


Update of the Technical Guidelines for the Implementation of Kangaroo Mother Programs in Colombia, with emphasis on nutrition for premature or low birthweight newborns



MINSALUD





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for the Implementation of Kangaroo
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or low birth weight infants



November 2017





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DOCUMENT INFORMATION

Version

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Made in the framework of Association Agreement No. 667 of 2015 of the Ministry of Health and Social Protection, the Colombian Neonatology Association and the Kangaroo Foundation.
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LIST OF ACRONYMS

| | |
|-------------|----------------------------------|
| BPD | Bronchopulmonary Displaysia |
| CF | Cardiac Frequency |
| RF | Respiratory Frequency |
| MKI | Kangaroo Mother Intervention |
| MII | Maternal Infant Institution |
| ML | Maternal Lactation |
| KMM | Kangaroo Mother Method |
| KN | Kangaroo Nutrition |
| EPI | Expanded Program of Immunization |
| KP | Kangaroo Position |
| AEP | Auditory Evoked Potentials |
| KMP | Kangaroo Mother Program |
| IUGR | Intrauterine Growth Restriction |
| GR | Gastroesophageal Reflux |
| NB | Newborn |
| ROP | Retinopathy of Prematurity |
| OT | Orogastric Tube |
| DHS | Departmental Health Secretary |
| ICU | Intensive Care Unit |
| NICU | Neonatal Intensive Care Unit |
| NU | Newborn Unit |

INTRODUCTION

Twelve years after the World Health Organization (WHO) recommended the use of the Kangaroo Mother Method (KMM) (2003), and the Ministry of Health and Social Protection in Colombia issued Decree 3039 of 2007 and Resolution 0425 of 2008 for the promotion of the Kangaroo Mother Programs (KMP) and the Application of the KMM in all Newborn Units in the country, the KMM continues to encounter resistance and barriers for its implementation.

Currently, reducing child mortality and the consequences of low birthweight and prematurity has been possible in affluent societies thanks to an improvement in quality of life that has resulted in healthier births, non-restricted access to neo-natal care and advances in technology of perinatal care.

In the world, at least 20 million children each year (90% of these children are born in low or medium income countries) are candidates for the KMM. Of the 4 million children that die each year, half of the deaths are associated with preterm births and/or low birthweight (LBW) and their complications. In Colombia, 12% of births are preterm, which means around 100,000 children a year on average. Even when general neonatal death decreases, LBW and prematurity continue to be principal causes of death. The majority of these newborns initially present serious complications that require medical treatment. After this, the newborns that survive the initial

adaptation to life outside the womb require special care while their organisms mature progressively until they reach the estimated birth date. This corresponds to a critical period given that those newborns who survive the neonatal adaptation process run the risk of dying due to secondary complications that could have been preventable via non-invasive interventions that require minimal neonatal care. Amongst these complications are: hypothermia, infections acquired in hospitals, non-optimal feeding and general overcrowding and unhygienic conditions.

The care of these fragile babies continues to be costly, and cost-effective alternatives are required. One of these is the Kangaroo Mother Method (KMM), a method for caring for a preterm newborn of LBW based on 1) the Kangaroo Position or direct skin-to-skin contact between the child and mother 24 hours a day once the child is stable, 2) exclusive breastfeeding, if possible, and 3) early discharge from the hospital in a kangaroo position with strict ambulatory follow up for at least the first year of the baby's life. The KMM is an alternative that offers the most rational use of resources in comparison with other methods that require costly, sophisticated, and technology-intensive techniques, without sacrificing the quality of medical service or results. The KMM is a complement to neonatal care, not a replacement.

The original components of the intervention (prolonged skin-to-skin contact in the kangaroo position, nutrition based on breast feeding, early discharge from the hospital in a kangaroo position) have been scientifically proven in observation studies and experiments conducted in Colombia and other countries, both industrial and developing. There is much evidence that supports the KMM with all its components. It is an efficient and reliable method for the care of preterm and/or low birth weight babies, clinically stable.

Recently, the KMM has been rediscovered by industrial countries and defined as a safe and emotionally appropriate physiological intervention that offers unique benefits when it is integrated as part of the care of fragile newborns. This has been reflected in the growing number of publications related to physiological, and some psychological, aspects of skin-to-skin contact between the mother and the fragile newborn. However, many of these researchers and doctors from developed countries have not realized that the KMM – as it has been conceptualized by its creator and followers in the south – is an intervention far more sophisticated and complex than incidental skin-to-skin contact between mother and child. Therefore, with the Kangaroo Mother Method being an innovative health technology, the quantity of evidence available referring to all its components and health benefits is limited. A great part of the evidence is produced in Colombia. Therefore, inasmuch that that the outreach and implementation of Kangaroo Mother Programs is increased, it is hoped that the quantity and quality of evidence regarding the various components of the KMM increase also.

For the implementation of a comprehensive care package in health and nutrition for first infancy, the Ministry for Health and Social Protection has been carrying out actions in a scaled manner in the

country's municipalities with a high rate of maternal and infant mortality, carrying out actions to strengthen the development of skills of personnel who attend gestation, children, and adolescents. In 2010, in a collaboration between the Ministry of Health and Social Protection and the World Food Programme, with the technical support of the Kangaroo Foundation, the Technical Guidelines for the Implementation of the Kangaroo Mother Programs in Colombia were published.

Due to advances in the last five years, in relation to new CONPES documents such as 162 of 2013, and 181 of 2015, Resolution 2003 of May 28, 2014, which define the procedures and registration conditions of the healthcare service providers and enablement of healthcare services, included in the Kangaroo Mother Programs, it is necessary to update the guidelines for the country on care for preterm and/or low birth weight newborns.

The Kangaroo Foundation committed itself, with the Ministry of Health and Social Protection and the country, to provide a high quality product that allows the actors of the social security healthcare system (health insurance, health institutions, and their users) to adopt a “kangaroo strategy” as a tool to reduce mortality amongst the infant population and the consequences of preterm and low weight births at any place in the national territory. This guarantees a high level in the quality of services provided and the conditions in which the same are delivered.

The Technical Guidelines for the Implementation of the Kangaroo Mother Programs in Colombia are based on the bibliography compiled by the Kangaroo Foundation in the practical clinic guide called “Guides for clinic practice based on evidence for the optimum use of the Kangaroo Mother Method in the care of preterm and/or low birth weight newborns” developed by the Kangaroo Foundation and the Department of Clinical

Epidemiology and Biostatistics of the Faculty of Medicine of the Pontifice Universidad Javeriana, that is currently being updated.”¹

¹ Ruiz J, Charpak N. “Practical Clinical Guides based on evidence for the optim use of the Kangaroo Mother method in preterm and/or low birth weight infants” Kangaroo Foundation and Department of Epidemiology and Statistics, Universidad Javeriana, 2007.

SCOPE

The Technical Guidelines for the Implementation of the Kangaroo Mother Programs (KMP) in Colombia that are developed in this document, aim to

- Provide hospitals or centers specialized in the KMM with the necessary methodological and clinical tools so that they can provide a high-quality KMM for preterm or low birth weight babies.
- Increment and strengthen that capacity of hospitals to implement the Kangaroo Mother Program in an integral way, with emphasis on constant interdisciplinary monitoring of the infants to guarantee their adequate development and growth, and to empower families and parents in the optimum care and protection of their baby.
- Provide information that allows coordination between the actors of the General Health Social Security Program involved in the attention and care of newborns, achieving continuity and adherence to the attention with the opportune entry of the preterm and/or low birth weight newborn in each of the phases of the program in its ambulatory component in order to decrease complications or avoidable death.
- Standardize interventions (consultations, diagnostic support, vaccinations, medication, individual and group educational activities, follow-up activities at home for cases of social risk, transport, feeding and telephone follow-up) in the joint modality or the comprehensive attention and care package that would allow health institutions to offer a specialized quality health service in the care and attention of preterm and/or low birth weight newborns.
- Ensure the quality of attention for preterm and/or low birth weight newborns in the health institutions where the service is offered, with monitoring indicators of adherence and outcomes of the Kangaroo Mother Method in its intrahospital and ambulatory components.

1 WHAT DOES THE COLOMBIAN KANGAROO MOTHER METHOD MEAN?

The Kangaroo Care or Kangaroo Mother Program consists of a group of interventions directed in essence at preterm and/or low birth weight infants.

These interventions have a degree of heterogeneity manifested in the various names that identified them, such as: i) kangaroo care; ii) kangaroo mother care; iii) kangaroo method; iv) kangaroo mother method; v) kangaroo mother intervention; vi) kangaroo technique;

vii) kangaroo program; viii) kangaroo mother program and, ix) skin-to-skin contact. In particular, the term skin-to-skin contact has frequently been used in anglophone scientific literature to describe interventions that only use one of the principal components of the Kangaroo Mother Method, such as the Kangaroo Position.

The title Kangaroo Mother Program has the meanings described below.

- **Program.** Collection of actions whose principal objective is to reduce mortality amongst preterm and or low birth weight infants and compensate for the lack of incubators.
- **Mother.** Mother who is asked to participate in an active way in the care of her preterm baby. The father also participates when present, but the responsibility mainly falls on the mother. For this reason, the method's name is attributed to her.
- **Kangaroo.** This term evokes the extra-uterine maturation of the fetus as occurs in non-placental mammals. It refers to the mother as provider of the so-called kangaroo position (defined below), continually carrying the preterm child until it reaches the expected maturity.

The Kangaroo Mother Program - KMP. A collection of organized activities destined to carry out a specific health intervention. In this case, it is the Kangaroo Mother Intervention, with duly trained and organized health personnel, within a defined physical and administrative structure.

1.1 Objectives of the Kangaroo Mother Method

The KMM seeks the improvement of integral health conditions of preterm and/or low birth weight infants, as well as the humanization of care processes for infant and family in neonatal care units. As such, the following benefits are obtained:

- Humanize hospitals and the ambulatory care of preterm infants.
- Provide specialized attention orientated to survival with quality and the preservation of adequate cerebral development.
- After the birth, allow development of the attachment between the infant and its parents as soon as possible.
- Empower the mother and/or caregivers and gradually give them the capacity and responsibility to be the primary caregivers of the infant, satisfying their physical and emotional needs.
- Detect in a timely way the variations in neuromotor and psychomotor development to intervene and prevent the appearance of consequences inherent to prematurity and low birth weight during high risk follow-up. (Minimum until 1 year of corrected age.)
- Improve life expectancy and provide adequate physical, neurological, and psychosocial development in the infants.
- Be an adequate clinical care alternative when the capacity and technology available are limited, with a rational use of human and technological resources.
- Promote and protect exclusive breastfeeding as much as possible.
- Educate and empower the mother and father so that they become primary caregivers and attend the physical and emotional needs of the infant at home, gradually transferring the responsibility of care and the skills to them.
- Contribute to decreasing child abandonment and abuse.

1.2 Application forms of the Kangaroo Mother Method

Considering the proposed objectives and the degree of development of the institution and the country, the Kangaroo Mother Method can be used to reach one or various objectives at the same time. As such, it may be applied in the following three ways:

The Kangaroo Mother Method as an alternative to weight gaining:

This is the most complete use of the Kangaroo Mother Method as it proposes achieving two objectives: i) optimizing the use of human and technological resources available, and ii) allowing the earliest possible integration of the newborn with the mother and the family environment.

This method is of special interest for middle income

countries that have limited economic, technical, and human resources, and that are concerned about the consequences of separating mother and newborn. It has the advantage that families participate actively in the care of the new born. This is the method of application that we use in the centers in Bogota and that can be recreated in newborn units.

The Kangaroo Mother Method used in places that do not have neonatal units:

In countries where there are no incubators in hospitals, the Kangaroo Mother Method represents a possibility for survival for preterm and/or low birth weight infants. We refer to those poor or deprived hospital centers where there is no option different to the method for the thermic regulation and feeding of the low birth weight infant.

We consider this way of applying the Kangaroo Mother Method as a transitory alternative. For developing countries, it must be insisted that there be adequate reference centers to receive these fragile infants, not just for their survival, but for their life quality to make them citizens capable of helping their families and countries in

their development. This method of application of the Kangaroo Mother Method is the first stage to reduce neonatal and infant mortality. This is not a treatment for pathologies. It only applies for the care of low birthweight and/or preterm infants without pathologies or with slight immaturity. Other infants with associated pathologies will be at risk of death if they do not receive the specialized clinical care that they need.

This alternative may be used in emergencies in healthcare centers that do not have newborn units before the newborn is transferred to a hospital capable of providing them with everything they need for their survival and quality of life.

The Kangaroo Mother Method in Neonatal Units and Intensive Neonatal Care Units

In places where access to high technology neonatal care is unlimited, the Kangaroo Mother Method, and the kangaroo position specifically, were introduced to favor the mother-baby bond and to stimulate breastfeeding.

Modern neonatology is usually quite aggressive for the small newborn that arrives to a high-technology environment where, despite their vulnerability, they must overcome the first vital stage of their life overwhelmed by stress. The intensive neonatal care units are enclosures where newborns experience frequent aggressive procedures, indiscriminate manipulation, sleep interruption, unpleasant oral medication and an excess of noise and light.

The immediate and long-term effects of being under this kind of stress vary. An infant of 26 weeks will have to tolerate around 400 painful treatments before leaving for their home and they won't have slept continuously for more than 19 minutes during their hospitalization. The effect of this accumulated stress is probably critical for the formation of the brain as diverse studies indicate that some cerebral alterations of these infants (in learning, behavior, and motor problems) are attributable to the stress and/or pain suffered in the neonatal unit.

The visiting regime in the majority of these units does not depend on the mother and family, but rather on that made available by the hospital's medical team. The mother, though recognized as the representative of her infant, is treated as a visitor and, in diverse cases, doctors can even overrule her consent to order some procedure that could be traumatic and even unnecessary.

The key steps of the different initiatives that seek to humanize the care of low birth weight infants, promote breastfeeding, and creating an early bond between mother and infant, propose changes in maternities across the world by early contact between mother and infant, the kangaroo position when needed, joint accommodation and frequent and exclusive breastfeeding, as well as minimal contact with health teams in constant rotation.

Parents are a constant throughout the life of any infant. As such, the family is one of the factors that most influences their future, especially when there is an alteration in their development.

Non-separation of the preterm and/or low birth weight infant from their parents must be promoted, regardless of their critical condition. As such, it is necessary to provide the necessary tools so that the parents can stay at the infant's side during the start of their life.

Neonatology requires a change in the paradigm of attention to low birthweight and/or preterm babies, in relation to participation and prominence of the parents during the care process. The introduction of the Kangaroo Mother Method allows for this change in practice as, in order to implement it, the units must not just open their doors to the parents, but also perform holistic care that integrates the parents in the period of treatment of their infant.

The KMM is very particular as it is a method created in Colombia that has spread in the last 20 years to many countries, regardless of their level of development and with different methods. It is currently used as a method to humanize the technology of neonatology services, and furthermore it is a topic of research in fundamental sciences in developing countries (physiology, neurophysiology, psychology, endocrinology)

The KMM is not a specific technique in the area of nursing or neonatology. It is a multidisciplinary intervention that involves the participation of all health personnel that work in neonatal units.

Between 1994 and 2015, around 70 teams from different countries, and 35 from Colombia, were trained in the Kangaroo Mother Method by the Kangaroo Foundation and their team thanks to the help of the Ministry for Health and Social Protection, European and American NGOs, international corporations (USAID, APC French Corporation), the European Union, departmental and district health secretaries, and private business. This project is based on the experience of our group to implement new

Kangaroo Mother Programs.

