showed a nurse ratio per 1000 live births above the national average for that year, which is coherent with the additional workload required by the implementation of a complex programme such as NIDCAP. On the other hand, it is interesting to note the low ratio of neonatologists per 1000 live births in the province of Fars (Shiraz), which may explain some of the difficulties encountered in implementing NIDCAP.

Figure 2: Neonatal mortality ratios and availability of resources per 1000 live births at provincial level and national averages in Iran (2015)



United Nations Population Division, National data base, UNICEF (2015)

Source: Neonatal health care in IRAN (2015) – MoHME (poster)

1.4 OBJECT OF THE EVALUATION - NIDCAP IN IRAN

9. The UNICEF Strategic Plan 2014 – 2017 included newborn infant health and health systems strengthening as part of programmatic areas. To achieve expected outcomes, capacity development of national systems and service delivery of essential services were part of the implementation strategies of this Strategic Plan. These two implementation strategies were adapted to the national context and constituted the core activities of UNICEF support of NIDCAP in Iran.

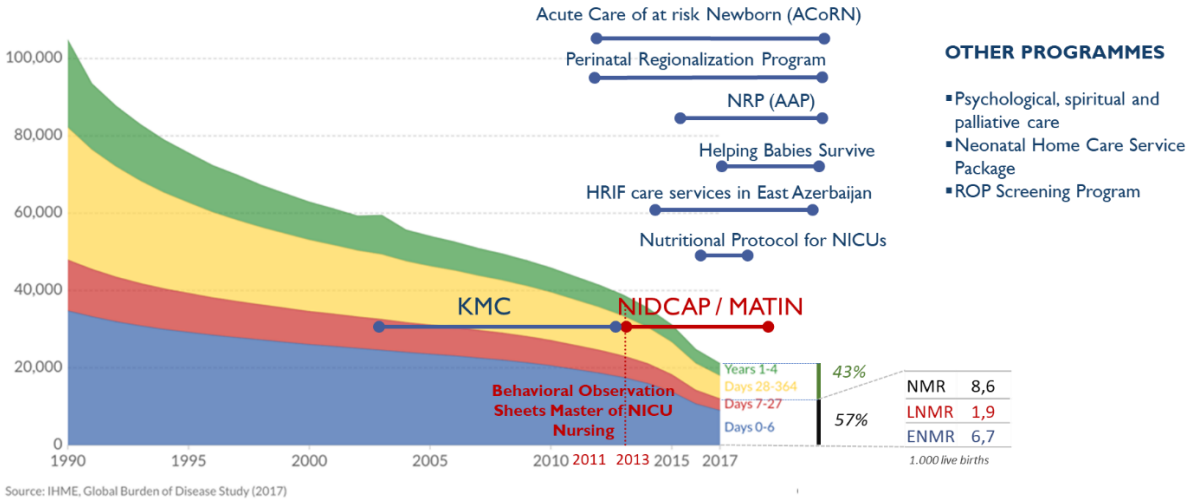
10. UNICEF has been supporting the Iranian Ministry of Health and Medical Education (MoHME) since the early 1950's. Since 2012, the UNICEF Iran country programmes have had an increased focus on both prevention and management of premature births. To enhance the survival of premature infants and reduce their neurodevelopmental morbidities in later life, UNICEF has been supporting the MoHME, in particular the Neonatal Health Office (NHO), through several programmes:

- A pilot project on high-risk infant follow-up (HRIF) care services in the East Azerbaijan province (2014), with the aim to roll out HRIF services in at least 50 per cent of NICUs in the country.
- Support to the development of the Nutritional Protocol for neonatal intensive care units (2016 - 2017).
- Support to the standardisation of kangaroo mother care (KMC) services (2017 – 2019).

- Support to Help Baby Survive trainings, developed by the American Academy of Paediatrics (AAP), to reduce neonatal mortality and morbidity in resource-limited health systems. Trainings have been accompanied by the procurement of 600 neonatal resuscitation simulators and 280 birthing simulators for hospitals in the most disadvantaged areas of Iran (2017 - 2019).
- Upgrade of the neonatal resuscitation programme (NRP), including the development of 'service package for ventilation of newborns' (2019).
- Support to the introduction and implementation of NIDCAP in four selected university hospitals and introduction of the NIDCAP approach to the neonatal community (1).

11. The following figure shows the different interventions in newborn health supported by UNICEF (blue lines), parallel to the implementation of the pilot phase of NIDCAP (red line) and in the context of the reduction of newborn mortality in Iran. The Kangaroo Mother Care programme (started in the early '00s) was integrated under NIDCAP as from 2013.

Figure 3: Trends in neonatal mortality rates (1990 – 2017) and relevant neonatal health interventions supported by UNICEF

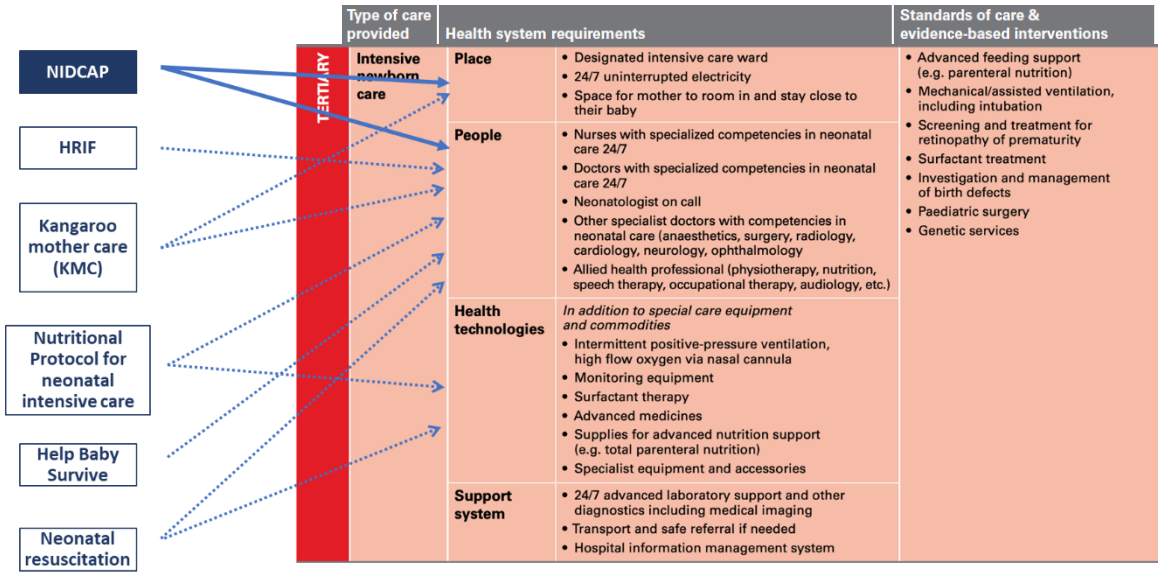


Source: MoHME, UNICEF reports, IHME

12. These complementary interventions were aligned with national priorities. Together, they have aimed to improve the quality of newborn infant care, contributing to the reduction of neonatal morbidity and, in the longer term and as part of broader clinical and public health interventions, the reduction of neonatal mortality. The activities implemented through the different programmes are aligned with WHO and UNICEF recommendations concerning the requirements for neonatal care at different health system levels[2], as the following chart shows. NIDCAP has focused mainly on strengthening the requirements concerning "Place" and "People".

[2] Survive and thrive: transforming care for every small and sick newborns. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO.

Figure 4: Inpatient care for small and sick newborns: requirements for care at tertiary care level



Source: WHO, UNICEF and adapted by the evaluation team

13. The reconstruction of the intervention, based on different documents and fragmented data, shows that UNICEF support of NIDCAP aimed to include 70% of the preterm infants of the four selected hospitals to receive treatment in accordance with the NIDCAP principles. In addition, in close collaboration with the MoHME, the establishment of a NIDCAP National Training centre and of 4 NIDCAP Centres of Excellence (in the four pilot NICUs) was planned.

14. The pilot NICUs are located in Mahdieh and Valiasr Hospitals in Tehran, Al Zahra Hospital in Tabriz and Hafez Hospital in Tabriz.

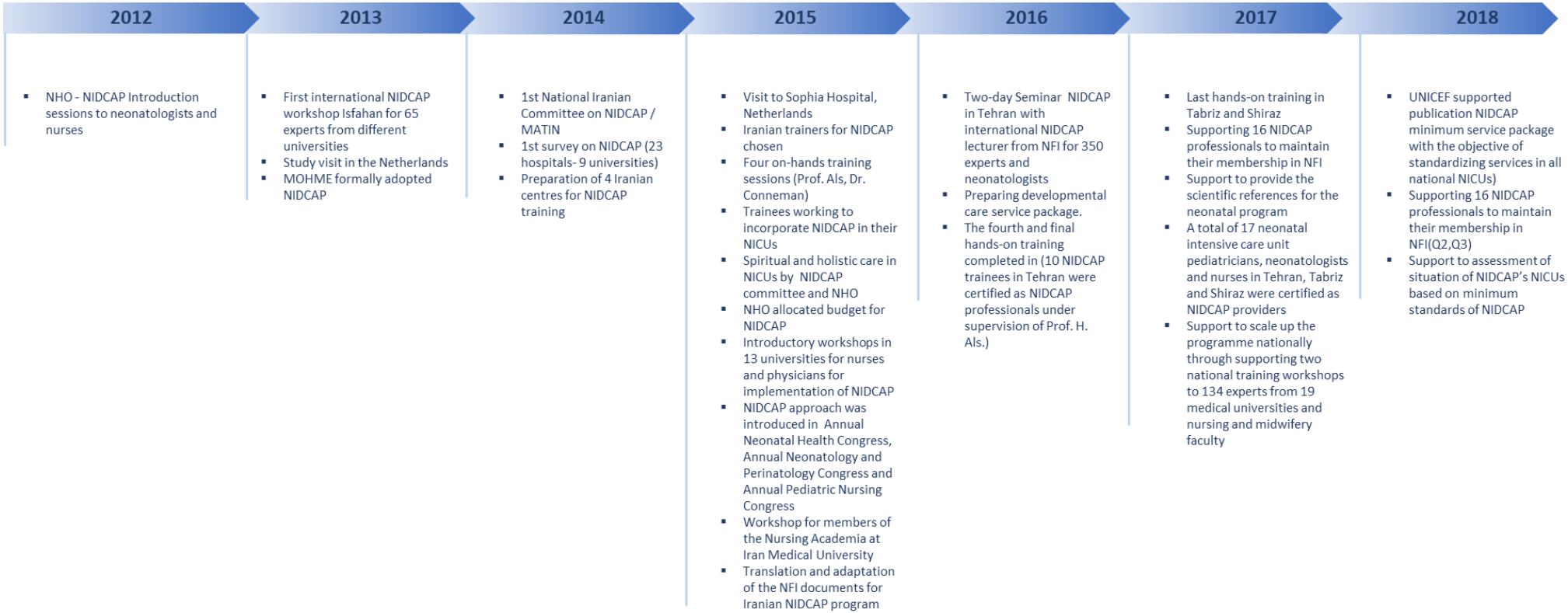
15. The NIDCAP pilot phase started in 2013 and included the following key activities:

- A series of introductory workshops on the NIDCAP approach were carried out with the attendance of 134 health experts from 9 medical universities.
- Training workshop for 65 newborn infant healthcare providers (2013).
- The establishment of a national NIDCAP committee supporting:
  - the scale-up of NIDCAP in 2014
  - a national assessment of the status of the developmental care of 23 NICUs around the country (2014)
  - exchange of knowledge between 7 Iranian neonatologists/nurses and Dutch NIDCAP experts (2014)
- First national seminar on NIDCAP attended by 350 health experts with the purpose of sensitizing NICU staff and raising their awareness of NIDCAP (2016).