2 PRELIMINARY DEFINITIONS

The use in scientific literature (and in the terminology of health professionals) of the terms *program*, *intervention*, and *method*, is imprecise, creating a high degree of confusion. For this reason, the definitions that shall be used for these guidelines are listed below.

- **The Kangaroo Mother Program** is the collection of organized activities destined to carrying out a specific health intervention (in this case, the Kangaroo Mother intervention) with a team of duly trained and organized healthcare personnel within a defined physical and administrative structure.
- **The Kangaroo Mother Intervention** consist of a series of components that are applied in an organized and systematic way by following the Kangaroo Mother Method.
- **The Kangaroo Mother Method** is a care system for premature or low birthweight infants, standardized and with a protocol based on skin-to-skin contact between the premature and/or low birthweight baby and its mother, exclusive breastfeeding whenever possible, and early discharge from the hospital in the Kangaroo Position with strict ambulatory follow-up during the first year of corrected age. The KMM seeks to empower the mother (fathers, caregivers) and gradually give them the skills and responsibilities to be the primary care of their child, satisfying their physical and emotional needs.

Prematurity: State that defines the birth before week 37 of the gestational period, independent of weight.

Low Birth Weight Infant (LBW): An infant born with a weight of less than 2,500, independent of gestational age.

Duration of the gestation: A normal gestation

to full term lasts from 37 to 42 weeks after the conception. 40 weeks are considered as the desirable term, and as a post-term, from week 42.

Chronological Age: According to recommendations from the APA (American Pediatric Society), (postnatal age, in days, months, years) age is calculated measuring the time passed from the date of birth to the moment of evaluation.

Example: A pre-term baby born at 32 weeks of gestational age that currently is 5 weeks old at the moment of evaluation has a chronological age of 5 weeks and a gestational age of 37 weeks.

Gestational age: According to recommendations from the APA (American Pediatric Society), this is defined as the time lapsed (in complete weeks) between the first day of the last menstrual period and the day of birth.

If conception was achieved using reproductive technological assistance, the gestational age is calculated adding two weeks to the conceptional age. The gestational age is used to define the age of the infant before they reach 40 weeks.

Corrected age: (Used starting from the 40 weeks of gestation) According to the APA (American Pediatric Society) recommendation, this is defined as the chronological age (in weeks or months) minus the number of weeks that were needed to reach the 40 weeks of gestation. The term is used only for infants born before full term until three years of age.

Example: An infant that is 6 chronological months of age (24 weeks) born at 28 weeks of gestational age, (12 weeks before term) has a corrected age of 3 months (12 weeks) in accordance with the following equation:

6 months – [(40 weeks – 28 weeks) x 1 month/4 weeks]

Kangaroo Position: This is when the infant is placed in the ventral decubitus, vertically on the chest of an adult provider of the position (commonly, the infant's mother). The chest and abdomen of the infant and the chest of the provider are in direct skin-to-skin contact. The back of the infant is covered by the clothes of the provider and the infant remains sustained by an elastic band that goes around the provider's torso (the band maintains the kangaroo position of the infant).

Provider of the kangaroo position: The person that carries the infant in the kangaroo position. Ideally, the mother would be the main provider of the kangaroo position, helped by the father or another family member.

Primary apnea of preterm newborn: This is the cessation of respiration for twenty seconds or respiratory pause accompanied by bradycardia (Cardiac Frequency < 100 x min) and/or cyanosis). Primary apnea is the most frequent form in preterm and immature newborns and is characterized by not being associated with another pathology that explains it, except prematurity. The following three types are recognized:

- **Central apnea** Characterized by the total absence of thoracic-abdominal movement (10 to 25% of apneas).
- **Obstructive apnea.** Characterized by the absence of nasopharyngeal air flow but with the persistence of thoracic-abdominal respiratory movements (10 to 25% of apneas)
- **Mixed apnea.** Where the obstructive apnea precedes or succeeds the central apnea (50 to 75% of premature newborn apneas).

Maternal lactation: Feeding with milk from the mother, be it directly from the breast or by the administration of previously extracted milk.

Breastfeeding: Feeding directly from the mother's breast.

Hindmilk: The hindmilk from breastfeeding or of extraction (mechanical or manual), richer in fats and calories.

Complementation to maternal feeding: The use of artificial milk (formula milk) to guarantee the contribution of the necessary volume for adequate growth.

Supplement to maternal feeding: Use of fortifiers of maternal milk to guarantee an adequate composition when the volume of maternal milk is adequate.

Fortifiers of maternal milk: Special preparations; substances that are added to maternal milk in order to increase the contents of nutrients, principally proteins, calcium, and phosphorous. In accordance with Act 11/09 of November 26, 2009, the National Institute for the Surveillance of Drugs and Food (INVIMA) recommends that fortifiers of maternal milk must be only for hospital use and with medical recommendations and monitoring.

Kangaroo Adaptation: Period of adaptation to the different components of the Kangaroo Mother Method (KMM) during which the responsibilities are gradually transferred to the person providing the kangaroo position to achieve the objectives of the method in the care of the infant.

Discharge in kangaroo position: Hospital discharge of the infant, regardless of their weight or gestational age, in the kangaroo position to regulate their temperature and after a successful kangaroo adaptation (once the criterium for eligibility has been fulfilled for the discharge of the infant, mother, and family).

3. REGULATORY FRAMEWORK FOR THE IMPLEMENTATION OF KANGAROO MOTHER PROGRAMS IN COLOMBIA

One of the Sustainable Development Goals issued by the United Nations is to guarantee a healthy life and promote wellbeing for people of all ages. Despite reductions in the death rate of infants under 5, it is not reducing quickly enough.

It is a widely recognized fact that a large part of infant deaths happen in the neonatal period, that is to say, during the first 28 days of life. In Latin America, in accordance with the data presented by the Pan-American Health Organization (PHO) in 2010, 71% of infant deaths occur during the neonatal period and 24% of these deaths correspond to deaths due to low birth weight and prematurity. To reduce infant mortality, it is essential to improve care given to mothers and newborns, centering efforts on reducing the number of deaths or complications associated with low birth weight and prematurity. The majority of complications in the neonatal period are preventable, controllable, and are associated with the health of the mother, the quality of care during gestation, labor and the neonatal period.

Since the seventies, Colombia has been making important transformations in its concept of childhood and the care that must be provided to it, governed by regulations that favor and promote maternal and infant health. This made it possible that in 1990 Colombia formalized its commitment to the International Convention on the Rights of the Child which was adopted into the Political Constitution of 1991, through **Articles 43 and 44** (protection of women during pregnancy and after birth, predominance of the rights of the child, fundamental rights to life, physical integrity, health and social security, obligation of the family, society and the state

to assist, protect, and guarantee children their integral development). This is sanctioned by **Law 12 of 1991** that established that “infants must be recognized as social subjects and as citizens with rights in democratic contexts.”

Decree 1397 of 1992 of the Ministry of Health, which promotes and protects maternal lactation, regulates the commercialization and advertising of formula foods for lactating women and small infants, and other provisions that apply to producers, distributors and merchandizers of formula foods for lactating women and for foods complementary to maternal milk, or those that substitute it, and to personnel from these organisms that direct or provide health services, with mandatory compliance.

In fulfillment of **Resolution 7353 of 1992** of the Ministry of Health that established the initiative Hospital Friends of Infants (IHAN, Spanish acronym) for the promotion of maternal lactation through the fulfilment of “ten steps towards a happy natural lactation”, from the start it has gone through various conceptual and methodological revisions. In 2005, the Ministry of Health and UNICEF reconstituted it into the framework of rights, the differential focus and perspective of gender, based on the principal of integration of services and programs, continuity of care and the optimum quality of care included into the obligatory system of quality guarantee. For the implementation of integrating global criteria, these

ten steps include, transversally, the humanization and completeness of care. Since 2011, the Strategy Institution Friends of Women and Integral Infancy (IAMII, Spanish acronym) has favored and improved the quality of maternal and infant care services and care practices in health and nutrition, specifically managing integral care in the application of the Kangaroo Mother Method and the continuity of attention in the Kangaroo Mother Program.

With the introduction of the General Social Security System through **Law 100 of 1993**, in Article 165 and 166; the State privileges the right to maternal-infant healthcare and maternal lactation. The Ministry of Health and Social Protection, by **Agreement 117 of 1998 and Resolution 412 of 2000** establishes the activities, procedures, and interventions of induced demand and obligatory fulfilment and adopts the technical regulations and care guides for the development of specific protection actions, early detection and treatment for illnesses of public health interest. This is in addition to timely care and follow-up to guarantee their control and the reduction of avoidable complications. Within these are care during pregnancy, labor and the postpartum period, care for newborns, control of growth and development, and an extensive program of vaccination and care for diseases of public health interest, timely care and monitoring to guarantee their control and surveillance in the reduction of avoidable complications (low birthweight). It establishes that health institutes that attend newborn babies are obligated to guarantee humanized and quality care, permitting the newborn to be next to the mother and supporting nutrition and exclusive maternal lactation at all times, initiating the vaccination scheme of BCG, anti-hepatitis B and consolidating the immediate neonatal adaptation at 72

hours of birth and providing education to the mother on civil registration of the newborn.

These technical regulations (labor and newborn care) have a monitoring system for the strengthening of the performance of administrators that have compliance indicators on the actions proposed in the regulations. Additionally, from the point of surveillance of public health, cases of low birth weight are monitored as a sentinel indicator of fetal and neonatal health conditions. The **Ambulatory Kangaroo adaptation** complies with the guidelines of Resolution 412 of 2000.

The **Guide for Care of Low Birthweight Babies** in Colombia was published in 2008 by the General Directorate for Promotion and Prevention of the Ministry of Health and Social Protection. As the Kangaroo Mother Method has gotten international recognition, the World Health Organization decided to edit a guide on the Kangaroo Mother Method in which the Kangaroo Foundation participated and was published in 2003.

In 2006, Law 1098 issued the Childhood and Adolescence Code which defines that integral care in early childhood shall be a responsibility exercised in a permanent and sustainable way by the state. Additionally, it defines the period of early childhood as the population group from zero to six years of age in which the bases of physical, cognitive, emotional, and social development of the human being are based on. In its Article 20, it establishes that “the imperative rights of early childhood is care in health and nutrition, a complete vaccination scheme, protection against physical danger, and initial education. In the first month of life, the civil registration of all infants must be guaranteed.”

The Practical Clinic Guides based on evidence for the optimum use of the Kangaroo Mother Method for newborns and/or low birth weight babies was published from 2005-2007 during a joint effort by the Kangaroo Foundation and the Department of Clinical Epidemiology and Biostatistics of the Pontificia Universidad Javeriana.

National Public Policy for Early Childhood 2006 “Colombia for the early childhood”: This takes on the commitments of the country made before the international community for the application of the CDN and General Observation No. 7 on the rights of early childhood, defending the strategies and actions that ensure all infants in Colombia their growth and development in healthy environments, with optimum nutrition, favorable environments for learning, affective, timely, relevant and quality interactions, access to drinking water and basic hygiene.

Decree 1011 of April 3, 2006, which establishes the Obligatory System for Quality Guarantee in Health Social Security defines actions with characteristics that are orientated to the improvement of results in healthcare focused on the user.

In the framework of the processes of transformation in the General Social Security System for Healthcare, the Ministry of Health issued Law 1122 of 2007 having as its priority the improvement of the provision of healthcare services, the strengthening of public health programs and the functions of inspection, surveillance, and control.

Decree 3039 of 2007 National Public Health Plan 2007-2010 establishes, as infant health priorities, amongst others, the promotion of health and quality of life, the prevention of risks, recuperation and overcoming of health injuries, surveillance in health and services. The same also establishes that the

Guides for the Management of the Kangaroo Mother Program are obligatory for the departmental and municipal health entities and healthcare providers. Policy line Numeral 2 and 3 Incise h, stipulates the creation of the kangaroo plan in health institutions that are responsible for the care of LBW babies and screening programs for ROP, hypothyroidism, syphilis.

Decree 425 of February 2008 published by the Ministry of Health and Social Protection, obligates health institutions that handle infants and mothers, to implement and promote the Kangaroo Mother Method in their service.

Ten Year Plan for the Protection, Promotion, and Support of Maternal Lactation 2010-2020 published by the Ministry of Health and Social Protection as an instrument of obligatory inclusion in public policy for the protection and nutrition of infants under two years of age, and that promotes the exclusivity of maternal lactation up until six months of age continuing with complementary nutrition until two years of age. In its first objective it includes: institutional capacities and competencies, development of institutional services necessary to promote, protect, and support maternal lactation through the strengthening of actions such as the Kangaroo Mother Method.

Law 1438 of 2011 proposes strengthening the General Social Security System for Healthcare (SGSSS, Spanish acronym) through a model of provision of public health services in the framework of primary health care. It shall be the responsibility of the Ministry of Health and Social Protection to create a ten-year public health plan that includes public health actions, epidemiological surveillance, early

detection, specific protection, and treatment of diseases of public interest, with objectives, goals and monitoring indicators on the impact on public health of activities for health promotion and prevention of the disease for the improvement of health. Equally, it is the responsibility of health promotor entities to ensure the provision of the same, considering the pathological conditions of opportune care and monitoring, in a way that guarantees control and the reduction of avoidable complications specifically of low birth weight.

Decree 4875 of 2011 creates the Intersectional Commission for Early Childhood integrated by the President of the Republic, the Ministry of Health and Social Protection, the Ministry of National Education, the Ministry of Culture, the National Planning Department, the Administrative Department for Social Prosperity and the Colombian Institute for Family Wellbeing. Its function consists of coordinating and harmonizing the policies, plans, programs and actions necessary for the execution of integral care in early childhood by dialogue between the different sectors involved.

Resolution 4505 of 2012 establishes the report related to the registration of activities of specific protection, early detection and the application of guides for integral care for diseases of public health interest that are of obligatory compliance.

National Plan for Food Security and Nutrition (PNSAN, Spanish acronym) 2012-2019 of which objective it is to contribute to the improvement of the food and nutritional situation of the Colombian population, especially the poorest and most vulnerable. It establishes lines of actions number 2 - perspective or dimension of quality of life and

wellbeing – item 2.3 better practice of maternal lactation.

Plan of Action for Health for the first 1000 days of life, Colombia 2012-2021 of which objective it is to guarantee the health of the mother in the exercise of her maternity, and the fetal, neonatal and infant health during the first thousand days of life with quality, efficiency and continuity. At the same time, it seeks to accelerate efforts to fulfill the objective of reducing maternal and neonatal mortality set by the country for 2015 in the framework of the Ten-Year Plan for Public Health and the Public Policy for Early Childhood.

It established strategic areas and activities for women in pre-labor, labor, and postpartum, and for newborns and infants...*Increase and strengthen the capacity of the actors of the SGSSS to implement the Kangaroo Mother Programs in intrahospital and ambulatory modalities as a method of care for the preterm or low birth weight infant. Also, to strengthen the capacities of the human health resources for the timely identification of conditions of disability, detection and prevention of deafness and blindness due to retinopathy of the preterm infant, and referral to specialized treatment of 100% of those identified. Include mothers, newborns and infants under three years of age in the Sectoral Plans for Integral Management of Disaster Risk, in line with the Dimension of Public Health for Emergencies and Disasters of the PDSP.*

Resolution 1841 of 2013 which adopts the Ten-Year Public Health Plan 2012-2021. Chapter 9. Transversal Dimensions. Numeral 9.1 Differential

handling of vulnerable populations. 9.1.3 Vulnerability of infancy and adolescence “...highlighting that in this part of life, the foundations are defined on which human capacities, skills, and potentialities are developed ...and impact the present and future life of people and the possibilities of progress of the society to which they belong to” “...Promotion of the practices of self-care and strengthening of actions of detection, early care, specific protection, opportune handling, treatment and rehabilitation of the conditions that affect oral, visual, auditive, cognitive, motor, emotional and communicative health from early childhood.”