16. Building on the above-mentioned activities, the following step for NIDCAP was for UNICEF to facilitate on-job training in the four NICUs: 2 in Tehran (Mahdieh and Valiasr), 1 in Tabriz (Al-Zahra) and 1 in Shiraz (Hafez). Thus, by 2017, 16 NICU professionals working at these hospitals were certified as NIDCAP providers. The hospitals were government hospitals, chosen based on their potential to pilot the programme. The above-mentioned activities are considered the core of the pilot phase of the NIDCAP implementation in Iran. The reconstruction of the programme's timeline is shown in the following chart.

17. Information regarding budgetary contributions by UNICEF and the MoHME has not been available for the evaluation. The only partial data (identified in different documents) about the budget allocated by UNICEF to the pilot phase of NIDCAP show figures that vary from 100,000 to 200,000 USD for the total of 5 years.

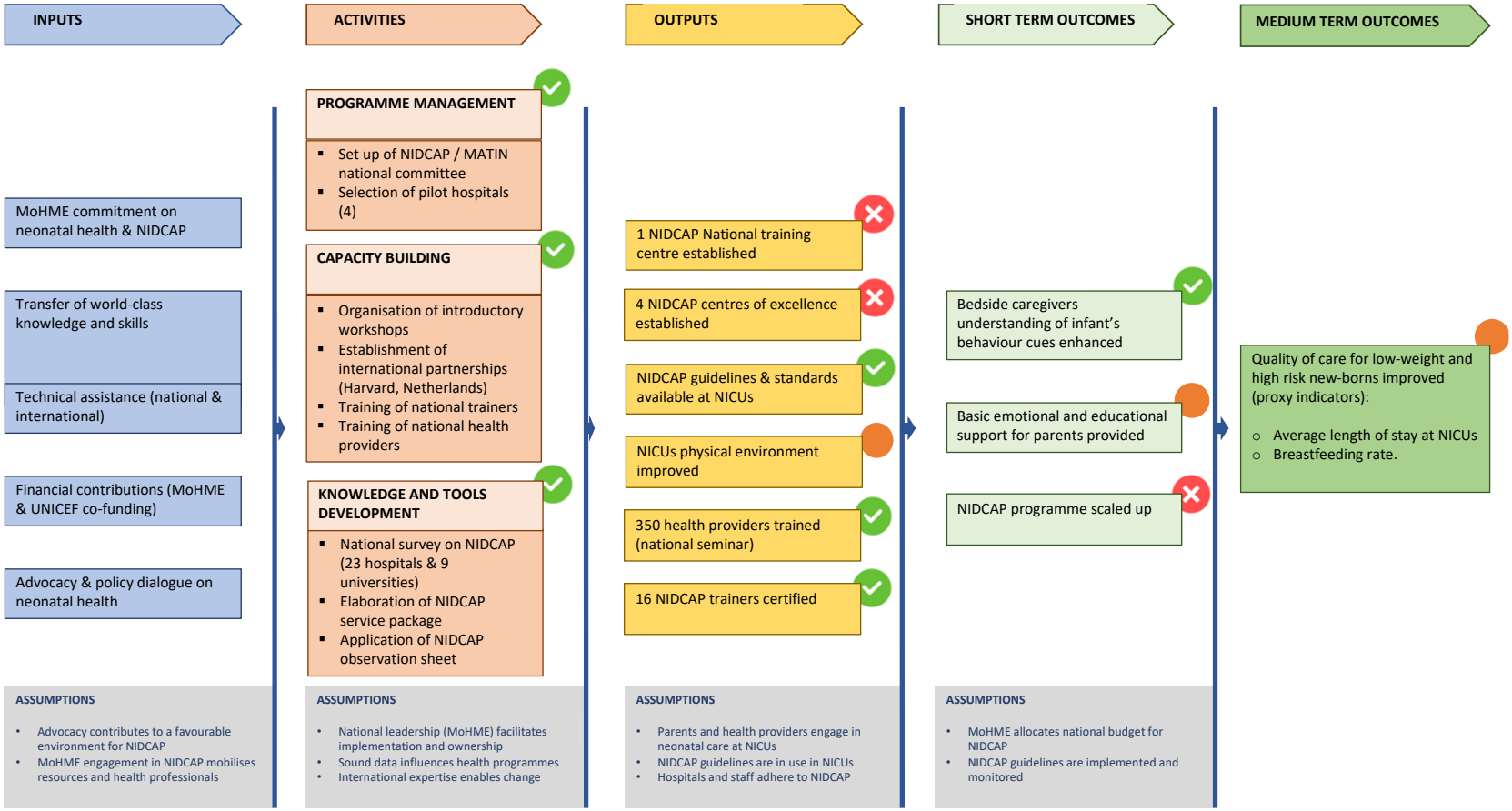
Figure 5: NIDCAP timeline in Iran (pilot phase)



Source: UNICEF reports and evaluation team

18. Based on the interviews and documentary review, a Theory of Change has been drafted; the green dots indicate a positive achievement; the orange dots indicate partial achievement (or insufficient data) and the red dots indicate failure to achieve.

Figure 6: Reconstruction of the Theory of change



Source: UNICEF reports and evaluation team

2 EVALUATION PURPOSE, OBJECTIVES AND SCOPE

19. The evaluation has taken place during a period when the COVID-19 pandemic is still having an impact on the lives of people all around the world and particularly in Iran, which is one of the most affected countries worldwide. The novel coronavirus in Iran officially started the 19th of February of 2020, when the first 2 casualties were reported as a result of COVID-19 in the city of Qom. Since then, like many other places in the world, the number of infections has risen quickly, as shown in the table below. The rise of cases grew towards the end of 2020, and in February 2021, nine cities in Iran were declared high-risk zones, and a fourth corona virus wave is feared to come[3]. The country expects to vaccinate 1.3 million people by March 20th.

Number of reported COVID-19 cases in Iran (March 2020 – March 2021)

Source: Our World in Data. Oxford Martin School. University of Oxford

20. The national health system has been faced with an unprecedent public health emergency and the hospitals involved in NIDCAP have experienced an increasing workload and challenging situations. Under these exceptional circumstances, the evaluation has relied on the use of IT and remote data collection tools and has needed considerably more time to be completed. The scheduling of interviews with health professionals at central and hospital level has been conditioned by the evolution of the pandemic in the country and their limited availability.

2.1 OBJECTIVES OF THE EVALUATION - PURPOSE

21. The purpose of the evaluation is dual, including accountability as well as learning. As stated in the ToR, the evaluation supports:
    - the generation of knowledge on the successes and challenges of NIDCAP to inform future programming.
    - accountability of the programme towards partners as well as for the beneficiaries[4].

22. The objectives of the evaluation are to determine the relevance, efficiency, efficacy, and sustainability of the UNICEF-supported implementation of NIDCAP in four public hospitals in Iran. The evaluation is structured according to the DAC criteria.

23. The primary audience for this evaluation is UNICEF Iran Country Office, the MoHME and the public hospitals network in Iran. UNICEF's partners, notably other development actors, will serve as a secondary audience.

[3] Iran Sees Risk of Fourth COVID Wave Fed by Mutant Virus; By Reuters
[4] It was not possible to carry out interviews with parents of premature newborns during the evaluation (see limitations).

2.2 SCOPE OF THE EVALUATION

2.2.1 Geographical scope

24. The scope of this evaluation is UNICEF-supported NIDCAP activities in the four selected hospitals in Tehran (2 hospitals), Tabriz and Shiraz.

2.2.2 Time frame

25. The project period examined starts in 2013, when the training of NICU staff was first initiated, and runs until the end of 2018, when the pilot phase of the UNICEF-supported implementation of NIDCAP ended.

2.2.3 Areas of focus of the evaluation and questions not covered

26. Through its work in two country-wide programmes from 2013 to 2018, the aim of UNICEF[5]) has been to enhance MoHME capacities in order to improve maternal and newborn infant health, supporting the implementation of NIDCAP, together with other five programmes also addressing newborn infant care (see figure 3). NIDCAP is one relevant intervention integrated into broader national health system efforts and UNICEF actions to contribute to the reduction of newborn morbidity and mortality. In this regard, advances made in the reduction of neonatal morbidity and mortality in Iran in the past decade are the result of collective efforts and comprehensive public health actions and clinical approaches that go beyond the scope of one single intervention and, in particular, of the implementation of NIDCAP activities. These elements have been essential to determine the areas of focus of the evaluation and delimit its scope.

27. First, the evaluation has assessed to what extent the programme in Iran has been implemented in accordance with NIDCAP standards and what relevant changes or achievements have been made in the four pilot NICUs during the 2013 – 2018 period. The evaluation envisaged using proxy indicators to assess eventual positive effects on the care of newborn infants resulting from the application of the NIDCAP model (if hospital indicators or clinical data were available). However, lack of data has hampered this area of analysis. The evaluation has used NIDCAP guidelines as a base to assess progress and changes in NICUs but is not meant under any circumstance to substitute NIF certification processes or methodologies.

28. Second, the evaluation has assessed to what extent, and how UNICEF support to the MoHME has enhanced the capacities of the health system at national and sub-national levels to improve newborn infant care. The evaluation has considered that UNICEF support to 'service delivery' and 'healthcare workforce' at NICUs through NIDCAP are relevant – but not the sole – contributing factors to quality of care. Quality of care is also influenced by health information, medical products and technologies, financing, and governance.

29. Third, and as explained in the inception report, measuring neonatal morbidity is methodologically challenging. The application of research tools to assess changes in neonatal morbidity from 2013 to 2018 would have required access to and use of standardised clinical records and morbidity data collection which have not been available and would have not been possible to include as part of the scope of the evaluation.

30. Fourh, a sound comparative analysis of the clinical practice at NICUs (including NIDCAP-certified and non-certified professionals) would have required the application of observational evaluations, not only in the four NIDCAP pilot hospitals, but also in a sample of non-NIDCAP NICUs in other selected hospitals of the country. Under this exceptional period, access to a larger sample of NICUs and the introduction

[5] 2012 – 2016 Country Program Output 1.1.4 - By end of 2016, the knowledge and system capacity of MOHME at national and sub-national levels in the area of follow up care for high-risk infants children and surveillance is enhanced towards reduction of neonatal mortality
2016 - 2021 Country Program OUTPUT 1 Output 1.1 - By 2021, the MOHME has enhanced capacity to provide upgraded maternal and neonatal health care services in light of the National Health Transformation Plan and with specific focus on marginalized areas.

of observational assessments as part of the evaluation methodology have not been possible. Although comparative analysis is used in programme evaluation, it is a methodological approach that requires time frames, resources, and favourable local conditions that have not been met during the past year.

2.2.4 Target groups

31. The main target groups who were involved in the evaluation included NIDCAP stakeholders, namely: MoHME officials at central and local levels, health staff working in NICUs in the four pilot hospitals, health staff working in NICUs on other hospitals of the country, UNICEF staff members, and NFI experts.

3 EVALUATION METHODOLOGY

3.1 OVERALL EVALUATION APPROACH

32. The evaluation framework is based on the Organization for Economic Co-operation and Development (OECD)/Development Assistance Committee (DAC) criteria for evaluation which examines relevance, effectiveness, efficiency, and sustainability. The criterion of impact is not within the scope of this evaluation. The evaluation framework was designed by the evaluation team based on UNICEF's inputs during the kick-off meeting and an initial documentary review.

33. The purpose of the evaluation is to address to what extent the first phase of the UNICEF NIDCAP intervention in Iran was relevant, efficient, effective, and sustainable. Despite limitations[6], the evaluation highlights successes, challenges and lessons learnt with the aim of using this experience in order to scale up the NIDCAP programme in the years to come.

34. The selection of key stakeholders was made in consultation between the UNICEF country office and the evaluation team. Considering the reduced number of KIIs identified during the inception phase, the evaluation team has applied a 'snowball approach', asking at the end of the interviews for suggestions about who else to interview. The aim was to identify other health professionals or relevant actors that are involved in NIDCAP who might provide additional information about the implementation of the programme. Two additional informants have been identified through this method.

35. The evaluation matrix has been the major tool for the review and was developed based on an initial interpretation of the ToR, scoping interviews, and a preliminary desk review. The matrix was discussed and agreed among the review team and the UNICEF CO. This tool was intended as a framework for the collection and analysis of data and presents the evaluation questions and sub-questions by criteria and breaks them down into sources of information and tools for data collection. The key evaluation questions have been broken down into 18 evaluation sub-questions, which are related to the selected evaluation criteria and areas of focus.

3.2 DATA COLLECTION AND ANALYSIS

36. The evaluation has mainly relied on qualitative data, drawing on primary and secondary sources. Data collection methods for this evaluation include a documentary review (around 90 documents, of which 60 are internal UNICEF documents and 30 are external sources) and semi-structured key informant interviews (19 remote interviews). The national evaluator had the opportunity to conduct a visit to the Valiasr Hospital in Tehran. A literature review about NIDCAP in Iran has allowed for documenting the contributions and challenges of NIDCAP in Iran and to reinforce triangulation. The distribution of key informants per type of organisation is broken down as follows:

    - MoHME: 4
    - Pilot hospitals (4 NICUs): 8
    - UNICEF CO & RO: 4
    - NFI: 2
    - Externals: 1

37. In a context of critical limitations, several measures were adopted to mitigate the scarcity of data. Firstly, in coordination with MoHME, a field observation was conducted at the Valiasr Hospital NICU (Tehran) by the national evaluator. Secondly, images and video files taken before and after the NIDCAP intervention were provided by Al Zahra Hospital (Tabriz). Thirdly, a 'light touch' literature review about

[6] See section on Evaluation limitations

NIDCAP and developmental care in Iran based on national specialised journals was conducted by the evaluation team.

38. Triangulation of evidence was carried out continuously throughout the data collection and analysis process, despite relevant limitations considering the scarcity of data and sources. Triangulation was carried out between the sources of information and the evaluation team. The validation process included a remote debriefing workshop with MoHME representatives (central and local levels) and the UNICEF Iran country office.

39. The evaluation quality assurance is based on the UNICEF-Adapted UNEG Evaluation Reports Standards, UNEG norms and standards, and good practice standards of the international evaluation community (OECD/DAC). Quality assurance monitoring has been conducted throughout the evaluation process at two levels: internally, by the evaluation team through peer review processes and self-assessments. Externally, by UNICEF Evaluation services, at Country Office and Regional Office level.

3.2.1 Literature review

40. A literature review has been conducted with the objective to strengthen the base of knowledge for the evaluative analysis. The literature review has documented available national evidence about NIDCAP and developmental care and Iran and has allowed to triangulate with primary data collected from interviews. Firstly, a light screening of published articles and grey literature available on the internet has been conducted. Secondly, an exhaustive search was performed through online scientific databases, and academic journals. Google Scholar, the Iranian Journal of Neonatology and the Iranian Red Crescent Journal were browsed using the search terms 'NIDCAP', 'Developmental care', and 'Iran'. Only articles that had combinations among 2 of the 3 search terms, were published between 2013 and 2020 and written in English were included.

41. A total of 35 articles were found using these search terms and the inclusion criteria. After an analysis and screening these articles, 11 publications were included in the literature review. The NIDCAP programme is mentioned in 5 of these articles, and 6 out of 11 articles mention the NICUs. 1 out of 11 refers to maternal anxiety and 8 of the articles mention developmental care (including NIDCAP). The results of the literature review are presented in the Effectiveness section.

3.3 LIMITATIONS

42. The evaluation faced relevant constraints which could only be partially addressed by the evaluation team. Constraints were due to the COVID-19 pandemic but also to the critical scarcity of NIDCAP programme documents and data. It was not possible to implement several measures initially conceived to overcome COVID-19 effects (e.g.: remote group discussions with the participation of the international evaluator, local support to conduct field observations in Tabriz and Shiraz). Effective coordination with UNICEF and MoHME helped in dealing with these challenges.

Limitations	Management and mitigation
▪ Absence of programme ToC/Logical framework and programme management and reporting tools	▪ For the purpose of the evaluation, a working ToC was developed, based on available documents. In the absence of a programme monitoring framework, the degree of achievement of results was analysed according to the constructed logic mode and only from a qualitative point of view.
▪ The COVID-19 pandemic has brought about numerous limitations, from delays in data collection, to the impossibility of doing	▪ All interviews were conducted remotely, with overall good participation from UNICEF CO staff, as well as MoHME and NICU senior staff. In

fieldwork and of observing and listening to a larger sample of health professionals and parents. It also limited the availability of government counterparts and health staff. In addition to the pandemic, the long period between the termination of the pilot phase and the evaluation limited, in some cases, people's availability to participate in interviews.	addition, interviews with NIDCAP international experts, including Prof. Als, were instrumental for reconstructing the implementation of NIDCAP in Iran.
▪ The information made available to the evaluation team about the NIDCAP implementation (particularly quantitative data about newborn care in the four pilot NICUs, or resource mobilization, among other relevant parameters) have been fairly limited and fragmented. These gaps in programme reporting, although partially attributable to the time elapsing from the implementation of the programme to the evaluation, have significantly limited the reconstruction of the response and a sound analysis of programme performance, including specific analysis of effectiveness or efficiency, as well as the application of a gender and equity lens.	▪ Qualitative data collected from interviews have partially mitigated the gaps, but the quantitative description and analysis of NIDCAP implementation remains limited. ▪ The role played by the national evaluator (and his knowledge of the national health system) have contributed to fill in some gaps. ▪ The observation of the Valiasr NICU has reinforced the triangulation of the activities implemented in this specific hospital. ▪ The light-touch review of published papers about NIDCAP in scientific journals in Iran has made it possible to substantiate the assessment of the positive effects on premature newborns, in the absence of clinical data.

3.4 ETHICAL ISSUES AND CONFIDENTIALITY

43. According to UNICEF's Procedure for Ethical Standards in Research, Evaluations and Data Collection and Analysis, the Ethical Review Board of the methodology was required and approved (see annex 4). Common guiding principles were used to ensure ethical safety during the evaluation: (i) Privacy and confidentiality, (ii) Informed consent, (iii) Harm and benefits, and (iv) Conflict of interest.

44. Stakeholders were informed of the purpose of the evaluation, key topics for discussion, major data requirements and ethical and confidentiality guiding principles of the assignment when contacted to schedule interviews. This brief introduction to the evaluation allowed informants to make an informed choice before committing to participate in the interview.

45. The participation of children was not required in this evaluation.

46. Electronic records of interviews were avoided due to the confidentiality of certain topics of discussion. In writing the report, the consultants have ensured that information used and cited cannot be traced to its source.

4 EVALUATION FINDINGS

4.1 RELEVANCE

UNICEF support towards NIDCAP was well aligned with MoHME strategies and priorities. NIDCAP was also coherent to respond to newborns' and parents' needs and the development of health professionals' skills. Improving neonatal care has been a priority for the MoHME; the healthcare reforms that have been put in place since 2014 prioritised maternal and child health, including neonatal health. At NICU level, willingness to make professional practices evolve and the commitment of healthcare staff seem to have facilitated the introduction of NIDCAP approach and principles. Overall, NIDCAP benefited from national leadership and an enabling environment, despite some resistances to change at NICUs level. NIDCAP is a gender and culturally-sensitive intervention.

4.1.1 Alignment with MoHME strategies and health professionals' expectations

47. The National Health Transformation Plan (NHTP) initiated in 2014 was the starting point for a number of relevant health reforms. The overall objective of these reforms was to reinforce universal health coverage in Iran, improving access to healthcare for the most vulnerable populations in the country. A strong emphasis was put on maternal and infant health, for example making prenatal care and deliveries free of charge in all public hospitals. The NHTP also promoted changes in the educational curricula of health professionals and updated existing postgraduate training courses. Another important national development plan, the Sixth Five-Year Development Plan, also considered maternal and neonatal care as one area of focus.

48. The priority granted by the MoHME to address maternal and child health gaps cleared the way for the implementation of several neonatal health programmes, including NIDCAP. It should be highlighted that before NIDCAP being introduced, none of the hospitals in the country was given attention to developmental care MoHME leadership granted the alignment with national priorities and the ownership of NIDCAP.

49. Among healthcare staff in the NICUs, a desire for change in the approach towards care for newborns seemed to have been present before the start of NIDCAP. Specifically, among nurses, the change in approach that NIDCAP brought in terms of care for babies, developmental aspects and the new ways of communicating and interacting with parents and families were positively perceived.

> *"NIDCAP is a change and is transforming infant care. The selected services (NICUs) had a good desire for this change".*

50. However, the introduction of NIDCAP also seems to have been confronted with some resistance. On the one hand, nursery staff expressed concerns about the workload associated to the full implementation of NIDCAP standards, in a context of an intense workload and scarce human resources. On the other hand, some divergences were also expressed by medical staff because of the developmental nature of the programme.

> *"Whereas the nurses had a strong desire to run the program, the resistance was high at medical level, but at the nursing level there was a strong desire to run the program".*

51. In some NICUs, the limited initial involvement may have been overshadowed by the strong motivation of nurses and other staff, the leadership of the MoHME, the inspiration and coaching provided by Prof. Als and Prof. Conneman and the support of UNICEF.

4.1.2 UNICEF-CPD Alignment

52. UNICEF has a long tradition of providing technical and financial support to the MoHME in the field of maternal, child and neonatal health. The two Country Programme Documents covering the period from 2013 – 2018 addressed neonatal health:

- 2012 – 2016 Country Program Output 1.1.4 – By the end of 2016, the knowledge and system capacity of MOHME at national and sub-national levels in the area of follow-up care for high-risk infants and surveillance was enhanced towards reduction of neonatal mortality
- 2016 - 2021 Country Program OUTPUT 1 Output 1.1 – By 2021, the MoHME has enhanced capacity to provide upgraded maternal and neonatal health care services in light of the National Health Transformation Plan and with specific focus on marginalised areas.