Component: Integral and differential care for infants and adolescents in the environment of health services. “Humanized care... Reduction of barriers to access healthcare services... intersectional management to tackle access barriers that transcend the competencies of the healthcare sector... Quality of healthcare... national implementation of the policy for integral care in infancy that includes, amongst others, the plan for the reduction of neonatal morbidity and mortality; the Kangaroo Mother Program and other strategies defined in the priority dimensions of the plan that seeks to favor life and the health of infants.”

Clinical Practice Guides of 2013 which include the Guide for Care of Preterm Newborns from the Ministry of Health and Social Protection in collaboration with the Administrative Department of Science, Technology, and Innovation - Colciencias -. This guide considered the KMM from the birthing room to exit from the hospital.

The conditions for the provision of obstetric and neonatal services, care for complications, the referral and counter-referral process and the transfer of patients have been regulated through the component of the Sole System of Enablement in the Obligatory System for Quality Guarantee through **Resolution**

1441 of 2013 and Resolution 2003 of May 28, 2014, through which the procedures and conditions for registration of the providers of healthcare services and enablement of healthcare services are defined, which includes the **Kangaroo Mother Programs**. Resolution 1441 included the following as enablement criteria of neonatal care units: the ophthalmological exam for preterm infants prior to their discharge by a pediatric ophthalmologist or retina specialist for the early detection of retinopathy of the preterm infant associated with the administration of oxygen. In accordance with recent studies, this is one of the causes of blindness in childhood that can be avoided with opportune handling (of oxygen flow and fluctuations of the same, noise level, infections), through which retinopathy is a trace indicator of the quality of neonatal care. Also, Resolution 2003 of 2014 established the creation of environments for the extraction, manipulation, conservation, and provision of maternal milk in pediatric hospitalization services of low, mid and high complexity of care.

Law 1751 of 2015 regulates the fundamental right to health and dictates other provisions. Article 2 establishes health as a fundamental right which includes access to healthcare services in a timely, efficient way and with quality for preservation, improvement and promotion of health. The state shall be responsible for adopting policies to ensure equality in treatment and access to activities of promotion, prevention, diagnosis and treatment, rehabilitation and alleviation for each and every inhabitant of the territory, and that its provision is a public and obligatory service.

Resolution 518 of February 24, 2015 dictates provisions in relation with the Management of Public Health and establishes guidelines for the execution, monitoring, and evaluation of the Public Health Plan of Interventions that are Collective – PIC –, specifically the management process of supplies for the population that present events of public health interest, and opportune surveillance of public health for the control of risks under the principals of quality and relevance.

Resolution 6408 of 2016 which integrally updates the Benefits Plan in Health with responsibility to the Payment Unit for Training – UPC (Spanish acronym) – of the General Social Security System for Healthcare–SGSSS, including in its technical annexes health technologies required in the care of the low birth weight infants and in the care of the preterm newborns at risk of respiratory infections.

Resolution 0429 of 2016 adopts the Policy for Integral Care in Health, establishing an integral operational model of care in the healthcare and social security system, guaranteeing the effective enjoyment of the fundamental right to health.

In relation to epidemiological surveillance, the National Institute of Health issued, in 2015, the **Protocol for Surveillance in Public Health for Low Birthweight Babies to Full-Term** which establishes the surveillance process for newborns to full-term of low birthweight infants. The same defines the guidelines for the notification, collection and analysis of data that allow for the orientation of actions and prevention and control measures of cases of low birthweight on a national, departmental, district, and municipal level as required.

Law 1804 of August 2, 2016, establishes the state policy for the comprehensive development of early

infancy from age zero onwards, and other provisions are dictated. Article 2 ensures the integral protection and guarantees the effective enjoyment of the rights of pregnant women and infants from age zero (0) to six (6) years of age and promotes the collection of intended and effective actions towards ensuring that each of the environments in which the lives of infants unfold have humane, social, and material conditions to guarantee the promotion and potentiation of their development.

Law 1822 of January 4, 2017, Article 1: modifies Numeral 1 of Article 236 of the Substantive Labor Code: “Every pregnant worker has the right to a paid leave of eighteen (18) weeks during the time of childbirth remunerated with a salary accrued from the moment of starting the leave. Numeral 5: Maternity leave for mothers of preterm infants shall take into account the difference between the gestational date and the birth to full term, which shall be added to the eighteen (18) days that are established in the present law. In the case of mothers with multiple births, the leave shall be extended two (2) weeks more. Paragraph 2. The spouse or partner shall have the right to eight (8) days of remunerated paternity leave.

Article 2: Article 236 of the Substantive Labor Code states: 1. No worker can be fired due to pregnancy or breastfeeding without prior authorization from the Ministry of Work that approves a just cause.

Law 1823 of January 4, 2017, Article 1 adopts the Strategy for Family Friendly Lactating Rooms in the work environment of public territorial entities and private businesses, and

other provisions are dictated. In accordance with Article 238 of the Substantive Labor Code, Paragraph: the use of these rooms does not exempt the employer from recognizing and guaranteeing the enjoyment of the hour of lactation. The lactating mother can make use of the same or go to her home or breastfeed in her place of work.

Other related regulations:

According to **Sentence number T-206/13²** of M.P. JORGE IVÁN PALACIO

3. Relaxation of legal protection procedure in the case of subjects of special constitutional protection

“There are special situations in which the analysis of the protection procedure must be done in a broader and more permissive way in regards to the special nature of the people that request the protection of their fundamental constitutional rights.”

4. The fundamentality of the right to health and the principles that inspire it. Reiteration of jurisprudence. *“The principle of integrity has been postulated by the Constitutional Court in situations in which health services required are fractured or separated in such a way that the responsible entity only authorizes the interested party a part of what they should receive to recuperate their health and obligates them to assume the cost of the other part of the medical service required. This situation of fractioning of the service has diverse manifestations in reason of the interest that the entity has to avoid a cost that, according to their judgement, they should not have to cover. This principle has been developed in the jurisprudence of the Constitutional Court*

² <http://www.corteconstitucional.gov.co/RELATORIA/2013/T-206-13.htm>

based on different legal regulations and it refers to the complete care and treatment to which the users of the system of social security in health have a right to, according to that prescribed by the treating doctor.

In this respect, the Court has said that ‘(...) care and treatment to which members of the social security system in health have a right to, whose state of illness is affecting their personal integrity or life in dignified conditions, are integral. That is to say, they must contain all care, supply of medicines, surgical interventions, rehabilitation practices, exams for diagnosis and monitoring, as well as any other component that the treating doctor values as necessary for the full reestablishment of the patient’s health or to mitigate the pain that impedes them living their life in better conditions. In said dimension, it must be provided to members by entities in charge of providing the public service of social security in health’ (Bold not in original text)

5. The right to health of infants. Infants require a unique, timely and prevalent healthcare with regard to which any public or private entity is obligated to guarantee effective access to services as ordered by Article 50, in accordance with the legal principals of integral protection and higher interest of infants.

6. Coverage of transport and accommodation in virtue of the principle of comprehensiveness in health.

6.1.1 In a specific way, Agreement 029 of 2011 issued by the Health Regulation Commission – CRES (Spanish, acronym) – indicates in its Article 42 that the obligatory health plan includes transport in ambulance for transfer between institutions that provide healthcare services, in the national territory, for those users

that require a service that is unavailable in the initial institution.

Equally, it provides that the transport service is guaranteed for that patient that requires any event or treatment stipulated by the agreement attending: i. the state of health of the patient, ii. The concept of the treating doctor and iii. The place of referral. As a consequence, although the transport must be offered in ambulance, this is not the only way to guarantee it as the use of all methods available is permitted.

6.1.2 Additionally, Article 43 of the mentioned agreement concerns ambulatory transport and provides that such a service must be covered additionally to the units by payment for respective training in geographical areas that are known for dispersion.

If a user of the health system requires referral to a municipality different to that of their residence in order to access a medical service, and at the place of referral an additional payment unit is recognized, the transport is included in the obligatory health plan and must be covered by the health insurance to which they are affiliated to.

6.3 As a consequence, the court has established that the protection proceeds through the action of legal protection when the lack of authorization of transport seriously affects the effective enjoyment of the right to health. On this point, Sentence T-760 of 2008 indicates:

“The constitutional jurisprudence, founded in the regulation, has indicated on various occasions that every person has the right to access health services that they require, which can implicate that they have the right to transport methods and accommodation expenses to be able to receive the care required.”

(...) But this does not just guarantee the right to transport and other costs of movement to a different place from residence to access the health service required. Additionally, the possibility of the

provision of transport methods and the transfer of a companion are guaranteed when necessary.”
(Bold not in original text)

As such, it has been indicated that the transport service is part of the obligatory health plan and as a consequence must be covered by the health insurance in the events that:

- vi. A patient is referred in ambulance from one health institution to another when the first does not have the service required.
- vii. It is necessary to transfer the patient in ambulance to achieve home attention under the responsibility of the health insurance, according to the criteria of the treating doctor.
- viii. An ambulatory patient must access a service that is not available in their municipality of residence and needs to be transported in a vehicle different to an ambulance.

7. Financing of the costs of transfer and accommodation for the patient and their companion.

The transfer of outpatients from their place of residence to the place where they will be attended is included in the obligatory health plan, with responsibility for additional premium for dispersions established over a unit of payment for some geographical zones.

The negation of a service due to the health insurance not having the infrastructure or coverage, is not a valid justification to deny health service. Sentence T-073 of 2012 considered:

“...the territoriality of insurance does not constitute a constitutionally admitted excuse to impede a person’s access to the health services they require.

Affiliation to an health insurance different to those that operate in the place of residence cannot constitute an obstacle for access to health services, given that a position of this time, as well as constituting an affront to the principles of universality (guaranteed since January 2010³) and continuity, depends the inequality between insurance regimes, placing administrative processes before the effective achievement of the fundamental right which is definitely inadmissible.

As a consequence, the health insurance is obligated to provide health services in an integral way (that is to say, everything that concerns therapies, specialized medical appointments, medication, home medicine, surgery, etc.) especially when they have been ordered by the health insurance itself and have been requested in due form.”

³ Law 1122 of 2007 and order number 29 of the sentence T-760 of 2008

4 APPROACH TO THE PROBLEM

Prematurity and low birth weight (LBW) are a burden on public health, especially in developing countries. Studies on low birthweight developed by UNICEF report that every year more than 20 million infants are born in this condition (with a weight less than 2,500 grams). They are either preterm (born before the 37th week of gestation) or full-term with low birth weight. This is equivalent to 17% of all births in developing countries, a figure that is double the level of industrialized countries (7%).

Low birth weight has been defined by the World Health Organization (WHO) as birthweight of less than 2,500 grams. This is with a basis in the epidemiological observation that infants who weigh less than 2,500 grams are 20 times more likely to die than those of a greater weight.

Each year, between 17 and 20 million infants are born across the world with low birthweight. According to the progress document for infancy 'An Appropriate World For Infants' (UNICEF 2007), around 60% of newborns in the world in developing countries are not weighed, and the absence of comparable data makes it difficult to evaluate progress. However, it appears that the incidence of low birthweight has persisted constantly since the year 2000. This group of infants has 40 times more possibilities of dying during the neonatal period than those that are born at a greater weight. Additionally, they have a 50% risk of suffering problems in their development, learning, and mental difficulties. The intellectual coefficient (IQ) is usually

between 5 and 10 points below the standard. They can develop auditive and visual alterations in the long term. They have a greater risk of developing cardiovascular diseases and diabetes in adulthood and suffer an early death (UNICEF, 2007).

The World Health Organization has indicated the following as the principal causes of low birth weight.

- Premature birth (before 37 weeks of gestation).
- Restriction of intrauterine growth.
- Maternal malnutrition such as deficiencies in vitamin A, iron, folic acid and zinc.
- Maternal arterial hypertension.
- Multiple births.
- Teen pregnancy.
- Lack of rest or high demand of work on behalf of the mother
- Stress, anxiety, and other psychological factors.
- Smoking or passive exposure to smoke.
- Acute and chronic infections during the pregnancy such as malaria and bacterial vaginosis.

The map of preterm births and LBW is superimposed over the map of poverty in the world. 90% of these infants are born in developing countries and have higher risks of presenting physical, neuro-psychomotor and neurosensory effects and chronic illnesses in adulthood.

Each year around four million infants die in the first 28 days of life or in the neonatal period. Given that the deaths of newborns represent 37% of all infants below five years of age, it is essential to improve neonatal survival. (1)

4.1 LOW BIRTH WEIGHT INFANTS (LBW)

Low birth weight infants (LBW) are infants whose weight at the moment of birth is less than 2,500 grams, independent of their gestational age. The determination of birthweight is usually possible in a more simple and precise way than that of gestational age. This is the fundamental motive for which this approximation is used to identify newborns with increased risk of problems in the transition to extra-uterine life and of comorbidities. This group is more heterogeneous still than that of preterm babies. It includes the majority of preterm newborns (still when in many cases those close to full-term weight more than 2,500 g and are excluded from this characterization of risk) but it also includes a substantial group of newborns to full-term who have variable degrees of restriction of intrauterine growth. The problem of this last group is that they are systematically different than those of the prematurity spectrum.

In Colombia, in accordance with the National Administrative Department of Statistics (DANE,

Almost 40% of all deaths of those below five years of age occur during the neonatal period, that is to say, during the first month of life. Beyond the individual repercussions, numerous diseases and health problems interact which increase death rates. Malnutrition contributions up to 50% of infant deaths. Unclean water, inefficient hygiene and inadequate sanitary conditions do not just explain a high occurrence of diuretic diseases, they also contribute in a significant way to the mortality of infants under five from pneumonia, neonatal complications, and malnutrition. The majority of these causes of death are preventable.

Spanish acronym), of the 658,835 infants that were born in 2013, 58,784 of them were LBD, that is to say 8.9%. In Bogota, the percentage is higher. Of the 103,256 infants that were born in 2013, 12.8% of the newborns presented said problem, that is to say 13,255.

Percentage of infants with Low Birthweight in the last five years in Colombia*

| Percentage of infants with LBW | Year |
|--------------------------------|------|
| 9.05% | 2011 |
| 8.98% | 2012 |
| 8.97% | 2013 |
| 8.72% (preliminary result) | 2014 |
| 8.90% (preliminary result) | 2015 |

* data obtained from the National Administrative Department of Statistics

LBW leads to at least three consequences. In the first term, infant mortality increases. In the second term, the infants have greater future risks of having inferior intellectual development as well as greater cardiovascular problems. In the third term, they represent a greater burden for the public

health of the country due to high costs of their caregivers and higher risk of a somatic, neuro-psycho-motor and sensorial development problem.