53. Well before and in parallel to NIDCAP, UNICEF has supported other neonatal care interventions (see figure 3), such as 'Help Babies Breathe', and the procurement of neonatal resuscitators and birth simulators. UNICEF documents (CPDs, COARs, strategy notes and reports from 2012 to 2018) show the coherence between UNICEF's country strategy, MoHME priorities and NIDCAP. In addition, COARs briefly describe NIDCAP activities implemented each year during the period 2013 - 2018.

4.1.3 Alignment with parents' and infants' needs

54. Epidemiological data from 2012 to 2021 in Iran shows a significant prevalence of preterm and low-weight births in that period. In 2015 it was estimated that 191,400 babies were born preterm, 8% of all infants were born with low weight, and 2.6% of newborns had to be transferred to a NICU. For parents, having a preterm baby at the NICU may be a stressful and traumatic experience. Available evidence shows that the birth of a premature baby is an event that causes parental distress and maternal anxiety; there is uncertainty about the health and future of the baby, and about the duration of the stay of the baby in the NICU. Concerns about the health and survival of the baby, in addition to the complexity of the medical care and technology employed in the neonatal ward, can deeply distress parents.

55. This stress that parents experience can influence their parenting behaviour (Lefkowitz, Baxt & Evans, 2010), and can even have an effect on the long-term relationship with their child (Carter et al. 2007). Furthermore, the parents are not only supposed to care their preterm baby, but frequently also other family members or children. Reducing emotional and physical stress among children and families by providing support and guidance during the stay of the premature baby in the NICU, is a determinant of the future development of the infant and parents.

56. Research conducted in Iran has shown that NIDCAP has been able to reduce the stress and anxiety of mothers (Khosravan et al. 2020), by stimulating developmental care, providing educational and emotional support for parents, and reinforcing the engagement of parents in the care of their baby. All these factors justified the need for the introduction of developmental care in national hospitals.

4.1.4 Gender and socio-cultural aspects

57. Gender distribution of roles for infant care and breastfeeding are essential components of the NIDCAP approach. In fact, NIDCAP gives a central role to the involvement of parents in the care of preterm newborns, the promotion of breastfeeding in proper conditions and the design of physical spaces that

respect privacy but allow for interaction between parents and nurses. NIDCAP has promoted changes about the perception of a father's role in caring for newborns; visiting times for fathers have been put into place in some NICUs, and fathers have been trained on skin-to-skin sessions with their infants. The NICUs have refurbished physical spaces, creating shielded rooms to ensure privacy during breastfeeding.

4.2 EFFECTIVENESS

The evaluation has a good level of evidence regarding the improvements brought about by NIDCAP in terms of focus and conception of neonatal care for preterm newborns, upgrade of physical spaces and equipment, as well as adoption of new protocols and clinical procedures in the pilot NICUs. Previously, ad hoc programmes like KMC were implemented at a few wards, but NIDCAP resulted in relevant changes; health professionals got involved in developmental care and interest on this field emerged. Today, the presence of mothers round the clock in all wards is considered normal – before they were only allowed to be there during visiting hours.

The evaluation only has partial evidence – and through secondary sources – regarding the improvement of the quality of the care and the reduction in morbidity in preterm newborns. However, the publications in specialised medical journals regarding the benefits of the introduction of NIDCAP in Iran constitute a source of rigorous information that attest to a generally positive appreciation of the introduction of NIDCAP in the country.

4.2.1 Development of tools for NICUs and service providers

58. Between 2011 and 2012, the MoHME started contact with Prof. Heidelise Als[7] and initiated informal consultations about NIDCAP with neonatologists and nurses of the national health system. In 2013, NIDCAP was officially endorsed by the MoHME as a comprehensive intervention aimed at supporting infant developmental care adapted to premature infants' needs at NICUs, as well as strengthening a family- and infant-centred approach.

59. From 2013 to 2018, UNICEF's support for NIDCAP aimed to strengthen national capacities for improving neonatal care in three areas. Firstly, UNICEF contributed to the governance of the NIDCAP programme in Iran by supporting the establishment of the National Iranian Committee on NIDCAP (locally termed MATIN) in 2014. During the years of full implementation of the programme, MATIN was actively engaged in supporting and coordinating the activities, but today it appears to have reduced its level of activity, probably due to the emergence of other priorities and contextual factors (at least the evaluation has no information on its current role). In addition, the MoHME and UNICEF conducted a survey to assess the status of developmental care in 23 randomly selected NICUs across the country in 2014, to lay the foundations for a proper implementation of NIDCAP and define a baseline. According to the results of the study, the developmental score of the NICUs was 37 per cent on average, compared with the minimum acceptable level of 70 per cent, according to the NIDCAP scoring system. The results highlighted the need for greater investment in developmental care and served to substantiate the introduction of the NIDCAP approach in Iran.

60. Secondly, UNICEF has supported the development of skills of health professionals working at the 4 NICUs8 and other hospitals of the country. The first relevant activity was the organisation in 2014 of a

[7] Heidelise Als, Director of Neurobehavioral Infant and Child Studies and Professor of Psychology at Harvard Medical School. Dr. Als is the author of the APIB (Assessment of Preterm Infants' Behavior) and the originator of the Newborn Individualized Developmental Care and Assessment Program (NIDCAP), an individualized, behaviourally-based developmental for Newborn Intensive Care Units (NICUs)

[8] Hafez Hospital in Shiraz, Al Zahra Hospital in Tabriz, Mahdiyeh and Valiasr hospitals in Tehran.

five-day training workshop in Isfahan facilitated by Prof. Als and Prof. Conneman9 for 65 Iranian health professionals working at different NICUs. Following the workshop, a group of Iranian neonatal specialists travelled to the Netherlands in early 2015 and visited Sophia Hospital in Rotterdam where NIDCAP standards were applied. Later, as part of the NIDCAP implementation in Iran, a two-year training programme was conceived, which included the following major activities:

- NIDCAP certification of 16 health professionals (neonatologists and nurses) working in the 4 pilot hospitals. The following table shows the distribution of NIDCAP-certified professionals per pilot hospital. The NIDCAP certification process of medical doctors and nurses was completed in April 2017, during Prof. Conneman's last visit to Tabriz and Shiraz hospitals. However, several changes have taken place since the certification in 2017 and, at the time of writing this report, 13 certified health professionals remain active:

    - Ms Zahra Eskandari moved from Mahdiyeh Hospital to the MoHME, and later left her job at central level.
    - Dr Keyvan Mirnia moved from Al Zahra Hospital in Tabriz to Tehran.
    - Dr Parisa Mohagheghi moved from Mahdiyeh Hospital to Ali Asghar Children Hospital (Tehran).
    - Dr Nikoo Niknafs and Dr Jila Mirlashari moved abroad.
    - Ms Zahra Godarzi is now retired.

Nbr of NIDCAP certified professionals	Hafez Hospital (Shiraz)	Al Zahra Hospital (Tabriz)	Mahdiyeh hospital (Tehran)	Valiasr hospitals (Tehran)	MoHME	TOTAL
Neonatologists	- Dr Seyed Mostajab Razavi	- Dr Keyvan Mirnia - Dr Mohamad Baqer Hosseini	- Dr Parisa Mohagheghi	- Dr Hosein Dalili - Dr Nikoo Niknafs	- Mohammad Heidarzadeh	7
Nurses	- Ms Masoumeh Pakrouh	- Marzieh Sami - Ms Hamideh Nikzad	- Ms Elaheh Rastkar - Ms Zahra Eskandari (Ali Asghar Hospital & MoH)	- Mrs Zahra Godarzi - Dr Marzieh Hasanpour, PhD, Faculty of Nursing - Ms Ameneh - Abroon Jila Mirlashari, PhD, Faculty of Nursing		9
TOTAL	2	4	3	6	1	16

- Design of a 'training of trainers' programme to replicate NIDCAP trainings and promote developmental care in other hospitals of the country.

- Coaching by the NIDCAP Federation International (NFI) experts of national health professionals, and organisation of hands-on trainings in the 4 NICUs to ensure consistent application of NIDCAP principles in clinical practice. In Tehran (Mahdiyeh Hospital and Valiasr Hospital), a total of four hands-on trainings were organised during 2015 (2) and 2016 (2), coordinated by Prof. Als. In Trabriz (Al Zahra Hospital) and Shiraz (Hafez Hospital) a total of four trainings were also organised during 2015 (2) and 2017 (2), coordinated by Prof. Conneman.

- Organisation of workshops and seminars to disseminate the NIDCAP approach and principles among health professionals and other relevant national actors. In 2015, introductory workshops about NIDCAP were organized in 13 universities, a specific workshop for the members of the Nursing Academia at the Iran Medical University was held in Tehran and the NIDCAP approach was presented in several national congresses (Annual Neonatal Health Congress, Annual

[9] Dr Nick Conneman is a Paediatrician-Neonatologist and the Director of the Sophia NIDCAP Training Centre at the ErasmusMC_Sophia Children's Hospital of Rotterdam, The Netherlands.

Neonatology and Perinatology Congress and Annual Pediatric Nursing Congress). In 2016 and 2017 two additional workshops were organised, involving nearly 400 health professionals from 19 universities countrywide.

61. Third, as part of enhancing national capacities, UNICEF has facilitated the adaptation of NIDCAP tools and guidance documents to the national context. In terms of tools development, the MoHME and UNICEF have worked together to make NFI materials available to the NICUs (e.g.: behavioural observation sheets, workbooks, and modules for other nurseries in the country). During 2017, the NIDCAP minimum service package was developed, and in 2018 it was validated and disseminated among hospitals to ensure homogeneous and proper standards in all NICUs of the country. The NIDCAP minimum service package was intended to serve as a national reference and although the document was accessed for the evaluation, it has not been possible to analyse its actual use and practical application at the NICUs.

62. Considering the limitations of the evaluation, changes in the clinical practice of NIDCAP-certified (or NIDCAP-trained)– health professionals could not be verified. Based on the documentary review and some interviews, key processes which seem to have benefited from the introduction of the NIDCAP approach at NICUs are as follows:

4.2.2 Changes in the clinical practice of trained service providers

63. Considering the limitations of the evaluation, changes in the clinical practice of NIDCAP-certified (or NIDCAP-trained)– health professionals could not be verified. Based on the documentary review and some interviews, key processes which seem to have benefited from the introduction of the NIDCAP approach at NICUs are as follows:

- Principles of developmental and individualised care.
- Bedside observations of preterm newborn behaviour using NIDCAP observation sheets.
- Application of fourhanded care.
- Support of the infants' self-regulation throughout a sequence of care actions.
- Bedding, holding and position of preterm newborns (head positions, alignment with the spine, limb adjustment with legs and arms, freedom to move the hands to the mouth for self-regulation and comfort, etc).
- Charting growth percentiles of each infant.
- Inclusion of developmental questions in daily medical rounds.
- Donor mothers' milk programme and support of breastfeeding.
- KMC and skin-to-skin care.
- Improving the comfort of parents

64. The extent to which NIDCAP standards and clinical procedures are consistently implemented by nurses, neonatologists and other health professionals at present has not been possible to assess.