4.2 Premature or preterm infants

The fetus grows and matures in intrauterine life at a predictable and biologically determined rhythm. On completing at least 37 weeks of gestation, they are usually sufficiently mature and have sufficient bodily size to make an appropriate transition to extrauterine life. When the fetus is born before the 37th week, it faces increased risks of the usual problems of transition to extrauterine life (hypothermia, hypoglycemia, hyperbilirubinemia etc.). In addition, there are specific problems related to prematurity (respiratory difficulty syndrome, hydro-electrolytic disorders, retinopathy, intraventricular hemorrhage, etc.) All these conditions can place their life or integrity at risk and require specific interventions that are usually complex and costly to assist them in the process of adaptation and to complete the maturity of vital functions for their independent survival.

The World Health Organization (WHO) considers that preterm infants are those that are born before the 37th week of gestational age, independent of their birth weight. The preterm group is heterogeneous given that it includes newborns of different gestational ages and, as such, with different degrees of immaturity and health problems. In addition, the somatic growth of newborns varies widely and said variation is grouped into three categories that condition different specific risks: small for gestational age (frequently due to

restriction in intrauterine growth), adequate for the gestational age (“pure” preterm), and large for gestational age (relative macrosomia, frequently associated with metabolic incidents such as maternal hyperglycemia during gestation).

Preterm infants have at least three problems. Firstly, they are one of the greatest causes of low birth weight infants. The more preterm infants that are born, the greater the number of low birth weight infants. Secondly, the level of infant mortality increases. Thirdly, the more preterm a baby is, the greater the complications it can have at birth. It will be hospitalized longer which decreases its time with the mother at home after being discharged.

Prematurity notably increases the costs associated with healthcare. There is a study on the costs of preterm birth throughout childhood until 18 years of age in England and Wales (2). On modelling the costs of a hypothetical cohort of preterm survivors born in 2006 and followed until their 18 years of age, they represented USD\$4.6 m, of which more than 90% was determined as hospital costs of initial handling of the preterm baby. Similar results are seen in studies in developed countries (3,4).

As such, the present initiative is directed to the care of the health of LBW and preterm infants, their families and fundamentally the health professionals responsible for their care.

References

1. WHO. Neonatal and perinatal mortality: country, regional and global estimates. www who int 2010; Available from: URL: www.who.int/making_pregnancy_safer/publications/neonatal.pdf
2. Mangham LJ, Petrou S, Doyle LW, Draper ES, Marlow N. The cost of preterm birth throughout childhood in England and Wales. *Pediatrics* 200 February;123(2):e312-e327.
3. Petrou S. The economic consequences of preterm birth during the first 10 years of life. *BJOG* 2005 March;112 Suppl 1:10-5.
4. Clements KM, Barfield WD, Ayadi MF, Wilber N. Preterm birth- associated cost of early intervention services: an analysis by gestational age. *Pediatrics* 2007 April;119(4):e866-e874.

5 CONCEPTUALIZATION OF THE KANGAROO MOTHER METHOD

The Kangaroo Mother Method (KMM) was conceptualized and implemented at the end of the seventies in the Instituto Materno Infantil of Bogota by Doctor Edgar Rey Sanabria (1978) who decided to use mothers as a heat source due to the lack of incubators. As such, he introduced what would be known as the Kangaroo Mother Method (KMM) in all “healthy” newborns with a birth weight of <2,000g. The intervention was then developed during 15 years in conjunction with pediatricians Héctor Martínez Gómez (1979) and Luis Navarrete Pérez (1982). Since then, it has evolved from the initial concepts, incorporating modifications originated in the practice and scientific investigations carried out in Colombia by the Kangaroo Foundation (1989).

The motives of that gave rise to the Kangaroo Mother Method are seen below.

- High index of morbimortality of premature and low birth weight children hospitalized in the Instituto Materno Infantil due to overcrowding of services and, therefore, innumerable inpatient infections.
- High index of abandonment due to the prolonged separation of the mother and newborn.
- The intimate conviction that the benefits of maternal milk cannot be received by premature or low birth weight children hospitalized in the neonatology services due to being separated from their mothers for prolonged periods.
- The conviction that the heat of the incubator could be provided by the mother in a more natural way.
- The observation that low birthweight children survived thanks to the care of their mothers or grandmothers who placed them in skin-to-skin contact (in the Kangaroo Position) on their bosom.
- The observation in nature of the experience of marsupials.

Since its creation in the 70s, this method has evolved from its initial concepts and the incorporation of modifications originated in practice and scientific investigation.

To characterize and understand the Kangaroo Mother Method, it is necessary to define some basic points such as: i) population object of the intervention; ii) what is the kangaroo position (KP); iii) how kangaroo feeding and nutrition based on maternal lactation is conceived and, iv) which are the kangaroo politics of hospital discharge and ambulatory follow-up.

elements of the KMM, a typical, basal or reference scenario is defined that serves to characterize the elements and circumstances of the application of the method. Such a space contains the components that are considered fundamental in this, the exercise of creation of affirmations based on evidence is centered on identifying, recuperating, analyzing critically and resuming the evidence referring to the questions that arise around each of the main elements. **The specification of this typical scene additionally serves as a check list to avoid leaving to one side any of the aspects or elements that are important in the provision of kangaroo care.** They also describe the different variants of this typical scene.

Based on the specification of these characteristic

There are six basic characteristics of the Kangaroo Mother Method which are defined below and constitute **guidelines of strict compliance**.

- Target population (the object of the intervention)
- Kangaroo Position
- Kangaroo feeding, and nutrition based on maternal lactation.
- Kangaroo policies for hospital discharge and ambulatory follow-up.
- Multidisciplinary – integral follow-up.
- Collective consultancy.

5.1 Target Population (object of the kangaroo intervention)

The Kangaroo Mother Intervention (KMI) is offered to preterm newborns of less than 37 weeks of gestation (independent of weight) or newborns of less than 2,500 grams (low weight independent of gestational age). The kangaroo position (KP) is used as soon as possible if: 1) the infant has the capacity to tolerate it; there is stabilization of vital signs, there is no bradycardia or hypoxemia when manipulated, they do not have primary apnea or if such were present before, now it is controlled and; 2) infants that are candidates for kangaroo intervention are born or referred to a minimum level II health institution with a newborn unit.

If the infant is born in a level I health institution, they must be transferred to an health institution where there is an NBU with a Kangaroo Mother

Program (KMP) implemented in an adequate way in an intrahospital environment. So that this can be possible, it is necessary to train personnel in the level I health institution regarding the transfer and initial care.

Kangaroo intervention is a complement to the neonatal care and health interventions of the preterm and/or low birth weight newborn. The full-term newborn of adequate weight for gestational age can take advantage of the kangaroo position during a limited time in the day and during a number of limited days (whilst they tolerate being placed and maintained in skin-to-skin contact). Although the kangaroo intervention can be directed to healthy full-term infants, this document does not deal with that topic.

The kangaroo intervention does not replace the Neonatal Care Units, but rather complements the health interventions for the newborn.

5.2 kangaroo position

The distinctive stamp of the KMM is the so-called kangaroo position. The attributes of the “typical” or reference KP are:

- Skin-to-skin contact between the mother and infant, 24 hours a day, placed in a strict vertical position between the breasts of the mother and under the clothes. Mothers do not just perform the function of maintaining the infant’s body temperature (replacing incubators) but also, they are the principal source of feeding and stimulation.
- An elastic fabric support is used (made of cotton or synthetic elastic fabric) that allows the provider of the position to relax and sleep whilst the infant is maintained firmly and securely in the kangaroo position. The support of the fabric helps the airflow of the infant not be obstructed by changes in position (for example flexion or hyperextension of the neck~~) which is particularly important due to the hypotonia that habitually presents in preterm infants, without this support positional obstructive apneas can occur. The elastic component of the fabric allows for small movements by the infant like when they are in the mother’s womb, without putting the kangaroo position at risk.
- The newborn can be fed at any moment remaining in skin-to-skin contact.
- Any person (for example the father) can share the role of the mother carrying the baby in KP.
- To sleep, it must be done in a semi-seated position (30°).
- The KP is maintained until the infant does not tolerate it anymore (the infant will indicate their discomfort by sweating, scratching, crying or with other clear demonstrations of being uncomfortable every time the mother places them in the KP).

The objective of this position is that the infant finds the mother as a permanent source of bodily heat, kinetic and sensory stimulation, maintaining a permeable air flow. The position stimulates and favors maternal lactation. In addition, the intimate and prolonged contact between mother and baby seeks to establish or reinforce the biological bond and healthy affection that must exist between any newborn and its mother of which establishment is more difficult by prematurity and the illness of the

infant which causes physical mother-infant separation. To achieve these objectives, the position must be a) continuous, that is to say, with minimum possible interruptions, b) prolonged, that is to say, for the greatest time possible, preferable 24 hours a day and no less than 2 consecutive hours; and c) lasting, for as many days or weeks as the infant needs and tolerates.

Below are three figures considered important for understanding the KMM.

KANGAROO POSITION⁴



4 Figures taken from “Kangaroo Mother Method – Practical Guide”, World Health Organization, 2004.

To complete these objectives, the position must be:

- a) Continuous, with the minimum possible interruptions.
- b) For the longest time possible, at best 24 hours a day.
- c) Lasting for as many days or weeks as the child needs the Kangaroo Position.

Variants of the kangaroo position

In different health institutions that have different problems, variants of the kangaroo position have been developed principally in the following three aspects:

- **Moment of initiation.** The moment of initiation of the kangaroo position has been described in different periods from the birth, from immediate postpartum to the moment of hospital discharge, as soon as the preterm infant stabilizes. Additionally, the use of the kangaroo position has been described as part of the work of early stabilization.
 - If the preterm newborn does not require specific reanimation maneuvers (resuscitation), it is recommended to dry them and place them on the chest of the mother in immediate postpartum in skin-to-skin contact. In this way, there is adequate thermic regulation and a positive influence is exercised over maternal lactation and the establishment of bonding and attachment. The physiological state of the new born must be monitored.
 - The newborn must be adequately immobilized with a support in the kangaroo position so that they do not slip. This procedure is important as the mother can be under the effect of medication or fatigue from the labor itself.
 - When the newborn is placed in the kangaroo position at birth, it is under the constant supervision of the nursing or pediatric professional in the labor room. Responsibility for supervision is not transferred to the mother.
 - It is recommended to start the kangaroo position from the moment in which the infant is stable without variations in oxygen saturation, cardiac frequency, respiratory frequency, during the manipulation of the infant and when there is availability of the mother or a member of the family. Currently, there is no solid evidence in favor of the kangaroo position in critical or unstable newborns. However, in Nordic countries there have been new studies on skin-to-skin contact immediately after birth to stabilize an immature infant in a lower stress environment.
- **Continuity of the position.** The KP should be maintained 24 hours a day. However, for very fragile recently stabilized infants it is recommended to place the infant on the mother's chest in an intermittent way. Minimum periods of two hours are considered adequate, alternating with the incubator. This intermittent method is employed mainly to strengthen the mother-infant bond and maternal lactation and can be considered as the initial adaptation to the KP in the intensive care unit when the infant is not stable (in a constant way) or when the mother, due to her state of health, is not ready to carry her infant in the kangaroo position.
 - **Duration of the intervention.** There are different schemes, for example only during the hospitalization and the child is discharged out of the Kangaroo position once regulates its temperature; while others maintain the Kangaroo Position after hospital discharge.
 - **Identification of a variant as Kangaroo Mother Method.** Independently of the start, continuity and duration of the Kangaroo Position, these alternatives can be identified as variants of the KMM as long as the

definition described previously is met, such as how the infant is carried in the kangaroo position. One cannot talk about the Kangaroo Mother Method if at any time the child is not placed in the Kangaroo Position.

Other approaches that involve parents in the care of their frail newborns, it is sought to humanize neonatology with change of the macro environment (eg, lifting the child, breastfeeding, NIDCAP⁵ or massages, among other activities), but in which the child is not held in Kangaroo Position, for

which it does not form part of the range of variants that can be identified as Kangaroo Mother Method.

5 The NIDCAP program (*Newborn Individualized Developmental Care and Assessment Program*) has been proposing a new philosophy for the care of premature babies for more than three decades, with great concern for the environmental impact on the development of the preterms in its long-term evolution. In NIDCAP, the child and the family become the center of attention and interventions remain in the background. The procedures adapt to the characteristics of the child and their families, not the contrary. In NIDCAP, the relationship between the child, the parents and caregivers is strengthened. Currently, the NIDCAP includes the kangaroo position within its criteria.

<http://www.pediatribasadaenpruebas.com/2009/12/programa-nidcap-y-proyecto-hera-la.html>

5.3 Kangaroo Feeding and Nutrition Based on Maternal Lactation

All the Kangaroo Mother Programs must comply with Decree 1397 of 1992 which promotes maternal lactation, regulates the commercialization and advertising of formula foods for lactating persons and complements to maternal milk and other provisions are dictated.

The nutritional needs of a low birth weight and preterm infant are heterogeneous and distinct to those of a healthy full-term infant. In the first place, newborns with the same low birth weight can be born to full-term, preterm newborns with adequate weight and preterm infants and with restricted intrauterine growth. Additionally, in the category of prematurity, we include almost mature and close to full-term infants (for example 35-36 weeks), moderate preterm infants and extreme preterm infants (23-28 weeks of gestation at birth). Their requirements and capacity to receive feeding can also change with the presence of illnesses and

concomitant conditions or complications in the transition to extra-uterine life.

A very important conditioner of the feeding and nutrition strategies of a preterm, low birth weight and/or ill infant, is the post-natal period of the infant. In general, it is appropriate to recognize three main periods:

- **The transition period** which goes from birth until the principal aspects of the immediate and mediate transition to extrauterine life are complete (usually during the first week of life). Here, it is usually eventually necessary to have parenteral support and/or the use of adaptation strategies for the physiology of the infant

through the use of the digestive tract to administer them the nutrients they require.

- *“Stable growth” period*, from when the transition is completed until reaching full-term, that simulates the period of intrauterine growth that would have occurred if the newborn had been able to reach full-term in the mother’s womb, and during which it is usually appropriate to use predominantly oral forms of feeding.
- *The “post-discharge period”* from the point of full-term until the year of the corrected.

Strategy for Feeding and Kangaroo Nutrition (KN) is initiated during the “stable growth” period

The feeding and nutrition strategy of the infant in the KMM framework is based on the following points:

- **Target population:** The kangaroo feeding strategy is designed for infants that are in the so-called stable growth period. The latter are based on exclusive maternal lactation until the age of 6 months, if the somatic growth of the infant is adequate and the mother is available. In the event that the mother works, and/or it is impossible for her to give or continue providing exclusive maternal lactation, this is complemented with artificial commercial milk or complementary feeding is introduced earlier. The same goals are always conserved: harmonious somatic growth reported in the growth curves used in the ambulatory KMP. This decision will depend on the

chronological age of the infant.

Feeding strategies in the period of transition (e.g., parenteral nutrition) are not considered in this document and may be consulted in the Clinical Practice Guide of the preterm newborn issued by the Ministry of Health and Social Protection. 6

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- **Source of feeding.** The fundamental source of feeding for an infant is maternal milk and this shall be used whenever possible. In addition, maternal milk is always supplemented with liposoluble vitamins until the infant reaches full-term. When a milk bank is available, the use of human donor milk is the best option, preferably from a similar gestational age. This is provided that it is collected, pasteurized and administered in a safe way and the advantages and nutritional value are preserved to the maximum. If no human donor milk is available, maternal milk can be strengthened or supplemented when necessary. When the infant is eligible, the strategy of use of final milk shall be attempted always before considering the supplementation of its mother's milk age.

Feeding route

Maternal lactation can be carried out by direct suction or the administration of previously extracted milk from other mother, that can be supplied by orally, by tube, by cup, spoon, syringe etc. It is necessary to avoid the use of pacifiers to not interfere with maternal lactation.