4.2.3 Parents' satisfaction and involvement in the care of their child

65. During the evaluation, it was not possible to carry out interviews with the parents of newborns hospitalised in the NICUs of the four hospitals, and therefore there is no primary information. The interviews of health professionals and the documentary review show that all four NICUs have upgraded the physical spaces to facilitate the role of parents in physical and affective care of preterm newborns. Likewise, the training of health professionals has emphasised the importance of the focus on newborns and on communication and sensitisation of parents as core aspects of NIDCAP. However, certain standard NIDCAP measures aimed at alleviating the stress and anxiety of the parents of preterm newborns (e.g.: psycho-social support) seem not to have been implemented. In general terms, there is sufficient evidence to state that NIDCAP has contributed to greater involvement of parents in caring for

their premature infants during their stay at the NICU but the evaluation does not have any quantitative or qualitative data to measure the level of parent satisfaction.

4.2.4 Improvement of newborn care in the four piloted hospitals

66. During the inception phase, the limitations were identified with regard to carrying out an analysis of the quality of newborn care, as a component of this evaluation. The impact of the pandemic on Iran, the impossibility of having clinical data for the four NICUs in a systematised manner, and the method of remote evaluation have been factors that have prevented carrying out an assessment, even cursory, of possible improvements to the quality of neonatal care brought about by NIDCAP. Likewise, it is necessary to point out two factors that make it especially complex to analyse the quality of NICU care and the reduction of neonatal morbidity, as mentioned in the Inception report. On the one hand, this type of analysis consists of exercises that require specific methodologies which, in general, are beyond the scope of an evaluation of this kind[10]. On the other hand, NIDCAP has been one intervention integrated into broader national health system efforts and other UNICEF actions aiming at quality of care and the reduction of newborn morbidity in Iran. In this regard, progress made in care at NICU level in past years is the result of collective efforts, comprehensive public health actions and diverse clinical approaches that go beyond the scope of one single intervention. In these circumstances, the parallel implementation of different interventions aimed at improving neonatal health makes it impossible to establish a direct causality relationship between NIDCAP and any eventual improvements in the indicators for the quality of care or neonatal morbidity.

67. Internationally, there is extensive scientific literature on the benefits of the NIDCAP model in premature newborns. By way of summary, the following is highlighted: reduced stress during ophthalmologic examination, and reduced stress during transfer from incubator to skin-to-skin care with the parent. Improved long-term outcome in infant cognitive, motor system and emotional functioning due to NIDCAP care in the NICU has also been reported. Furthermore, NIDCAP has been shown to significantly reduce healthcare costs; the hospital cost savings alone far outweigh the initial costs for staff training and compensation for the key developmental professionals required for NICUs who choose to practice using the NIDCAP model[11].

68. The literature review of published articles in Iran has identified relevant contributions of NIDCAP and challenges affecting its implementation. NIDCAP-related studies published in specialised national journals since 2013 highlight the following results (see annex 3 – bibliography):

    - NIDCAP provides a comprehensive and effective model for premature infants, having the goal to promote neonatal growth and development while also facilitating the self-efficacy of caregivers. Implementation of the NIDCAP model requires attention to be paid to social context, infrastructure, adjustment of the program according to the facilities and resources of each country, and the needs of caregivers

[10] See Inception report::" ew tools of newborn morbidity have been optimised and standardised for use over the entire spectrum, from minimal to severe, in perinatal population studies of early neonatal period. Indicators such as birth weight, preterm birth, APGAR score, or infant's length of stay in the nursery have been used as general outcome measures of effectiveness of national health policies and interventions for perinatal care. These conventional measures of neonatal morbidity are available from routine hospital records, but do not capture the full range (or degree of severity) of complications in the infant, fail to characterize morbidity after the first few moments of life and exclude a large number of infants with problems in the neonatal period. Other measures of neonatal morbidity addressing specific clinical entities have been developed in past years (e.g.: Morbidity Assessment Index for Newborns, Respiratory Disease Distress Syndrome, neurological examination, Score of Neonatal Acute Physiology Perinatal Extension). Based on a light-touch literature review, measuring neonatal morbidity appears to be methodologically challenging; the application of any of the previously mentioned tools require access to and use of standardized clinical records, and morbidity data collection is highly resource-intensive. In general, these tools are not widely used except for specific diseases or limited focus of studies.

[11] Heidelise Als, Gloria B. McAnulty (2011) The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) with Kangaroo Mother Care (KMC): Comprehensive Care for Preterm Infants. Curr Womens Health Rev. 2011 August; 7(3): 288–301. doi:10.2174/157340411796355216.
EVIDENCE IN SUPPORT OF DEVELOPMENTAL CARE AND THE NIDCAP APPROACH

- Implementation of the NIDCAP programme and the home follow up was effective in reducing the stress and the anxiety of the mothers of preterm babies. Execution of the NIDCAP is recommended to all hospital of the country for mothers of preterm babies.
- The majority of nurses participating in the study about Perceptions and Knowledge of NIDCAP showed familiarity with the programme.
- Developmental care, especially when initiated since birth, may improve some aspects of developmental outcomes in preterm new-borns.
- Environmental-structural barriers were considered the main hurdles to the implementation of NIDCAP. Therefore, hospital administrators should make efforts to eradicate the existing barriers to improve the quality of care.
- Parents always prefer the priorities of their babies to their individual needs. Given the lower scores for the parental assessment of received support in Iran, it is important to focus on these specific items in providing interventions to meet the needs of Iranian parents.
- Since family-centred developmental care in Iran is not favourable, the findings suggest the development of a suitable plan to improve family-centred developmental care as well as comprehensive NICU care, including developmental care, with regards to other domains.

69. Despite limitations, the proposed methodology had planned on the use of 'proxy' indicators to indirectly assess the eventual improvements brought about by NIDCAP in Iran (e.g.: use of APIB tool, length of stay of preterm newborns, intubation, use of medicines, breastfeeding, kangaroo mother care / skin-to-skin, upgrade of physical spaces). With the information provided for the evaluation, it has only been possible to assess the last two parameters mainly through secondary sources (only the NICU at Hospital Valiasr in Tehran could be directly observed).

Parameter	Assessment
Breastfeeding rates	There are no data made available for the evaluation regarding this parameter in the four hospitals for the 2013 - 2018 period. The documentary review shows that breastfeeding has been a national priority since 1991, when the Iranian National Committee for Promotion of Breastfeeding was formed. The law for the protection of breastfeeding mothers and the promotion of breastfeeding was first approved by the Iranian Parliament in 1995. In 1996, executive regulations for this law were circulated to health departments in all medical universities. This issue is also evaluated as part of periodic monitoring for hospital accreditation. In 2014[12] the early initiation of breastfeeding rate was 57% and the exclusive breastfeeding at 6 months rate was 53.1% (national average rates). Breastfeeding is a central aspect of NIDCAP, in terms of newborn care standards, involvement of parents in the care for newborns, and physical spaces to provide in the NICUs. The four NICUs have been adapted in accordance with NIDCAP standards and have upgraded spaces that are comfortable and respectful towards the privacy of mothers for breastfeeding and breast pumping. Breastfeeding has also formed part of NIDCAP trainings for nurses and certified neonatologists. Despite the lack of quantitative data, it can be inferred that NIDCAP has contributed to reinforcing early breastfeeding in all four NICUs, as part of standards of care for preterm newborns.
Kangaroo mother care (KMC) / skin to skin	KMC was introduced in Iran in 2000 at the Imam Reza Hospital of Mashad University of Medical Sciences and at the Al-Zahra Hospital neonatal ward (the second level of neonatal care) in Tabriz and was progressively implemented in other hospitals of the country. In 2012, the Neonatal Health Office of the MoHME officially adopted KMC as a standard of care for all NICUs countrywide.

[12] Source: Neonatal health care in IRAN (poster)

	In 2013, NIDCAP integrated the KMC focus under the broader concept of neonatal developmental care. Skin-to-skin holding and care, which is at the core of KMC intervention, is, in its broadest sense, a neuro-developmentally important component embedded in the NIDCAP approach, as is maternal breastfeeding. Scientific evidence available in recent decades regarding the efficiency of this neonatal care (integrated in NIDCAP) in improving survival as well as motor and cognitive development of preterm newborns is abundant at an international level, and also within Iran[13]. In Iran, a recent study to investigate compliance of KMC at the Tabriz Alzahra Hospital with national standards showed that the implementation of care is close to the standards of the Ministry of Health and Medical Education[14]. With these premises, it can be inferred that the implementation of NIDCAP has promoted KMC as a systematic and standard care practice in all four NICUs and, therefore, has been able to contribute to improving the health outcomes of preterm newborns, despite the lack of quantitative data.
Upgrade of physical spaces	From 2013 to 2017, the Ministry of Health invested in the upgrade and equipment of the four NICUs to adapt them to the organisational changes and standards necessary to ensure the adequate implementation of NIDCAP. The evaluation has identified that there are differences in the approaches adopted for the refurbishment and reorganisation of physical spaces across all four hospitals. At Valiasr Hospital (Tehran), two new NICUs, separate from the main building, were built some seven years ago, which provided access to extensive surface areas that enabled the new organisation of the service. At Al Zahra Hospital (Tabriz), a new NICU was also built, to complement the existing one. At the hospitals at Hafez (Shiraz) and Mahdiyeh (Tehran) the available spaces were upgraded, which seems to have caused difficulties in ensuring compliance with some NIDCAP standards and the functionality of the service. The visual records available (videos and photographs) of Al Zahra Hospital (Tabriz) show significant improvements achieved following the upgrade and equipment of the service, with positive changes for nursing work, the participation of parents in the care for their newborns, breastfeeding and interaction between mothers. However, the reports by Prof. Conneman of his last visit in 2017 to Tabriz and Shiraz mention problems regarding the privacy of mothers and families, staff circulation flows and levels of lighting and noise that had not been resolved. The latest report by Prof. Als (September 2016) documents the improvements introduced in the physical spaces of the NICUs of Hospital Valiasr and Hospital Mahdiyeh (Tehran). The report on the visit of a delegation from the regional office of Unicef to Valiasr Hospital (June 2019) issues a highly positive assessment of the organisation and NICU installations. The observation visit to the NICU at Valiasr Hospital in Tehran carried out within the framework of the evaluation (January 2021) also verifies an excellent quality in the current condition of the installations and the equipment. However, the nursing staff states that the high number of newborns that they have to attend to and the constant presence of medical and nursing residents in the service make it difficult to control the levels of noise.

[13] Heidelise Als, Gloria B. McAnulty (2011) The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) with Kangaroo Mother Care (KMC): Comprehensive Care for Preterm Infants. Curr Womens Health Rev. 2011 August; 7(3): 288–301. doi:10.2174/157340411796355216.

[14] Farinaz Saeidi Hassani, Mir Hadi Mousavi, et al (2021) A survey of Compliance of Kangaroo Mother Care with the Standards of the Ministry of Health and Medical Education in Premature Infant. Iranian Journal of Pediatric Nursing (JPEN) Winter 2021, Volume 7, Issue 2

	It has not been possible to make other observation visits for this evaluation that provide direct references of the current condition of the installations in other ICUs.

70. The programme has not managed to put into operation two of the crucial activities in terms of development of national capacities that had been planned initially. On the one hand, none of the four NICUs has put in motion a NIDCAP certification process, despite managing to certify several of its professionals. The absence of certification of the NICUs has made it impossible to create NIDCAP Excellence Centres, as originally foreseen by the MoHME. On the other hand, the national NIDCAP Training Centre has not been created either. This, as recommended by the NFI team, would make it possible to train professionals in the national health system in a more efficient and generalised way for the national health system.

4.2.5 Factors influencing the achievement of results

71. The following table summarises the facilitating and inhibiting factors for the implementation of NIDCAP in Iran, based on the interviews and the analysis of available documents.

Facilitating factors	Inhibiting factors
▪ MoHME leadership and ownership ▪ UNICEF-sustained support and coordination ▪ High quality of the NIDCAP programme and international expertise ▪ Senior and management positions (at hospital level) trained as NIDCAP professionals ▪ Predisposition for change among health professionals (particularly nurses) ▪ Paediatric residents involved in NIDCAP ▪ Involvement of parents led to further dissemination of knowledge to other parents	▪ Lack of physical space in some NICUs ▪ Insufficient equipment ▪ High workload and shortage of nursing staff ▪ Limited involvement of medical doctors (behavioural programme) and multidisciplinary approach ▪ Progressive disengagement of health professionals and staff turnover ▪ Contradictions with hospital accreditation programmes ▪ Costs of the NIDCAP nursery certification process (estimated around USD29,000 per certification[15])

4.3 EFFICIENCY

With a modest level of external funding, NIDCAP has had a positive leverage effect on promoting the developmental care approach in Iran; the introduction of NIDCAP helped 4 NICUs to adopt a family- and baby-centred approach and better newborn care standards but also it stimulated biomedical research and scientific publications on this field. However, the absence of a logical framework for the programme and a structured planning, reporting, and monitoring system has hampered capturing progress and bottlenecks; NIDCAP, as a "pilot project", has missed the opportunity to capitalise on and showcase learnings and good practices emanating from its implementation.

4.3.1 NIDCAP duration (2013 – 2018) and timely implementation

72. NIDCAP implementation covers the period from 2013 to 2018, although there were prior contacts with Prof. Als and the NFI from 2011, within the framework of Nursing Masters student works and exchanges between national and international neonatologists. With the information available, the reconstruction of the timeline of the programme shows that most activities were implemented between 2015 and the

[15] NIDCAP Nursery Program Application and Review Process cost (based on a three-day site visit).

start of 2017. In 2018, the last year of the NIDCAP pilot phase, it has only been possible to document the validation and dissemination of the NIDCAP minimum service package.

73. The absence of an initial timeline makes it impossible to assess the timeliness and the extent to which the planned deadlines were met. However, the documents show, in general terms, that the activities defined every year between the MoHME and UNICEF were implemented within the agreed deadlines. The individual NIDCAP certification of health professionals was achieved in the phases established by the NFI and in similar time frames as the standard ones identified in other countries, although there is significant variability depending on the individual and local circumstances.

74. The five-year duration of the programme has made it possible to have an adequate implementation of the activities planned, although on the other hand, it is considered an excessively long period for a pilot programme. Several interviewees feel that it would have been necessary to reduce the duration of the pilot programme so as to be able to capitalise more quickly and precisely on the lessons learned and make adjustments in time. Likewise, making the final external evaluation two years after the end of the programme, with significant documentary limitations, makes it impossible to reconstruct and analyse in depth the achievements and challenges of the programme.

4.3.2 Skills mobilised during the implementation

75. The technical expertise mobilised for the introduction of NIDCAP in Iran is fully coherent with the NFI process and guidelines. The MoHME and the four NICUs participating in the pilot programme have benefited from the support and involvement of Prof. Als (Harvard University), NIDCAP creator and world reference on the subject, as well as from Prof. Conneman (Rotterdam University) and other senior NFI profiles. In addition to the technical expertise, the programme has also benefited from the involvement of experts and senior decision makers of the MoHME at a central level, which has ensured the alignment and the anchoring of NIDCAP in the priorities and tools for the management of the national health system. The UNICEF country office has put at the disposal of the project a Health and Nutrition Officer and has mobilised other people from its team to provide support in organising training and seminars in Tehran and other cities in Iran.

4.3.3 NIDCAP monitoring and accountability

76. One of the main weaknesses of NIDCAP as a pilot programme is the absence of programme planning documents and monitoring and reporting tools. At the time, the programme was not provided with a coherent planning framework detailing activities, outcomes, aims, indicators, timeline, and so on, which has made it impossible to carry out regular monitoring and analysis of the implementation from 2013 to 2018, or to systematise learning or carry out an in-depth external evaluation.

77. In fact, systematisation as an essential element of any pilot intervention is completely absent in NIDCAP. Systematisation would have allowed a deep analysis of how it was possible to accomplish what was accomplished; what worked well and what did not; what were the key success factors; what could have been done differently and why; and what learnings and recommendations result from practice and implementation. Systematisation would have allowed for identifying, capturing and tracking key learning and experience with the purpose of generating, transferring and adapting knowledge. A proper systematisation approach would have facilitated knowledge exchange, transfer and adaptation, and contributed to capacity-strengthening of the health system, increase of effectiveness, and the promotion of innovation and decision-making at policy level.

78. In its origin, the design of NIDCAP showed elements with a clear potential for capitalisation, mainly national leadership and ownership, and the implementation in four different NICUs, which would have made it possible to carry out a comparative analysis between hospitals. An adequate systematisation

would have made it also possible to compare the neonatal care results between the NICUs participating in NIDCAP and 'classical' NICUs that had not introduced the NIDCAP approach. The potential for analysis and learning derived from NIDCAP would have been able to generate highly valuable scientific knowledge in the sphere of developmental care in Iran and on an international level,

79. The absence of a monitoring framework and of essential programme management tools has also limited structured accountability to all parties involved in NIDCAP. The only reporting and accountability documents identified during the evaluation are the annual reports of the UNICEF country office, which include a merely descriptive account of the activities implemented during the year, and do not offer sufficient qualitative or quantitative data to allow for a detailed analysis. UNICEF's annual reports are public in nature and have at least made it possible to ensure reasonable communication and visibility throughout the programme.

4.3.4 Collaboration among partners (MOHME, hospitals, UNICEF, parent associations)

80. The key actors for the introduction of NIDCAP in Iran have been MoHME at a central level, specifically the neonatal health office and the department of international cooperation, the four participating hospitals, UNICEF and the NFI.

81. The evaluation has not identified the signing of a specific agreement for the introduction and implementation of NIDCAP in Iran between UNICEF and the MoHME given that, generally speaking, it could be considered as covered under UNICEF's Country Programme Document.

82. The evaluation has identified the existence of a regular communication between the ministry, the NFI and UNICEF both for the conception and the start-up of NIDCAP and throughout its implementation. The spaces for coordination and technical discussion, as well as the levels of institutional trust between the MoHME and UNICEF are perceived positively by all people interviewed.

83. The creation of parent associations as a key element for emotional support between families and the invigoration of parents' involvement in neonatal care have been recommended by Prof. Als and Prof. Conneman in their reports (and are part of the NIDCAP standards). However, this is an activity that seems not to have been implemented within the framework of the programme. The limitations of the evaluation make it difficult to make a statement on the relevance and viability of the creation of new associations or the eventual use of other mechanisms for citizen participation in the country's hospitals and health services.

4.3.5 Value for money

84. The introduction of NIDCAP in Iran has been possible thanks to the contributions of both MoHME and UNICEF. The evaluation has only had partial and fragmented information regarding the initial budget and the budgetary implementation during UNICEF's implementation of NIDCAP. The figures found vary between a total of USD 100,000 and USD 200,000 provided by UNICEF for all five years, which seems a modest amount given the potential impact of NIDCAP not only on the four NICUs but also on the national health system as a whole. UNICEF's contributions have been aimed mainly at financing the mobilisation of international NFI experts and organising trainings and seminars in different cities in Iran.

85. The evaluation does not have budgetary information regarding the contributions made by the MoHME, but the records available show the efforts made by the health authorities to expand and improve infrastructure and equipment in all four NICUs. In addition to budgetary contributions, the MoHME has mobilised health professionals both at a central level and within different hospitals to ensure the implementation of NIDCAP.

86. As stated in the section on efficiency, some of the main aims set out by the MoHME and UNICEF have not been reached. However, NIDCAP has generated unexpected positive results that provide added value to the national health system, and, to a certain extent, offset the programme's deficits. Firstly, a large number of interviewees recognise that the introduction of NIDCAP has contributed to changing the focus of neonatal care of preterm infants in Iran, and to making clinical practice evolve, particularly in the NICU nursing services. Despite the difficulty of the evaluation in measuring this level of change in a precise manner, there is consensus among interviewees about the change in paradigm in neonatal care brought about by NIDCAP.

87. Furthermore, NIDCAP has promoted interest in developmental care among health professionals, which is reflected in the studies carried out in the different NICUs and in scientific production generated as from 2014 in this field. The evaluation has made a light-touch review of the publications about developmental care and NIDCAP in Iran and has identified 11 papers in national journals.

88. Most authors are NICU health professionals participating in NIDCAP. Biomedical research, as a central activity of health knowledge generation, is essential for any knowledge transmission strategy and for improving health knowledge application in any health system.

4.4 SUSTAINABILITY

Overall, the MoHME and the four hospitals have the capacities and means to maintain NIDCAP standards of care without external support. However, the high workload in the four NICUs seems to affect the performance of health professionals, in particular nurses, which may result in variability of care and a gradual decline in NIDCAP standards of care. Under a health system perspective, in Iran NIDCAP has not reached the maturity required to allow for scalability and to continue developing local capacities.

4.4.1 NIDCAP sustainability and replicability or scalability at national level

89. The improvement of the quality of neonatal care and the generalisation of developmental care, in particular, continue to be a part of the priorities of the MoHME. From an institutional point of view, the MoHME's neonatal health office has played a crucial part in the introduction of NIDCAP in Iran in recent years and continues to be committed to its continuity. The nationwide validation and dissemination of the NIDCAP minimum service package in 2018 is the latest example of integration of NIDCAP in healthcare standards and national programmes.

90. No information regarding the budgets of the MoHME and the hospitals was examined for this evaluation. However, the contributions made to the improvement in infrastructure and equipment of the NICUs make it possible to infer that there may be sufficient financial capacity to continue investing in NIDCAP, depending on the budgetary availabilities and the national economic context. In any case, once the staff is trained, the continuity and the maintenance of the NIDCAP standards depends more of organisational and managerial issues than of financial resources.

91. From an organisational point of view, all four NICUs have adequate infrastructures and installations, although some services seem to require improvements. They also have some health staff (albeit a low number) trained in NIDCAP or with a good training that would allow them to update their clinical practice and align it with NIDCAP standards. In a context of high care demand in the four NICUs, the maintenance of NIDCAP care standards probably requires a greater investment in staff both in number (number of professionals assigned to the NICUs and trained in NIDCAP) and in quality (multidisciplinary nature of teams, including specialist doctors, nurses, and other professionals such as physiotherapists, psychologists, paediatricians, etc.) The evaluation has identified that the recourse to other formulae,

such as the involvement of residents of paediatrics, nursing, and other specialities, could alleviate staff deficits in the NICUs, even if this is not the ideal solution.