The starting age for direct suction from the breast and the suppression of the tube depends on personal

health experiences and the experience of the countries. For example, in Sweden the infant is placed on the breast to start the suction process at 29 weeks of gestational age whilst it is placed in the Kangaroo Period during very short periods. Additionally, they do not implement the use of oral therapy to stimulate the suction process to allow the infant to stop the suction in a physiological way when it gets tired. Many countries wait until week 32 or 33 to initiate direct suction from the breast, without evidence of the benefits for this waiting period. This constitutes an open field to carry out investigations.

TEXT

Feeding based on maternal milk from the infant's own mother in order to take advantage to the maximum of the advantages of non-modified human milk, especially their immunological properties, the balanced contribution of essential nutrients and its security profile with respect to the risk of enterocolitis. The growth goal is to obtain a weight gain at least that of intrauterine growth (15 g/kg/day until 37 weeks of gestational age and then 8 to 11 g/kg/day). Maternal milk is initially administered at fixed intervals, not by demand, to ensure a minimum appropriate contribution.

The growth goal is:

To obtain a weight gain of at least that of intrauterine growth (15g/kg/day/ until 37 weeks of gestational age and then 8 to 11 g/kg/day until term).

5.3.1 Intra-hospital Kangaroo Feeding and Nutrition Strategy

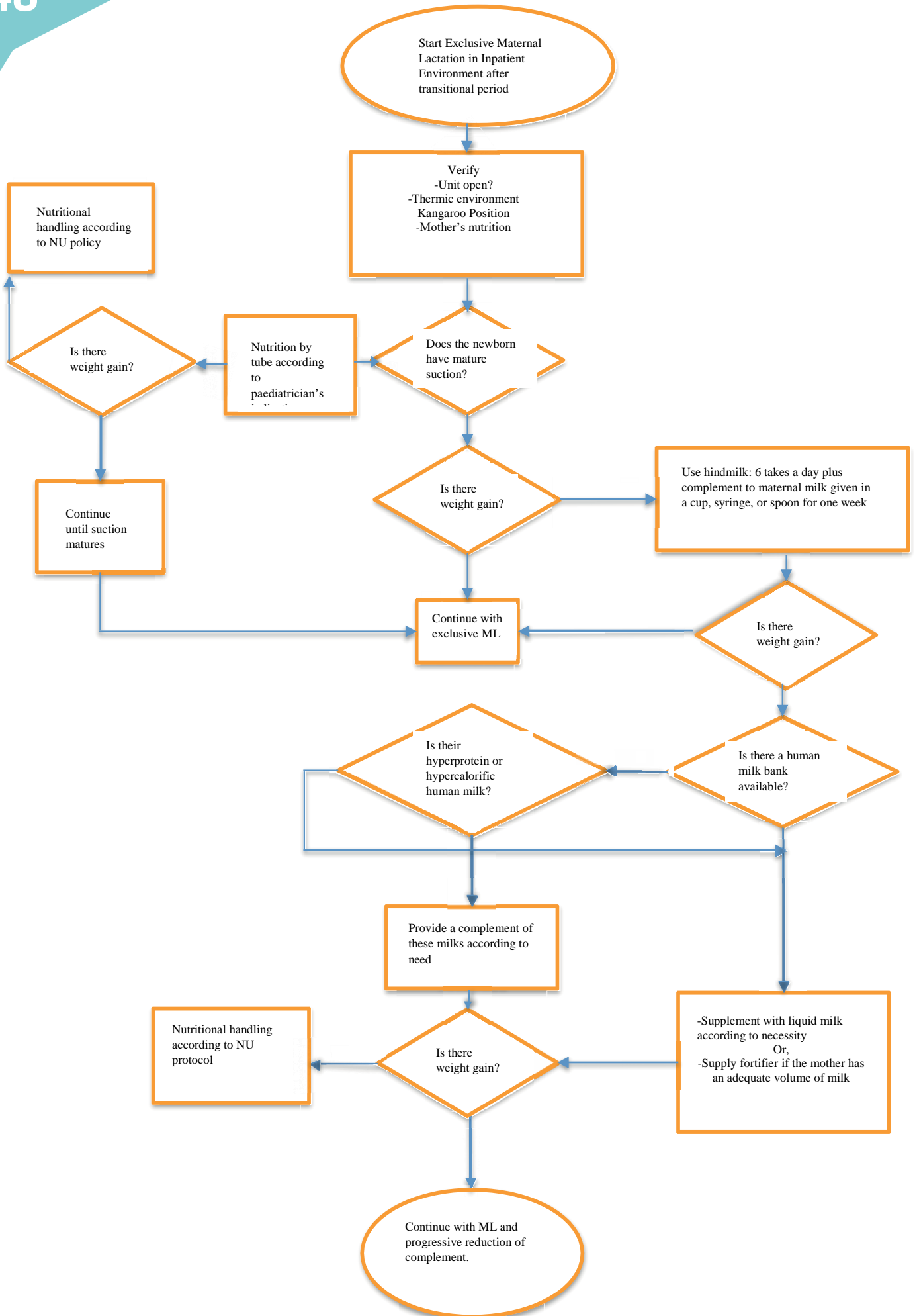
If with exclusive maternal lactation (supported by an intensive kangaroo adaptation intervention and the establishment of maternal lactation) the goal is not achieved, doctors proceed to rule out pathological conditions that explain the inadequate weight gain (for example anemia, infection, hypothermia, lack of adherence to the kangaroo position, amongst others). Once the base condition is corrected, the growth should improve. If even then it is not achieved, it is recommended to, 1) evaluate if the newborn is receiving final milk (the infant empties at least one breast), 2) the quality of the thermic atmosphere (is the infant positioned in a cradle or incubator when it is not in the kangaroo position? How many hours a day does the newborn remain in the kangaroo position?) 3) evaluate the presence of the mother in the newborn unit (are they open and friendly newborn units? How many hours a day does the mother spent in the new born unit? Does she keep her infant in the kangaroo position?) 4: the mother's nutrition (does the mother receive food and

hydration?). Once any of these aspects have been corrected, the base condition should improve. If even then it is not achieved, doctors will proceed to using hyper calorific or hypo protein human milk from a milk bank according to necessity and formulated by the treating doctor or nutritionist of the milk bank and/or newborn unit. In the event that there is no hyper calorific or hyper protein milk available, doctors will proceed with maternal lactation with fortification and/or special formula milk for preterm babies according to hygiene conditions and the protocols of the newborn units. If the infant has not acquired suction maturity, the ration is administered by a tube and suction of the nipple is stimulated. If the infant has acquired suction maturity (mature suction is characterized as a cycle of 10 to 30 suctions without pause to

breathe, given that the infant coordinates to perfection both processes, suction-swallowing and respiration), the complement to maternal milk or fortified maternal milk can be administered by a tube, cup, or syringe

to not interfere with maternal lactation. The use of maternal milk fortifiers is theoretically of exclusive intrahospital use in Colombia. Eventually, final milk can be used in a hospital environment, but it requires the coordination between the maternal milk extraction room or milk bank and health personnel of the newborn unit.

For greater illustration, below there is a flow diagram of the intrahospital kangaroo nutrition strategy.

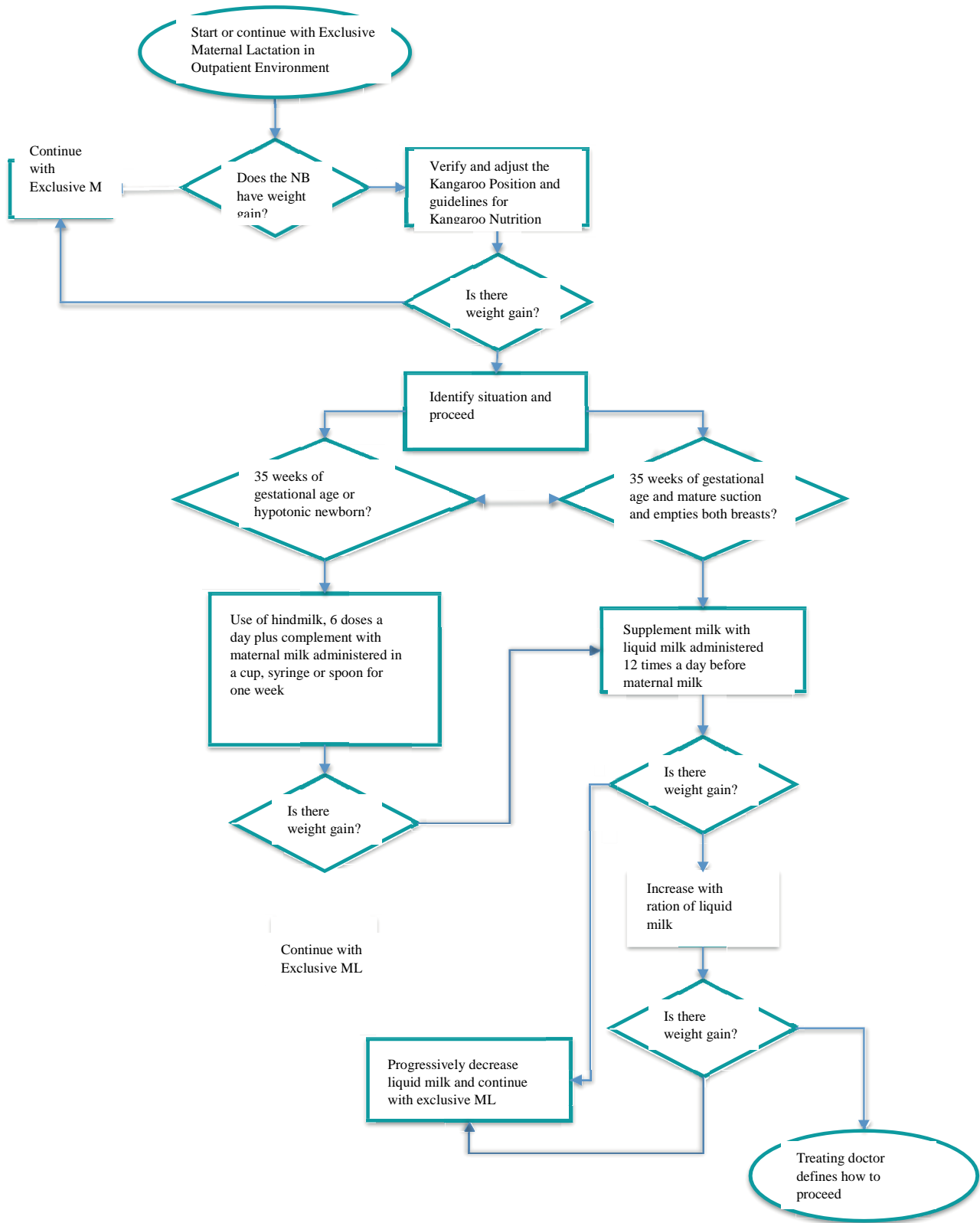


5.3.2 Ambulatory Kangaroo Feeding and Nutrition Strategy

One must always commence and/or continue with exclusive maternal lactation. If with exclusive breast feeding (supported by intensive intervention of kangaroo adaptation on behalf of nursing and psychology) the growth goal is not achieved, doctors will proceed to rule out pathological conditions that explain the inadequate weight gain (e.g., anemia, infection, hypothermia, not adhering to the kangaroo position, etc.). Once the base condition is corrected (which includes intense reinforcement of the ambulatory kangaroo adaptation), the growth should improve. If it is still not achieved, doctors will proceed to the use of final milk in accordance with the quality of suction and maturity of the infant (<34 weeks). In as much that the infant improves, suction will too, and this will facilitate drinking all the milk from the breast to be able to reach the final milk (see technical description, extraction of final milk). If the growth still does not improve, maternal lactation is complemented with special formula milk for preterm babies preferably in liquid form to not generate manipulations in its preparation (risk of transmission of diseases with hands, risk of use of contaminated water), administered in drops or spoons to not interfere with maternal lactation, and

divided into 12 or 15 doses a day. Liquid milk (special formula milk for preterm babies) is administrated before putting the baby to the breast to avoid gastric repletion and the risk of vomiting or coarse aspiration. Based on support calculations, the goal is taken as complementing maximum 30% of the recommended daily calorie intake. After at least 1 week of adequate growth, a progressive reduction of the complementation is always tried with the goal of arriving at 40 weeks of gestational age exclusively with maternal milk. The use of fortifiers of maternal milk are not considered in this document until there is greater evidence for their safety and use in the ambulatory environment. In accordance to Act 11/09 of November 26, 2009, the National Institute for the Surveillance of Food and Drugs (INVIMA) recommends that fortifiers of maternal milk must be administered only at the hospital and with recommendation and medical monitoring.

For a better illustration, below there is a flow diagram of the ambulatory kangaroo nutrition strategy.



Variants: Kangaroo Mother Method and Maternal Milk

There are occasions when the KP is offered to infants who are not going to receive the kangaroo feeding strategy based on maternal milk, as in the cases in which the baby still cannot suck or swallow or is receiving parenteral nutrition. It is also offered in other cases in which maternal lactation is not possible (infant given in adoption and maintained in kangaroo position by adopting parents, death of the mother, absolute or relative contraindications for

maternal lactations such as a mother with human immunodeficiency virus (HIV).

In these cases, this component of the KMM cannot be applied, but the care offered to the infant can still be considered as a kangaroo mother intervention, if the kangaroo position is employed in an adequate way.

5.3.3 Extraction of Maternal Milk

The mothers of preterm and/or LBW newborns must stimulate and maintain the production of maternal milk through manual or mechanical extraction of milk from postpartum onwards. The use of pumps is more efficient and practical, but given that there may be economic difficulty for access to these appliances or deficient hygiene conditions, the extraction can be done manually. This requires special training for the healthcare personnel and close assistance from the start until the infant's suction can regulate production.

It is recommended to explore the possibilities that mothers extract milk next to the incubators or carrying the infant in the kangaroo position in the newborn unit. For this, there must be appropriate logistical and hygiene conditions. It is very important to wash hands before each extraction to avoid contaminating the milk. It is advisable to have short unpainted nails and hair tied back. A daily shower with water and soap is recommended. The use of lotions is not advised. It is convenient to dry the chest before each extraction with a towel dedicated exclusively for this. The maternal milk must be stored in an adequate recipient that will be

provided by the newborn unit. It is recommended to use a glass bottle, plastic screw lid, bearing in mind that glass is the only inert material that has no chemical or physical reaction with the milk. It is not advisable to use plastic as the secretory immunoglobulin binds to the plastic. Moreover, glass bottles do not have depolymerization with changes in temperature. Each recipient of maternal milk must be labelled with the following information: name of the infant, bed number, clinical history number, date (day, month, year), hour of the start of extraction and the volume of milk. For each extraction, different recipients must be used. Milk from different extractions must not be mixed in the same recipient. Immediately after the extraction process, the mother will give the recipient to the nurse or assistant nurse who will place it quickly in the fridge so that it does not remain at room temperature. It is important to bear in mind during this period that we must minimize bacterial growth in the milk during storage. For this, the newborn unit must have a fridge available to store maternal milk. If these conditions are not fulfilled, the mother must go to the extraction room for the process of extraction of maternal milk.

In a study by Acuña-Muga and collaborators, it is concluded that the volume of milk increases when the mothers extract during or immediately after carrying their infants in the kangaroo position. Additionally, the volume of maternal milk is less when the extraction rooms are located in isolated rooms where the mother is distanced from her infant and better when she is next to the incubator. For this, it is recommended that the mother extract milk close to her infant. There is no scientific evidence that extraction next to the incubator, following the rules

previously described, increases intrahospital infection.