92. From the point of view of capacities development, the MoHME created a 'training of trainers' programme to enable cascade training in other hospitals in the country. Likewise, NIDCAP has been integrated in the Masters in Nursing at Tehran University. However, NIDCAP does not form part of the curriculum of medicine studies or of other health science disciplines. Some informants feel that NIDCAP is not integrated in a structured and systematic manner in the introductory training courses taken by medical and nursing residents when they join the NICUs.

93. Currently, the sustainability of NIDCAP is limited both by systemic factors and by human resources factors. Firstly, the NIDCAP National Training Centre has not been created, and therefore the health system has not been provided with a stable mechanism to continue and replicate the training organised during the implementation of the programme. Furthermore, none of the four NICUs has been certified as a centre of excellence, which prevents the health system from having a centre of reference to maintain a stable agenda of continuous training or to organise rotations for health professionals who come from other hospitals, for instance.

94. Secondly, although most NIDCAP-certified professionals continue being active, some professional or personal changes have reduced the initial number from 16 trained individuals to 13 over the past two years. The number of NIDCAP-certified professionals may continue to drop in the event of new professional and personal changes, which are inevitable in the career of any professional. In these circumstances, the health system would run the risk of losing part of the progress made in NIDCAP during the pilot phase.

5 EVALUATION CONCLUSIONS AND LESSONS LEARNED

5.1 CONCLUSIONS

C1 **The absence of essential planning documents (logical framework), management, monitoring and reporting have prevented capitalising on the learning that should have been inherent to NIDCAP as a pilot project.** The level of analysis and the findings of this evaluation are significantly determined by the limited information available. Despite this, the interviews and the review of the documents available have made it possible to reconstruct the implementation of NIDCAP in Iran and to carry out, in a limited manner, a qualitative analysis of strengths and weaknesses.

C2 From a health system perspective, **NIDCAP has contributed to change mindsets about neonatal care and reinforce national capacities in developmental care in Iran**. **One of the major achievements of NIDCAP in Iran is the positive impact on new-born care givers, including paediatricians, nurses, hospital management, and professors which adhered and supported the introduction of the developmental care approach.** As part of broader efforts, NIDCAP has helped to transition from "classical" NICU care (protocol-based tasks) to newborn- and family-centred, developmentally supportive care in the four piloted NICUs. Although the NIDCAP pilot phase focused only on four NICUs, national workshops and the coaching provided by NIDCAP-certified professionals to other neonatal care teams have contributed to expanding the NIDCAP approach and standards to other NICUs.

C3 **The programme has fallen short of NIDCAP full standards and meeting the initial ambitions** (e.g.: creation of the NIDCAP Training Centre in Iran and establishment of Centres of Excellence), despite MoHME's leadership and involvement from early stages of the programme. Paradoxically, the introduction of NIDCAP in Iran has been coherent with the NFI stages and standards, and the activities agreed between the MoHME, UNICEF and the NFI have been implemented adequately. However, at a strategic level the programme has not managed to achieve the aims it set out for itself. The initial momentum seems to have slowed down because the number of NIDCAP-certified professionals did not reach critical mass, and essential elements for the continuing education of health professionals and the expansion of NIDCAP in the country have not been consolidated.

C4 **In terms of the four pilot NICUs, there seems to be variability between the standards and the clinical practice associated with NIDCAP due to infrastructural factors (old installations difficult to adapt to NIDCAP requirements), medical care factors (low number of NICU beds and high pressure on medical care) and human factors (insufficient staff trained in NIDCAP, lack of nursing staff).** Variability in clinical practice can cause an impact on healthcare quality and an erosion of the progress achieved during the implementation of NIDCAP.

C5 **Scientific production generated in Iran forms part of the added value of the programme and contributes to documenting both the experience of implementing NIDCAP in the country and to expanding knowledge about the benefits of NIDCAP in preterm newborns**. The publications issued are nationally relevant, but they may also serve as a reference for other countries in the region or hospitals interested in introducing NIDCAP and developmental care.

C6 The costs associated to NIDCAP certification do not explain why the programme was not capable of completing the process to certify the NICUs (or at least one of the NICUs). **Most NIDCAP-certified professionals continue working in different NICUs and represent a capital that the health system can continue to leverage to relaunch NIDCAP both in pilot hospitals and in other hospitals**. Financial investment in certifying a minimum number of health professionals in each of the four NICUs has already been made and the costs of certifying the NICUs should not be an insurmountable obstacle.

5.2 LESSONS LEARNED

- The design of knowledge capitalisation mechanisms that pertains to any pilot project, as a complement of programme management tools (planning, monitoring, reporting and evaluation), is essential for documenting learnings and making decisions based on evidence.

- UNICEF technical support to the implementation of a pilot project led and resourced by the MoH has proven to be an effective cooperation modality to run the first phase of NIDCAP and set up the bases for an eventual scale-up.

- NIDCAP training and developmental care must be perceived as a continuous process and be integrated in basic or specialised health system training so as to ensure a constant critical mass of trained professionals and to respond to the inevitable losses and changes resulting from personal circumstances.

6 RECOMMENDATIONS

The table below details the recommendations both at a strategic level and an operational level, assuming a scenario of continuity and consolidation of NIDCAP, following the end of the pilot phase.
The recommendations are defined based on three fundamental premises:

- Although the evaluation does not have recent data, the current neonatal health situation in Iran differs from the situation that led to the implementation of NIDCAP in 2013. Therefore, it is necessary to update any strategy for intervention in neonatal (or perinatal) health in the light of the existing indicators today.

- It is necessary to define and consolidate a national model of NIDCAP-certified NICU, with homogeneous and substantiated care standards, before continuing with the expansion of NIDCAP to other hospitals.

- Like in any other healthcare context, the articulation of a virtuous circle that combines knowledge generation with knowledge transmission and finally knowledge application must be a fundamental strategy of the MoHME to ensure decision-making based on evidence and dissemination of learnings.

RECOMMENDATIONS	PRIORITY	AUDIENCE	TIMEFRAME
STRATEGIC LEVEL			
▪ R1) MoHME and UNICEF jointly develop and implement a comprehensive newborn infant care strategy aligned with current national priorities (eventually as part of a broader perinatology strategy). o Learnings from NIDCAP and other newborn infant care and maternal health interventions are integrated into the MoHME – UNICEF collaborations. o A clear evaluation, monitoring and accountability framework on new born care integrating NIDCAP evaluation is established. o The National Iranian Committee on NIDCAP is reactivated and its composition reflects the diversity of stakeholders engaged in developmental care (health officials at central and regional level, practitioners -medical and paramedical staff-, health managers, researchers and parents). Considering the eventual scale-up of NIDCAP to other regions of the country and based on learnings from the pilot phase, a clear articulation between the central and regional level (e.g: NIDCAP regional focal points) could be envisaged. In addition, key alliances could be developed (e.g: national neonatal association, parent's associations, other national and international stakeholders). The National Iranian Committee on NIDCAP has the legitimacy and expertise to define the strategy and next steps for the scale-up of NIDCAP, based on an sound assessment of needs (particularly in deprived regions) and national means.	High	MoHME – NHO UNICEF CO	Second half 2021
PROGRAMMATIC LEVEL			
▪ R2) NIDCAP achievements during the "pilot phase" are consolidated; at least 1 NICU engages in a NIDCAP certification process to serve as 3rd level NICU reference and "model" for other hospitals. o A plan to support 2nd level NICUs and homogenise standards of neonatal care for premature newborns, particularly in remote and deprived provinces is defined (building on the recommendations	High	MoHME – NHO Hospitals NFI	Second half 2021

from Mid-Term Review conducted by UNICEF in 2019 concerning neonatal health in deprived provinces[16]).			
▪ R3) A structured research agenda on developmental care and NIDCAP is defined and implemented (engaging MoHME, universities, hospitals, UNICEF and, eventually, NFI experts).	Low	MoHME – NHO Hospitals Universities NFI	Second half 2021
▪ R4) A NIDCAP national training centre is established and developmental care and NIDCAP principles are integrated into medical, nursing, midwifery education and the national action plan on human resources for health. o Developmental care and NIDCAP approach are integrated into annual training programmes for health professionals (as part of undergraduate and postgraduate education, as well as continuing education programmes). o NIDCAP principles and standards are part of integration trainings for new staff working in NICUs.	High	MoHME – NHO Hospitals Universities NFI	Second half 2021
▪ R5) Communication and awareness raising actions about NIDCAP and developmental care among hospital staff (management and multidisciplinary teams) and parents accompany the renewed efforts for the consolidation of NIDCAP in Iran. o A communication plan and education actions aiming at the involvement of parents in the care of their premature babies are defined and implemented in the four hospitals. o Other health professionals (e.g: physiotherapists, psychologists, paediatric residents) are integrated into NICU teams.	Medium	MoHME – NHO Hospitals Parents	Second half 2021

[16] « Investments will be accelerated in few areas identified as catalytic for the wellbeing of children living in Iran: a) neonatal health in deprived provinces (…)"

7 ANNEXES

i. Evaluation matrix
ii. List of organisations interviewed
iii. Relevant publications on NIDCAP and developmental care in Iran
iv. UNICEF Research Ethics Approval letter

I Evaluation matrix

RELEVANCE

KEY EVALUATION QUESTIONS	SUB-QUESTIONS	SOURCES	DATA COLLECTION METHODS
KQ1) To what extent were the NIDCAP intervention's design and intended results relevant to UNICEF's country programme health component and overall needs of the national health care objective including service providers and the beneficiaries?	1. To which extent NIDCAP was **was coherent** with: o UNICEF country programmes (health & nutrition) 2012 – 2016 and 2016 - 2021 o MoHME neonatal health plans, priorities and indicators at national and local levels o Newborns and parent's needs countrywide o NICU health care professionals	▪ UNICEF country programmes and annual reports ▪ WHO country programmes and annual reports ▪ NIDCAP progress reports ▪ MoHME national plans and statistics on neonatal care ▪ MoHME medical and neonatal training programmes ▪ National Iranian Committee on NIDCAP ▪ Hospital annual planning and activity reports	▪ Documentary review ▪ Semi structured interviews
KQ2) To what extent has NIDCAP consistently integrated gender and equity dimensions?	2. To which extent have both parents (**mothers and fathers) got involved** in the training in NIDCAP? 3. -To which extent have eventual **social, cultural factors or barriers affecting equity** been addressed by NIDCAP?	▪ MoHME and research reports on accessibility to health care programmes and services (notably childcare) ▪ NIDCAP progress reports	