In a study by Acuña-Muga and Collaborators⁷

7 Acuña-Muga J, Ureta-Velasco N, de la Cruz-Bértolo J, Ballesteros-López R, Sánchez-Martínez R, Miranda-Casabona E, Miguel-Trigoso A, García-San José L, Pallás-Alonso C. Volume of milk obtained in relation to location and circumstances of expression in mothers of very low birth weight infants. J Hum Lact. 2014, Feb;30(1):41-6.

Manual extraction technique:

Hygiene methods:

- Wash hands with water and soap, and scrub nails.
- Wash collecting recipient with hot soapy water and rinse with boiling water.
- The recipient must be of a wide opening and with a lid, ideally made of glass or hard polycarbonate suitable for the conservation of food. They must never be polypropylene bags due to the risk of toxic substances entering the milk.
- Prior washing of the nipples is not necessary apart from the daily shower, nor is it necessary to discard the first drops of milk.
- It is recommended that the mother not talk during the extraction and only touch the recipient on the outside.

To stimulate the ejection reflex:

- The mother must stimulate the breasts (in circles/radials like 'brushing'), smooth touches and light shaking.
- Smoothly rubbing the nipple with the thumb and index finger.

To locate the milk ducts

The mother must be asked to softly palpate the breast at three or four centimeters from the nipple until finding a place where she feels something similar to a string with knots or a line of peas. These are the milk ducts. The mother must place her hand in the shape of a letter C with the thumb above the ducts and the index finger next to it and support the rest of the breast with the other fingers

Squeeze the breasts over the milk ducts:

Once the mother puts pressure with the thumb and index finger and squeezes the milk duct between them, it is necessary to ask her to place light pressure with the thumb and fingers towards the back, towards the ribs. This helps the milk flow to the nipple. The pressure is released, and the movement of squeezing and releasing is repeated until the milk starts to drip (this can take a few minutes). The colostrum can flow in drops, as it is thick and in small quantity. Then, the milk can come out in a flow after the oxytocin reflex starts to work.

When the flow of milk decreases, the thumb and index finger are moved around the edge of the areola towards another session. The movement of pressuring and releasing is repeated. When the flow stops, the mother changes to the other breast and the technique is repeated. The mother can take a pause to massage again and can go from one breast to another, if necessary.

5.3.4 Complementary Feeding

There is controversy in pediatric literature and practice for preterm and/or LBW babies on the use of corrected age or chronological age for the start of complementary feeding. The only thing certain is that the health professional must make decisions in relation to growth in weight, size and the KP reported in the WHO curves according to sex and corrected age.

If the infant grows adequately in weight, size, KP and in the growth curves with exclusive maternal

lactation, it is recommended to wait until six months of corrected age to start complementary feeding. Complementary feeding can be considered from four months of chronological age if the infant does not grow adequately with exclusive maternal lactation, having ruled out base pathologies and under the suspicion of insufficient support. In the same way, this applies if the mother returns to work and cannot exclusively breastfeed. If this situation occurs before 4 months of chronological age, artificial milk is introduced to complement maternal lactation. However, support is continued to be provided to the

work and wants to keep breastfeeding. Advice is offered so that the mother extracts milk every 3 or 4 hours, insisting that there is Law 1823 of 2017 and that it is possible to make use of extraction rooms in her business or institution.

The introduction of complementary feeding must be progressive. For this, any new food must be given for at least three consecutive days without mixing it with

5.4 Hospital Discharge and Ambulatory Follow-up Policies

The use of KMM allows for gradual transfer of the responsibilities of physical and emotional care of the infant from the healthcare personnel to the infant's family, particularly the mother (and to any other KP provider accepted by the family such as the father, grandparents, amongst others).

As the kangaroo position continues until the infant can adequately regulate their temperature and is constantly under the direct care and observation of the provider of the position, it is permitted to “de-medicalize” the care of the infant earlier than if an infant is maintained in an incubator or a crib.

The early (timely) exit in kangaroo position is one of the basic components of the Kangaroo Mother Method. This early discharge, accompanied by a close and strict ambulatory follow-up program, is a safe and efficient alternative to a stay in the neonatal unit during the stable growth phase (defined in the previous point). Despite discharge from the neonatal unit, the infant continues with the ambulatory KMP,

another to test tolerance. After six months of corrected age, it is recommended to try to get the infant to eat during the same schedule of the family. The diet must be balanced regarding carbohydrates, proteins, and fats. Monitoring anthropometric measurements (weight, size and BPI) give an idea of the quality of the complementary feeding. The role of the pediatrician is to evaluate the growth of the infant at each consultation and interview and advise the parents or caregivers on feeding practices.

healthcare comparable at least in intensity and quality to that they would receive in the minimal care neonatal unit, without being exposed to nosocomial risks and being physically and emotionally integrated into the family. If it is known that the mother cannot return to the ambulatory KMP (the mother belongs to an indigenous reserve or has a difficult economic situation), one must consider the possibility of discharge from the neonatal unit to a refuge for the mother and her infant or the possibility of joint accommodation (mother and infant) in the same health institution.

Timely discharge in KP

Upon leaving the NU, the infant can have as its destination a place within or outside the hospital but controlled by the same in which there is joint mother-infant (or caregiver-infant) kangaroo accommodation (e.g., a “kangaroo house”, “kangaroo pavilion”, or hostel outside the hospital), or they can be discharged from the

NU directly to their house.

Discharge criteria

- Criteria for discharge to a joint mother-child accommodation.
- Regardless of the weight or gestational age but as soon as the mother and child achieve a successful kangaroo adaptation (to the KP and KN).
- That is isn't certain if the mother (caregiver) and infant can go to daily consultations. If there is no transport or no ambulatory KMP follow-up, or if the family is not able to return to daily consultation, or it is not sure that they will attend these daily consultations, the mother and infant are kept in a hostel or kangaroo accommodation until there is adequate growth and the consultations can be weekly, or the reason to not send the child home has disappeared.

A 'kangaroo' child can be chosen for kangaroo handling at home as soon as they meet the conditions numbered below:

5.4.1 Eligibility criteria for the infant's discharge

The treating pediatrician is the person who decides on the exit of the infant from the neonatal unit to a joint accommodation or home.

The infant is considered ELIGIBLE to leave the neonatal unit, whether for a joint kangaroo accommodation for the mother-infant dyad or for the home, independent of their weight or gestational age, when the conditions listed here are met. Once at home, the infant is maintained in the kangaroo position 24 hours until they reject it.

a. The infant has had a successful intrahospital kangaroo adaptation, especially in that they regulate their temperature in the kangaroo position and have an adequate suction-swallowing-respiration coordination. There are Kangaroo

Mother Programs with experience in discharging for ambulatory handling in infants that are fed by tube administered by the mother who has been trained to do so (if adequate suction and swallowing is not present), or by oral administration without suction (cup, spoon, drops; the infant must swallow in the appropriate way). This option is not considered in Colombia.

b. The infant has an adequate weight gain in the neonatal unit with the kangaroo position and incubator during at least two consecutive days if they are more than ten days old. (In the first days, the infant can lose weight and the exit criteria for a stable infant is different in this aspect. A normal clinical exam is required without the need for

weight gain during two consecutive days).

- c. The infant has finished their medical treatment, if applicable.^e
- d. If they receive oxygen through the nasal canal, this must be less than ½ lt/min (This is for practical reasons, as on average the journey from the Kangaroo Mother Program hospital entity takes an hour. As such, the oxygen tank must last the

distance there and back and still have enough for an emergency visit).

The infant must have an ambulatory Kangaroo Mother Program able to provide them with adequate follow-up. This guarantees access to a systematic, rigorous and well-established program of ambulatory management and kangaroo monitoring.

5.4.2 Eligibility criteria for the mother's discharge

The mother is considered ELIGIBLE for exit from the neonatal unit when the following conditions are met.

- a. She has accepted to take part in the Kangaroo Mother Program. For this, she must receive the necessary education in the Kangaroo Mother Method.
- b. She feels capable of caring for her infant using the Kangaroo Mother Method (position and nutrition) at her home.
- c. She has had a successful intrahospital kangaroo adaptation and in particular she has acquired the adequate lactation (direct suction from the breast) and

milk extraction techniques.

- d. There is a family commitment and capacity to assist in the ambulatory kangaroo monitoring controls.
- e. She is physically and mentally capable of caring for her infant.
- f. The concept of a multidisciplinary team is favorable for the ambulatory follow-up, in particular for cases of high social risk such as teen motherhood, single mother with an infant using portable oxygen, with twins, or with more infants, with infants that have health problems, and in the case of alcoholism or drug addiction.

5.4.3 Eligibility criteria for the discharge of the family/support network

The family group or support network that will enter into the Kangaroo Mother ambulatory follow-up program must comply with the

following aspects.

- a. They must want to support or accompany the mother and be part of the program that applies the Kangaroo

Mother Method.

- b. Understand the method well and feel capable of helping the handling of the infant at their home.
- c. Have sufficient time and family collaboration in care to achieve the objectives of the KMM and guarantee the safety of the infant.
- d. Support the mother in duly attending appointments, respecting lactation hours until 40 weeks of gestational age (and afterwards continue with maternal lactation on free demand), follow application instructions for medications and carry out the special exams ordered.
- e. To be able to adapt to the transitory changes implied by the adoption of the Kangaroo Mother Method at home. Provide support for maintaining the kangaroo position 24 hours a day and redefine the cooperation roles between members of the family which must be adopted to support the principal caregiver.
- f. Be physically and mentally capable to help care for the infant at home.
- g. Reside close to or in the same city where the Kangaroo Mother Program is based. If the family lives far or there is no commitment to the ambulatory follow-up, it would be advisable to have a temporary joint mother-kangaroo infant accommodation where the caregiver(s) could stay at least until the infant gains weight in an adequate way and can pass the weekly control.

It is necessary that the family members that are going to collaborate in the kangaroo care do not have problems for carrying out their task. The mother, father, and other family members or support network must be free from the following:

- Injuries to the skin of the thorax
- Skin eruptions or contagious diseases
- Hyper or hypothermia
- They must not have epilepsy or any uncontrolled mental illness
- Extreme obesity

High risk ambulatory follow-up

After the exit of the kangaroo infant from the hospital center, they are controlled daily with weight monitoring until they reach a daily weight gain at least two or three consecutive days of 15g/kg/day if they have less than 37 weeks of gestational age, and then 8 to 11g/kg/day until full-term. When this gain is achieved, weekly controls are carried out until the infant reaches full term (40 weeks of gestational age) and 2,500 grams. This constitutes the ambulatory equivalent to the minimal intrahospital care and can be named “minimal neonatal ambulatory care.” This care includes systematic prophylactic treatments such as anti-reflux measures, vitamins, prophylaxis of the primary apnea of the preterm baby. During this monitoring, ophthalmological, audiological and neurological screening exams are carried out, including a brain echograph. After completing the full term (40 weeks of gestational age), the high-risk monitoring is

initiated until the infant reaches one year of corrected age as a minimum, ideally until two years of corrected age to be able to ensure observation of independent movement.

The justification for this approach is that kangaroo infants clearly belong to the high biological risk category due to risk of inadequate somatic growth and the risk of presenting neuro-psychomotor and sensory problems. The KMP represents, as such, an opportunity for high risk monitoring for these

infants during at least the

first two years of life.

For this reason, in this document the minimum activities that a high-risk follow-up program must perform are described.

Note: In the following chapters of these guidelines, topics such as vaccines and screening are described.

5.5 Comprehensive Multidisciplinary Monitoring

The comprehensive multidisciplinary monitoring principle of the KMM defines that the health institution attending the infants provides them with the necessary medical personnel (whether part the KMP or not), the necessary exams and care, and constant monitoring. However, despite the multidisciplinary care, the KMP group analyses all the aspects related to the patient and has an integral vision of their state of health and the procedures that have been carried out, allowing them to determine the best handling of the infant. Regular monitoring is performed on the infant by a basic team made up of pediatricians (or neonatologists), nurses, psychologists, and social workers. Other disciplines

can be included according to the need with the only goal of resolving any problem in a pertinent and effective way. This monitoring is carried out through the entire stay of the infant in the KMP and especially during visits. The comprehensiveness of care goes beyond medical aspects, as analysis is also carried out for the psychological, social, economic difficulties that the infant, mother, caregiver, family could have that could impede adequate adoption of the KMM.

Whenever necessary, as any other patient, the infant can receive care from different medical specialists and the information shall be gathered and integrated into the KMM to provide the infant the best care possible and achieve their optimum development.

5.6 Collective Consultancy

The last central point of the KMM is the collective consultation during the ambulatory KMM. The wait for the collective consultation is in the same room as all the patients and the multidisciplinary team of the KMP. However, the consultation is individual. To capture the complexity, benefits and environment of this type of consultation, parts of the presentation done in 2009 by Juan Camilo Arboleda, anthropology student of the Human Sciences Faculty of the Universidad Javeriana, who did his professional practice on the topic of collective consultations, are cited below.

“The collective consultation is the particular method in which the consultation is carried out in the Kangaroo Program room. They are interactions, what happens in the room, that go beyond merely being a medical consultation, of waiting and applying medications for health anomalies of preterm and/or low birth weight babies.

...The collective consultation is collective because it brings together many patients in the same space at the same time, but all are assisted individually by the pediatricians.

The consultation is done visibly without divisions between doctors and makes it possible for mothers to hear what they say and think about the realities of the infants and/or about general care that can be recommended to the mothers.

It allows for the dynamization of information where all medical talks are open for parents to listen to all being discussed.

Parents, pediatricians and nurses care for the infants together. Mothers ask for health services for their infants, doctors give their knowledge, the nurses facilitate the execution of said knowledge...”

It is important to explain that the medical consultation is always individual. It is collective because the infants (patients), mothers (caregivers), pediatricians and nurses are in the same space. It is individual because each infant is attended to individually by a pediatrician, when it is their turn.

The mother-infant dyads are assisted on the KMP premises. This allows for observation of the handling that parents give to their kangaroo infant, especially in the first days of daily consultation. Then measurements and pediatric evaluations are made individually, but in view of all those present in the room.

The collective consultation has shown great contributions to the KMM. As a first aspect, it allows for the observation and evaluation of the kangaroo adaptation of the different dyads by the KMP personnel. It also allows for the spread of information and experiences between mothers and caregivers in a controlled way (knowledge chat), which contributes to the handling of anxiety and a quicker training of mothers and new caregivers thanks to the experience of others.

Finally, the presence of infants of different ages in the same room allows new mothers or caregivers to see well-developed and big infants that started like their own. This makes fears or anxiety with regard to the future of their infants tend to disappear or decrease. All this permits greater adherence to the program by caregivers and as such better adherence to the KMP.

It should be noted that, due to it being a collective consultation, there are precautions that must be made. Sick infants of over 40 weeks of gestational age cannot be admitted with other infants to avoid any contagion. These infants are attended separately in another room or must go directly to the emergency room.

5.7 Other governing principles of the Kangaroo Mother Method (KMM)

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Below are a series of additional principles that the KMP must fulfill. It is possible that some of these principles have already been mentioned in previous sections, but they are compiled into this section to emphasize their importance.

- Due to the particular vulnerability of the preterm or low birth weight infant and the particular conditions of the hospital, it must be considered that it is better for the infant to be at home with adequate care and not in a NU or hospital. The stay of the infant at home is possible only if the infant has adequate health and stability conditions. The risk-benefit of the infant being hospitalized or at home must always be evaluated.
- All decisions in the handling of the dyad (mother-infant or caregiver-infant) must favor them being together.
- When the infant needs to be in the NU, 24-hour access for the parents to the neonatal unit must be ensured. Equally, it must be insured that they can interact with their infant to facilitate the initiation of the Kangaroo Mother adaptation.
- Independently of the KMP implemented by the level I or II health institution, the infant must be able to have easy and timely access to: the newborn unit, emergency services, specialized care, diagnostic methods, whenever necessary.
- In ambulatory care, until at least 40 weeks of corrected age, there must be telephone assistance to parents, 24 hours a day every day (including non-business hours of the KMP). This telephone line must be answered by a pediatrician and permit the parents to resolve concerns in relation to the handling of their kangaroo baby. This also allows for the orientation of the caregivers with regards to the emergency room and whether it is necessary to go there or not.
- The KP for transport “is not recommended as a routine practice nor as a policy to substitute the transport incubator, but rather as a safe and adequate alternative when transport incubators are not optimum, are not available, or the roads are not paved, in a transportable infant (Practical Clinical Guides).
- The KMP is initiated once the stability of the infant has been determined in the level I or II health institution or NU.
- In levels of inferior complexity, the advantages of the KP can be exploited to

provide a neutral thermic environment and the NC to reduce the risk of hyperglycemia, whilst adequate transport is guaranteed (see intrahospital flow diagram).

6 SCIENTIFIC EVIDENCE

Each year, more investigations are published worldwide regarding the KMM and its benefits. Studies are making progress in the search to establish the ideal moment to start the intervention with the kangaroo position. Others go in-depth in the physiological bases for the kangaroo position in order to decrease pain on the preterm infant in the neonatal unit, the effects on oxygenation and the effect of KMM intervention on long-term neurological and behavioral development.

Matters such as early discharge, feeding of the preterm newborn in the weight-gain period, ambulatory follow-up, and strategies to reduce the consequences of prematurity, contain several questions that must be answered in order to establish better follow-up and evaluation strategies in preterm and low birth weight infants.

Various clinical research projects have been developed in Colombia over these 25 years. The first phase corresponded to an impact assessment of the KMM as a pre-requisite for newborns under 2,000 g at birth in order to do experimental studies. It was done through an analytical observational study of two cohorts that was conducted during 1989 and 1993. (1) After this, a clinical effectiveness evaluation (mortality, morbidity, growth and development) of all the components of the intervention was carried out through a random clinical study. (2, 3) Throughout the progress of the experimental study, sub-studies were done which answered specific questions related

to psycho-effective outcomes and the biology of the preterm mother-infant dyad. (4, 5) An evaluation of the KMM was done in the following years, especially evaluating the nutritional aspects and the impact on discharge in kangaroo position with ambulatory oxygen. In recent years, a pilot study was done with the Universidad Laval to evaluate, at the age of 15, the impact of the KMM on the brain and in particular on the connectivity evaluated by transcranial magnetic stimulation in a group of 40 young people who had been exposed to the KMM in the neonatal period and had less than of 33 weeks of gestational age. (6)

The articles published by McCormick (7), Saigal (8) and Zelkowitz (9) summarize the current status of the subject and highlight the following aspects as research priorities: a) Factors associated with short and long-term development disorders and b) the implementation of effective intervention programs for infants and their families. The purpose of increasing the survival rate in extremely preterm newborns and the deficiencies and complications that may cause extreme prematurity, cause concern in both scientific as well as in ethical terms. The decrease in the perinatal mortality rate, particularly in infants with LBW, has been the result of effective medical interventions. Likewise, it has increased the survival rate on preterm and extremely preterm newborns in developing countries, thus creating a greater load on the disease attributable to prematurity and an even

more complex problem to fight against. Scientific literature has proven that prematurity is associated with short-term and mid-term development disorders. Meta-analysis results, including observational studies (10, 11) have shown cognitive deficits (12, 13) in subjects with a prematurity and LBW history, low academic performance (12, 14), attention problems (15) and fewer social skills (16, 17) compared to their classmates who were born full-term. Compared with their classmates, infants with a prematurity history that attend school, describe themselves as having lower social skills (18) and experience greater victimization (19). Upon reaching adolescence, their teachers describe these individuals as having a greater percentage of social rejection and attention problems (20).

Additionally, the results of a seven-year longitudinal study on a cohort of very low birth weight newborns, has supported this notion through a model where prematurity was clearly associated with delays in neuromotor development and intellect. These deficits explained the predictive relationship between prematurity and specific behavior problems such as isolated behavior, alterations in attention and social victimization. These problems continued until the infants were 11 and 12 years of age. Social victimization was more prominent at 12 years of age than at an earlier age (21).

A systematic revision by the Cochrane library published in 2016, which included 18 systematic revisions (including Colombian studies), found that when comparing the KMM with conventional

neonatal care, KMM was associated with a 40% decrease in the neonatal mortality rate and a 44% decrease in the risk of severe infection. (22) In 2016, the initial results of the long-term monitoring of the participants of the first randomized clinical trial were published. 20 years later, 69% of the original sample was recovered and the results of 264 participants who weighed less than 1800 grams at birth were analyzed. The comparison was carried out in both the group that received the KMM as with the control group, the state of health, neurological and cognitive, as well as social functioning, with the use of neuroimaging and behavioral and neuropsychological tests. The effects of the KMM on the IQ and the family environment at one year of life were present 20 years later in the group of most fragile individuals, and parents were more stimulating and protective which meant a reduction of school absenteeism, aggressiveness and hyperactivity. This study was able to demonstrate the long-term effects of the KMM. (23).

The Preterm Newborn Clinical Practice Guideline document, published by the Health and Social Protection Ministry, describes the handling of a complex intervention, as this method is, in which experts in the Kangaroo Mother Method examined the necessary information and formulated their recommendations based on explicit, systematical and reproducible judgments regarding the validity and pertinence of the examined evidence. For more information, check the free access document: <http://gpc.minsalud.gov.co/guias/Pages/Guia-del-rciennacido-prematuro.aspx>

References:

1. Charpak N, Ruiz-Peláez JG, Charpak Y, Rey-Martinez. Kangaroo Mother Program: an alternative way of caring for low birth weight infants? One-year mortality in a two cohort study. *Pediatrics*. 1994 Dec;94 (6 Pt 1):804-10.
2. Charpak N, Ruiz-Peláez JG, Figueroa de C Z, Charpak Y. Kangaroo mother versus traditional care for newborn infants ≤ 2000 grams: a randomized, controlled trial. *Pediatrics*. 1997 Oct; 100 (4):682-8.
3. Charpak N, Ruiz-Peláez JG, Figueroa de C Z, Charpak Y. A randomized, controlled trial of kangaroo mother care: results of follow-up at 1 year of corrected age. *Pediatrics*. 2001 Nov; 108 (5):1072-9.
4. Tessier R, Cristo M, Velez S, Giron M, de Calume ZF, Ruiz-Palaez JG, Charpak Y, Charpak N. Kangaroo mother care and the bonding hypothesis. *Pediatrics*. 1998 Aug; 102(2): e 17.
5. Tessier R, Charpak N, Giron M, Cristo M, de Calume ZF, Ruiz-Peláez JG. Kangaroo Mother Care, home environment and father involvement in the first year of life: a randomized controlled study. *Acta Paediatr*. 2009 Sep; 98(9):1444-50.
6. Schneider C, Charpak N, Ruiz-Peláez JG, Tessier R. Cerebral motor function in very preterm-at birth adolescents: a brain stimulation exploration of kangaroo mother care effects. *Acta Paediatr*. 2012 Oct; 101(10):1045-53.
7. McCormick MC. Preterm delivery and its impact on psychosocial and emotional development in infants. In: Tremblay RE, Barr, R.G., Peters R De V., ed. *Encyclopedia on Early Childhood Development* (online). Montréal, Québec: Center of Excellence for Early Childhood Development, 2004.
8. Saigal S. Behavioral and emotional functioning in preterm infants. In: Tremblay RE, Barr, R.G., Peters R De V., ed. *Encyclopedia on Early Childhood Development* (online). Montréal, Québec: Center of Excellence for Early Childhood Development, 2004.
9. Zelkowitz P. Prematurity and its impact on psychosocial and emotional development in infants. In: Tremblay RE, Barr, R.G., Peters RDeV., ed. *Encyclopedia on Early Childhood Development* (online). Montréal, Québec: Center of Excellence for Early Childhood Development, 2004.
10. Amiel-Tison C, Allen MC, Lebrun F, Rogowski J. Macropremies: underprivileged newborns. *Ment Retard Dev Disabil Res Rev* 2002; 8:281-92.
11. Aylward GP. Neurodevelopmental outcomes of infants born prematurely. *J Dev Behav Pediatr* 2005; 26:427-40.
12. Aylward GP, Pfeiffer SI, Wright A, Verhulst SJ. Outcome studies of low birth weight infants published in the last decade: a metaanalysis. *J Pediatr* 1989; 115:515-20.
13. Hack M, Flannery DJ, Schluchter M, Cartar L, Borawski E, Klein N. Outcomes in young adulthood for very-low-birth-weight infants. *N Eng J Med* 2002; 346:149-57.
14. Bjerager M, Steensberg J, Greisen G. Quality of life among young adults born with very low birthweights. *Acta Paediatr* 1995; 84:1339-43.
15. Pharoah PO, Stevenson CJ, West CR. General Certificate of Secondary Education performance in very low birthweight infants. *Arch Dis Infant* 2003; 88:295-8.
16. Rose SA, Feldman JF, Jankowski JJ, Van Rossem R. Pathways from prematurity and

infant abilities to later cognition. *Infant Dev* 2005; 76:1172-84.

17. Nadeau L, Boivin M, Tessier R, Lefebvre F, Robaey P. Mediators of behavioral problems in 7-year-old infants born after 24 to 28 weeks of gestation. *J Dev Behav Pediatr* 2001; 22:1-10.

18. Hoy EA, Sykes DH, Bill JM, Halliday HL, McClure BG, Reid MM. The social competence of very low- birth weight infants: teacher, peer, and self-perceptions. *J Abnorm Infant Psychol* 1992; 20:123-50.

19. Dahl LB, Kaaresen PI, Tunby J, Handegard BH, Kvernmo S, Ronning JA. Emotional, behavioral, social, and academic outcomes in adolescents born with very low birth weight. *Pediatrics* 2006;118: e 449-59.

20. Nadeau L, Tessier R, Lefebvre F, Robaey P. Victimization: a newly recognized outcome of prematurity. *Dev Med Infant Neurol* 2004; 46:508-13.

21. Rickards AL, Kelly EA, Doyle LW, Callanan C. Cognition, academic progress, behavior and self-concept at 14 years of very low birth weight infants. *J Dev Behav Pediatr* 2001; 22:11-8.

22. Conde-Agudelo A, Díaz-Rossello JL. Kangaroo mother care to reduce morbidity and mortality in low birthweight infants. *Cochrane Database Syst Rev*. 2016 Aug 23;(8): CD002771.

23. Charpak N, Tessier R, Ruiz JG, Hernandez JT, Uriza F, Villegas J, Nadeau L, Mercier C,

Maheu F, Marin J, Cortes D, Gallego JM, Maldonado D. Twenty-year Follow-up of Kangaroo Mother Care Versus Traditional Care. *Pediatrics*. 2017 Jan; 139(1).

7 GUIDELINES AND REQUIREMENTS FOR THE DEVELOPMENT OF THE PROCESSES OF THE KANGAROO MOTHER PROGRAM

7.1 Institutional conditions for the development of the processes for the implementation of the Kangaroo Mother Programs

In principle, the possibilities for the implementation of Kangaroo Mother Programs (KMP) for a health institution are the following:

| TYPE OF health institution (*) (minimum) | TYPE OF CARE | | | CRITERION |
|--|------------------|--|---|---|
| | In-hospital care | Up to 40 weeks of postconceptional age | From 40 weeks (postconceptional) to one year of corrected age | |
| Level III or II with NICU | | | | It can be seen as a start to the Kangaroo Mother Method (KMM) and works if there are effective and timely remission mechanisms to continue with the KMM. In this stage, once the infant is discharged from intra-hospital care, the continuity of the KMM must be ensured in a KMP between 24 and 48 hours. The start of the KMM is mandatory in accordance with Resolution 0412 of 2000 of the Health and Social Protection Ministry within the activities of specific protection and early detection. |

| TYPE OF CARE | | | | |
|--|------------------|--|---|--|
| TYPE OF health institution (*) (minimum) | In-hospital care | TYPE OF CARE | | CRITERION |
| | | Up to 40 weeks of postconceptional age | From 40 weeks (postconceptional) to one year of corrected age | |
| Level III or II with NICU | | | | Ensures the minimum. However, it is desirable that follow-ups are performed on the infant until it is one year of age, with high-risk examinations. A minimum number of repetitions of an intervention, are necessary in order to guarantee quality, expertise and efficiency in the service. There is a risk of not having enough patients in small neonatal units in order to guarantee the quality of the KMM and it might not be appealing from a cost-benefit point of view. |
| Level III or II with NICU | | | | Optimum, since it ensures the full follow-up of the infant and avoids problems that may arise in the referral and counter-referral between different health institutions. Safe economy of scale and coherence. |
| Level II | | | | Corresponds to the care for infants in high risk and does not show evidence of benefits for the application of the KMM. |

As it is shown in the table, the lowest admissible level for the health institute is of level II, regardless of the type of KMP.

In case a blue code is presented in a neonatal patient (corresponding to less than 40 weeks of gestational age or less than one month of life),

the neonatal intensive care unit must be immediately notified.

It is considered that the first responder must be the Kangaroo Mother Program pediatrician who will provide the initial stabilization measures while the specialist of the neonatal intensive care unit arrives, whom will perform expert care

in the resuscitation process, and thus decreasing complications.

Likewise, the table describes the health institutions that offer integrated services, meaning intra-hospital care of the preterm and/or low birth weight newborn and ambulatory care in the Kangaroo Mother Program. This allows an optimum operation since it guarantees the continuity of the care and

7.2 Presentation of Flow Charts

In this chapter, a KMP is presented as a flow chart to show how it is to comply with what is established by the KMM and to ensure the wellbeing of the preterm or low birth weight infant. However, the kangaroo mother method is not described in detail since it is already described in the guidelines and in the application literature of the KMM. The application of the KMM in the health institution should be an institutional policy and should promote the coordination of its management protocols for the issues that require it, and that complement the application of the KMM. The minimum list of protocols to be considered is presented in the "guidelines and requirements for the implementation of KMP" chapter. Additionally, it must be ensured that those who work directly with, or collaborate with the KMP, know and apply that established by the KMP protocols of its institution. In the Technical Guidelines for Health Institutions chapter, the theoretical and practical knowledge of the KMM and the demonstration of its competence in the areas of specialization required by the program, are presented as a requirement for health professionals. Both the

decreases the gaps in quality of health services (opportunity and access).



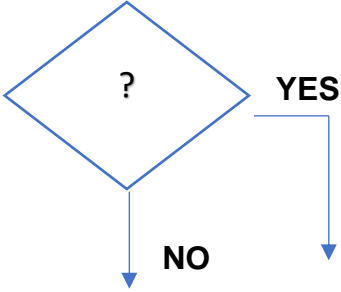

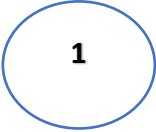

The following sections of the chapter describe the intra-hospital and ambulatory care. However, before this description, a brief introduction to the flow chart is given, since this method was chosen to explain how these two types of care work in the KMM.