EFFICIENCY

KEY EVALUATION QUESTIONS	SUB-QUESTIONS	SOURCES	DATA COLLECTION METHODS
KQ3) To what extent did MoHME &UNICEF's contributions to NIDCAP represent the best possible use of available resources to achieve results of the greatest	4. To which extent have NIDCAP activities deliver **value for money** (cost - outputs relationship)? 5. To which extent has NIDCAP **duration** (2013 – 2018) allowed the achievement of expected results and activities have been timely implemented? 6. To which extent have the teams, experts and **skills mobilised** during the implementation fitted with the institutional (MoH, hospitals) and technical requirements to implement NIDCAP? 7. To which extent has NIDCAP **monitoring perspective allowed** regular accountability to all stakeholders? 8. To what extent has effective coordination and **collaboration among partners** (MOHME, hospitals, parent's associations?) been addressed and achieved?	▪ UNICEF country programmes and annual reports ▪ NIDCAP budget, progress reports ▪ National Iranian Committee on NIDCAP, minutes of meetings	▪ Documentary review ▪ Semi structured interviews

possible value to improve neonatal care?	9. To which extent is the **NIDCAP certification process** easy to understand and straightforward to follow?	▪ UNICEF & MoHME MoUs ▪ MoHME & hospitals budgets	

EFFECTIVENESS

KEY EVALUATION QUESTIONS	SUB-QUESTIONS	SOURCES	DATA COLLECTION METHODS
KQ4) To which extent have the knowledge and system capacity of MOHME at national and sub-national levels in the area of follow up care for high risk infants children and surveillance been enhanced towards reduction of neonatal mortality[17]?	10. To which extent NIDCAP has supported the development of **tools for NICUs** and service providers? o Which guidelines and instruments have been developed and implemented? o Has the standard service package for NICUs been validated and implemented? o Has the national survey on neonatal health generated disaggregated data on gender (and other variables) to support decision making regarding newborn infant care? 11. To which extent has the NIDCAP contributed to **improve newborn care**, in the four piloted hospitals? (as this would require extensive follow-up, the data looked at will be the following - assuming that breastfeeding, reduction of admission days and NIDCAP care standards are proxies for quality neonatal care): o How many of the currently admitted preterm and severely ill infants have been assessed as according to the APIB tool? o Has the number of days of admission for preterm neonates decreased during the implementation of NIDCAP? o How many of the admitted patients are breastfed now – compared to before NIDCAP? And compared to the national average? o Do all preterm and ill neonates lie skin-on-skin daily with a parent? Is kangaroo mother care systematized? o To which extent have NICUs physical spaces been upgraded based on NIDCAP standards and guidelines? 12. To what extent are **parents satisfied** with the level of involvement in the care of their child? o Are parents introduced to NIDCAP upon admission, and do they feel involved in the care of their child and welcomed by staff? o In what ways are parents being supported in order to reduce their level of stress and anxiety? 13. To what extent does the **practice of the trained service providers** has evolved thanks to NIDCAP training and technical support and it is aligned with NIDCAP international standards?	▪ MoHME national plans and statistics on neonatal care ▪ MoHME medical and neonatal training programmes ▪ Hospital annual planning and activity reports ▪ Satisfaction surveys of parent's feedback. ▪ MoHME career development and compensation policies	▪ Documentary review ▪ Semi structured interviews ▪ Databases analysis

[17] As defined in: Outcome and Output performance summary by business area.xls "By end of 2016, the knowledge and system capacity of MOHME at national and sub-national levels in the area of follow up care for high risk infants children and surveillance is enhanced towards reduction of neonatal mortality
World-class knowledge and skills on neonatal care were transferred to Iran through on-the-job training in 4 selected Neonatal Intensive Care Units focused on the Newborn Individualized Developmental Care and Assessment Program."

	○ What do NIDCAP providers report as having changed in their way of providing neonatal care compared to before? ○ To what extent has the daily routine of the nursery been adjusted to accommodate the NIDCAP principles? 14. What were the key **factors influencing the achievement** or non-achievement of the anticipated results? ○ What are the barriers and enhancing factors for using the NIDCAP approach (time, financial resources, education, etc)? ○ How have doctors' and nurses' attitudes towards NIDCAP influenced implementation? ○ Are there **career benefits** for NIDCAP professionals (increased salary? any other advantages or disadvantages?) 15. To what extent has NIDCAP been implemented into the four hospitals comparing to the **NFI certification criteria**?		

SUSTAINABILITY

KEY EVALUATION QUESTIONS	SUB-QUESTIONS	SOURCES	DATA COLLECTION METHODS
KQ5) To which extent are NIDCAP achievements likely to be sustained without international or external support?	16. To what extent has the NIDCAP been incorporated into the national policy frameworks, neonatal care programmes and protocols (incl. learning objectives for physicians and nurses training to become experts in neonatology) – **organisational, administrative and financial sustainability**? 17. To what extent the NIDCAP pilot initiative mature for **replicability or scalability** at national level without UNICEF's support? ○ Do the hospitals keep a whitebook / NIDCAP reflective reports (or similar knowledge and experience repositories) in order to conserve their NIDCAP knowledge? ○ Is information on NIDCAP part of the introduction for new staff at the 4 hospitals? ○ Staff turnover - how many of the staff who over time have received NIDCAP training still work with NIDCAP in the same or a different public hospital? ○ How is the MOHME intending on disseminating the knowledge gained from the 4 pilot projects to low-income regions of rural Iran – practically as well as financially (is NIDCAP part of the health sector budget)?	▪ MoHME national plans, administrative framework and budgets on neonatal care ▪ Hospital annual planning and activity reports ▪ MoHME and hospitals human resources reports or statistics	▪ Documentary review ▪ Semi structured interviews

II List of organisations interviewed

LOCATION	ORGANISATION
Tehran	▪ MoHME ▪ Tehran University of Medical Sciences ▪ Valiasr Hospital ▪ Mahdieh Hospital ▪ UNICEF CO ▪ WHO
Tabriz	▪ University of Medical Sciences ▪ Alzahra Hospital
Shiraz	▪ University of Medical Sciences ▪ Hafed Hospital
Amman	▪ UNICEF CO
Rotterdam	▪ NFI
Boston	▪ NFI

III Relevant publications on NIDCAP and developmental care in Iran

Soleimani F, Torkzahrani S, Rafiey H, Salavati M, Nasiri M. Assessing Factors Influencing the Quality of Developmental Care in Neonatal Intensive Care Units of Tehran, Iran J Pediatr. 2017 ; 27(1):e6733. doi: 10.5812/ijp.6733.

Mirlashari J, Fomani FK, Brown H, Tabarsy B. Nurses' and Physicians' Experiences of the NIDCAP Model Implementation in Neonatal Intensive Care Units in Iran. J Pediatr Nurs. 2019 Mar-Apr;45:e79-e88. doi: 10.1016/j.pedn.2018.12.014. Epub 2019 Jan 7. Erratum in: J Pediatr Nurs. 2019 Nov - Dec;49:113. PMID: 30630639.

Khosravan S, Khoshahang M, Heidarzadeh M, Basirimoghadam M. Effect of NIDCAP home care follow-up program of preterm newborns on maternal anxiety and stress. Annali di Igiene : Medicina Preventiva e di Comunita. 2020 Nov-Dec;32(6):627-634. DOI: 10.7416/ai.2020.2384.

Baghlani R, Hosseini MB, Safaiyan A, Alizadeh M, Bostanabad MA. Neonatal Intensive Care Unit Nurses' Perceptions and Knowledge of Newborn Individualized Developmental Care and Assessment Program: A Multicenter Study. Iran J Nurs Midwifery Res. 2019 Mar-Apr;24(2):113-117. doi: 10.4103/ijnmr.IJNMR_54_18. PMID: 30820222; PMCID: PMC6390436.

Ouladsahebmadarek, E., Hasanpour, S., Hosseini, M., Mirghafourvand, M., Heidarabadi, S., Asghari Jafarabadi, M. (2020). Effect of Developmental Care on Preterm Neonates' Neurodevelopmental Outcomes at 12 Months of Age. Iranian Journal of Neonatology IJN, 11(3), 7-14. doi: 10.22038/ijn.2020.43769.1728

Foladi, Nahid and Shirinabadi Farahani, Azam and Nourian, Manijeh and Faghihzadeh, Elham and Khanali Mojen, Leila and Gholami, Sara and Goudarzi, Fateme (2020) Barriers to the Implementation of "Newborn Individualized Developmental Care and Assessment Program" from the Perspectives of Nurses and Physicians. Iranian Journal of Neonatology IJN, 11 (4). pp. 14-20.

Mousavi, S. S., Chaman, R., Khosravi, A., Mohagheghi, P., Mousavi, S. A., & Keramat, A. (2016). The Needs of Parents of Preterm Infants in Iran and a Comparison With Those in Other Countries: A Systematic Review and Meta-Analysis. Iranian journal of pediatrics, 26(5), e4396. https://doi.org/10.5812/ijp.4396

Razavi Nejad M, Eskandari Z, Heidarzadeh M, Afjeh A, Almasi-Hashiani A, Akrami F. Assessing infant-oriented care with developmental support approach in Iranian NICUs. J Matern Fetal Neonatal Med. 2018 Jul;31(14):1851-1855. doi: 10.1080/14767058.2017.1330879. Epub 2017 May 31. PMID: 28508672.

Razavi Nejad, M., Heidarzadeh, M., Mohagheghi, P., Akrami, F., Almasi-Hashiani, A., Eskandary, Z. (2017). Assessment of Physical Environment of Iran's Neonatal Tertiary Care Centers from the Perspective of the Neonatal Individualized Developmental Care. Iranian Journal of Neonatology IJN, 8(4), 20-25. doi: 10.22038/ijn.2017.21258.1240

EskandarI, Z., Akrami, F., Razvi Nejad, M., Almasi-Hashiani, A., Heidarzadeh, M. (2020). Assessing Family-Centered Care in Iranian NICUs from Perspective of Neonatal Individual Developmental Care. Iranian Journal of Neonatology IJN, 11(4), 87-92. doi: 10.22038/ijn.2020.47189.1808

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Research Ethics Approval

22 September 2020

Enric Grau, Evaluation team leader
c/o UNICEF MENA Regional Office
P.O. Box 1551
11821 Amman, Jordan

RE: Ethics Review Board findings for: *Evaluation of the "Newborn Individualized Developmental Care and Assessment Programme (NIDCAP), Iran, 2013 – 2018"* (Review #283EIRA20)

Dear Mr. Grau,

Protocols for the protection of human subjects in the above study were assessed through a research ethics review by HML Institutional Review Board (IRB) on 01 – 22 September 2020. This study's human subjects' protection protocols, as stated in the materials submitted, received **ethics review approval.**

You and your project staff remain responsible for ensuring compliance with HML IRB's determinations. Those responsibilities include, but are not limited to:

- ensuring prompt reporting to HML IRB of proposed changes in this study's design, risks, consent, or other human protection protocols and providing copies of any revised materials;
- conducting the research activity in accordance with the terms of the IRB approval until any proposed changes have been reviewed and approved by the IRB, except when necessary to mitigate hazards to subjects;
- promptly reporting any unanticipated problems involving risks to subjects or others in the course of this study;
- notifying HML IRB when your study is completed.

HML IRB is authorized by the U.S. Department of Health and Human Services, Office of Human Research Protections (IRB #1211, IORG #850), and has DHHS Federal-Wide Assurance approval (FWA #1102).

Sincerely,

D. Michael Anderson, Ph.D., MPH
Chair & Human Subjects Protections Director, HML IRB

cc: Robert Stryk, Penelope Lantz, JD

HML Institutional Review Board
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