KMM application protocols and the way in which the handling and application of the KMM will be demonstrated, as well as the demonstrated skill in the areas of specialization in health professionals, will be developed by each institution by following the recognized models and they should be able to be evaluated by peers when it comes to possible processes of authorization, certification and accreditation.

Each flow chart has four columns. The first presents the activities sequence, the second has the characteristics and actions taken on the infant, the third has the characteristics and actions taken on the caregivers (usually the mother), and the fourth column has the actions or criteria applied by the health professionals. Each row refers to a single activity and the columns to the right explain, in depth, the activity described in the first column to the left.

It is suggested to read the row completely corresponding to the activity, and for the case of the presented decisions, understand how the activities are developed according to the decision made.

The conventions of the flow chart are:

| CONVENTION | DESCRIPTION |
|---|--|
|  | Beginning or end of the flow chart. |
|  | Brief description of the activity. This description is complemented with what is described in the columns on the right, which describe the actions taken or the characteristics of the infant, caregivers and health professionals. |
|  | Decision or question proposed to carry out different actions. |
|  | Information and activities flow. |
|  | Page connector and activities. |
|  | A process is a set of activities that have a defined purpose. Processes are represented in as a sequence of activities with a beginning and an ending. In these guidelines, processes are represented as a flow chart. When a processes is presented in the flow chart, it means it continues in the mentioned process. |

The flow charts have been divided in:

Kangaroo Mother Program – intra-hospital care and Kangaroo Mother Program – ambulatory care. These two flow charts cover all types of KMP that are going to be implemented, since they describe the KMM from the beginning of the intra-hospital phase until the ambulatory phase and high risk follow-up.

7.3 Adaptation of the preterm and/or low birth weight infant in an intra-hospital Kangaroo Mother Program

The BMI of the preterm or low birth weight infant born in an intra-hospital KMP is more than a program in itself. It is a complement to the care provided by the professionals of the NICU with the Kangaroo "know-how". This intra-hospital intervention allows early kangaroo selection and adaptation of the dyads (mother-infant) to breastfeeding and to the kangaroo position, thus ensuring a better adaptation of the infant to extrauterine life and in most cases, the infant's safe early discharge from the hospital in an ambulatory KMP.

Each NICU that wants to implement the KMP must, as mentioned at the beginning of the chapter, in a first stage, write its kangaroo protocols based on the kangaroo guidelines. These rules will be reflected in protocols, the minimum protocols, thus mandatory, listed in the "guidelines and requirements for the KMP implementation" chapter.

During the intra-hospital care, the elements that ensure the success of the KMM are: the kangaroo experience of the health institution reflected in the protocols, the collaboration of the KMP nurse that supports breastfeeding, the kangaroo position and the adaptation to the KMM which, in general, results in timely early discharge, and the integration and commitment of the entire NICU team.

An aspect that ensures a successful intra-hospital kangaroo adaptation is the 24-hour access of parents or caregivers to their infant in the NICU.

Likewise, the Ambulatory Kangaroo adaptation complies with Resolution 0412 of 2000 of the Ministry of Social Protection.

Below is a general flow chart of the intra-hospital KMP care. However, it is necessary to stress that the medical criterion is important to choose the initiation moment of the KMM, according to its experience and the existing scientific evidence.

ADAPTATION FLOWCHART OF THE PRETERM AND/OR LOW BIRTH WEIGHT INFANT AT BIRTH IN A INTRA-HOSPITAL KANGAROO MOTHER PROGRAM (KMP)

| Kangaroo Mother Program - Intra-hospital care | Characteristics and actions on the infant | Characteristics of the caregivers and activities with the same | Considerations for the health professionals of the health institution |
|---|---|--|--|
| <pre> graph TD Start([Beginning]) --> Birth[Birth of the premature or low birth weight child in the delivery room] Birth --> Adaptation[KP and KN neonatal adaptation on stabilized child] Adaptation --> Decision1{Was the child born in a level II IPS with NICU or a level III IPS with ICU?} Decision1 -- YES --> Decision2{Does the child meet the conditions to be hospitalized with its mother?} Decision2 -- YES --> 1((1)) Decision2 -- NO --> Decision3{Is there immediate availability of a transport incubator?} Decision3 -- YES --> TransportKP[Child transport in KP] TransportKP --> Reception[Child received in the level II IPS With NICU or Level III with ICU] Reception --> 3((3)) Decision3 -- NO --> TransportOpt[Transport of child in optimum conditions] TransportOpt --> Reception Decision1 -- NO --> TransportNICU[Child transport from delivery room to NICU in optimal conditions.] TransportNICU --> 2((2)) </pre> | <p>An infant is considered preterm if:</p> <ul style="list-style-type: none"> -The infant has less than 37 weeks of gestation. -The infant weighs less than 2,500 grams. | | <p>The pediatrician in the delivery room should receive and examine the preterm or low birth weight infant at the time of birth.</p> |
| | <p>If the clinical status of the infant (according to the pediatrician) allows it:</p> <ul style="list-style-type: none"> - The infant is placed immediately on skin-to-skin contact. - Breastmilk is administered to promote early bonding and to ensure breastfeeding success, an essential component of Kangaroo Nutrition (KN). - The infant must be immobilized in the kangaroo position (KP) so that the infant does not move. <p>-This procedure is very important since the mother can be sleepy, under the effect of medication or fatigue of the birth itself.</p> | | <p>The medical staff develops the neonatal adaptation procedures, according to the needs of the infant.</p> <p>The pediatrician, according to the clinical examination, determines if:</p> <ul style="list-style-type: none"> - The kangaroo position (KP) is initiated. - Breastfeeding is initiated. <p>When the infant is born, it is put in the KP under the constant supervision of the nurse or pediatrician in the delivery room.</p> |
| | | | <p>The best transport method is the intrauterine method, reason for which it is necessary to try to transport the infants before their birth, if the state of the infant allows it. This is achieved with adequate prenatal follow-up.</p> |
| | | | <p>The conditions of the infant and the mother, in order to move them from the delivery room directly to the hospitalization of the infant with the mother, must be established in the protocols of the institution.</p> |
| | | | <p>The doctor assesses the situation of the infant and determines the best transport method for the infant, taking into account that the KP is an alternative when there is no incubator available.</p> |
| | <p>The optimal transport conditions of the infant is with immediate availability of:</p> <ul style="list-style-type: none"> -Doctor. -Ambulance. - A transport incubator in good working order. | <p>The mother (or caregiver) is always transported with the infant, if the state of the two allows it.</p> | |
| | <p>The KP is put into practice on the already stabilized infant, always avoiding hypoglycemia (use of dextrose EV, nutrition by orogastric tube (OG)).</p> | <p>The mother (or caregiver) is always transported with the infant, if the state of the two allows it.</p> | <p>The transport KP "is not recommended as a routine practice or as a policy to replace the transport incubator, but as a safe and suitable alternative for a transportable infant when the transport incubators are not optimal, are not available or when roads are not paved." (Recommendation: Guidelines for Clinical Practice of the Preterm Newborn).</p> |
| | <p>In case of being referred from another health institution, the reception of the infant can be carried out through the emergency service, but the optimum method is direct entry to the NICU.</p> | | |
| | | | <p>The infant and transport conditions must be defined in the protocols of the institution.</p> |

| Kangaroo Mother Program - Intra-hospital care | Characteristics and actions on the infant | Characteristics of the caregivers and activities with the same | Considerations for the health professionals of the health institution |
|---|---|--|--|
| | <p>The infant is staying with its mother or caregiver in a joint room.</p> <p>The stability criteria of the newborn to start KP and KN in the NICU (including ICU) are the following: -FC and FR stable during manipulations (manipulations do not cause a drop in oxygen saturation or significant variations in vital signs). -The newborn has overcome any critical pathology, such as infections.</p> | <p>The mother or caregiver stays with the infant in a joint room and keeps it in KP for 24 hours.</p> <p>The KP and KN start when the mother or the caregiver are willing to collaborate and wish to hold the infant. Additionally, it is carried out according to the institution's protocol (it can be from the ICU, intermediate or basic care).</p> <p>Selection criteria and requirements for the mother or caregiver:</p> <ul style="list-style-type: none"> - Absence of infectious, cutaneous and/or hyperthermia diseases. - Physical and mental ability to handle the infant in KMM. - Voluntarily accept participation in the training sessions. | <p>The stability of the infant is determined by the medical staff of the NICU, according to the written protocol belonging to the same institution.</p> <p>The Pediatrician responsible for the NICU decides the final location of the Infant-Mother dyad.</p> <p>According to the protocol of the institution, infants over 1800 grams or equal to 34 weeks, could be sent to intra-hospital joint room, under the condition that there is an intra-hospital kangaroo adaptation and that the kangaroo nurses go to the room, teach the KP and check the breast feeding to avoid hypoglycemia.</p> <p>Observation by the medical staff and under the supervision of the nursing professional: optimum 72 hours; Mandatory: 48 hours. KP and KN from the beginning. The joint room is in the hospital. It is necessary to avoid the separation of the mother-infant dyad. If the infant presents a pathological condition at any time, it must be taken to the NICU.</p> <p>The nurse performs daily kangaroo adaptations KP and KN as long as the stability of the infant allows it, for as long as possible. If the infant is in the NICU for suspected infection and the infant's lab results are negative, during the next 48 hours, it can return to the joint room with its mother if she continues to be hospitalized.</p> <p>During the kangaroo adaptation, the medical staff applies the initiation protocols of the KP and KN, according to the protocol of the institution and in accordance with the regulatory entities (peers) or international recognition guides.</p> |

| Kangaroo Mother Program - Intra-hospital care | Characteristics and actions on the infant | Characteristics of the caregivers and activities with the same | Considerations for the health professionals of the health institution |
|---|---|---|---|
| <pre> graph TD Start((4)) --> D1{Is the child eligible for discharge?} D1 -- NO --> Up1[] D1 -- YES --> D2{Is the dyad eligible for KMP?} D2 -- NO --> Up2[] D2 -- YES --> D3{Does the child require O2?} D3 -- NO --> Left[] D3 -- YES --> D4{Does the dyad have the ability to handle O2?} D4 -- NO --> Right[] D4 -- YES --> D5{Can the dyad attend daily visits?} D5 -- NO --> Accom[Mother-child dyad accommodation] Accom --> OPKMP[Outpatient Kangaroo Mother Program] D5 -- YES --> Discharge[Discharge to go home] Discharge --> OPKMP </pre> | <p>Successful kangaroo adaptation:</p> <ul style="list-style-type: none"> -Increased weight for at least 2 consecutive days, except if the infant is in its first 10 days of life (physiological weight loss). In this case the clinical status prevails. -Good coordination suction-swallowing-breathing. -The newborn has finished medical treatment, if any. -If the infant is receiving oxygen through a nasal cannula, it should be less than 1/2l/min. -It has an ambulatory KMP able to receive the infant and provide it with adequate follow-up. | | <p>The pediatrician and nursing professional determine if the infant is eligible to be discharged from the hospital</p> |
| | <p>Successful intra-hospital kangaroo adaptation:</p> <ul style="list-style-type: none"> -The mother has acquired breastfeeding and milk extraction techniques. - There is a commitment and family ability to attend the ambulatory follow-up controls in the KMP. -The mother or caregiver is physically and mentally capable of taking care of her infant, and feels capable of taking care of her infant at home under the KMM. | | <p>Pediatricians and nurses must ensure that the dyad will receive care in the ambulatory KMP to which they are refer to, during the 24 to 48 hours following the referral.</p> <p>At this point, social work is of great importance in order to evaluate and help with possible solutions.</p> |
| | <p>Proper saturation with less than 1/2 liter of oxygen (according to the distance the parents must travel and the capacity of the oxygen tank).</p> | <p>The family correctly manages the KP, the KN and the use of oxygen. The family has knowledge of the warning signs of the infant using oxygen.</p> | <p>Health professionals make sure that the caregiver properly applies the KMM and correctly manages the oxygen. They also ensure the availability of a neonatal flowmeter for the oxygen tank at home, as well as for the ambulatory oxygen tank.</p> |
| | | <p>Do parents or caregivers have the possibility of attending daily ambulatory appointments?</p> | |
| | <p>Accommodation in the hospital or at home under the responsibility of the health institution if the infant meets the requirements to exit with or without oxygen, but its family does not have the kangaroo infant handling skills, has low income or has no transport availability to return the next day. This makes it impossible for the newborn to go home and return to the ambulatory KMP every day.</p> | | <p>Accommodation in the hospital or at home under the responsibility of the health institution.</p> |
| | <p>Criteria to discharge the newborn from the joint room:</p> <ul style="list-style-type: none"> -Successful kangaroo adaptation. - No serious pathology. -Has spent 72 hours of observation, ideally. <p>Criteria to discharge the newborn from the NICU:</p> <ul style="list-style-type: none"> - No serious pathology. -Increased weight during 2 consecutive days (except if it is in the physiological period of loss of weight). -Good coordination suction-swallowing-breathing. -Anemia discarded. -Maximum 1/2 liter of oxygen per nasal cannula. | <p>Successful kangaroo adaptation.</p> <ul style="list-style-type: none"> -Caregivers with available time. -Commitment of the caregivers to follow the guidelines of the KMM and return to the follow-up consultations in the ambulatory KMP. -Knowledge of alarm signs. | <p>The medical staff evaluates:</p> <ul style="list-style-type: none"> - There is an ambulatory KMP to receive the kangaroo infant and its family in the first 24 or 48 hours after discharge. - An appointment can eventually be made. -The family handles the KP and KN. -If the discharge is for an infant using oxygen, does the health insurance entity of the family have an ambulatory oxygen service? -The family manages the oxygen correctly. -The family has knowledge of the warning signs of the infant using oxygen. -The family or caregivers have the possibility of attending ambulatory consultations daily. |
| | | | <p>The infant's admission to the ambulatory KMP should be considered as a referral and, ideally, the KMP staff should be informed of the arrival of the dyad in such a way that they can point out when the dyad did not attend the control visit.</p> |

7.4 Monitoring of preterm or low birth weight infant in an ambulatory Kangaroo Mother Program

The follow-up of the preterm or low birth weight infant in an ambulatory KMP is based on the following principles, which were explained in the “Conceptualization” chapter:

- Integral – Multidisciplinary - Ambulatory Kangaroo Care;
- Pediatric advice by telephone to assist parents 24 hours a day, every day (including holidays). The telephone line must be attended by a pediatrician.
- The health institution documents and implements its KMM adaptation protocols.

Follow-up in an ambulatory KMP has to be carried out at least until 40 weeks of postconceptional age of the infant, and optimally up to two years of corrected age. If the follow-up of the infant is suspended at 40 weeks of gestational age, the infant should be referred to a high-risk follow-up program that offers handling comparable to the high-risk follow-up that is carried out in a KMP. The program must comply with quality criteria and be able to be confirmed through a peer evaluation. Likewise, it is recommended that ambulatory follow-up, up to two years of corrected age, is carried out in a single institution for reasons of economy of scale and the great contribution carried out in the ambulatory KMP collective consultation by the families of the largest infants to the primiparous mother-infant dyads, in terms of clarifying doubts and reducing fears, and the proven effectiveness of KMM in high-risk infants. (See “Collective Consultation” in the “Conceptualization” chapter).

The infant’s visits consist of a systematic control in order to detect any variation of the

somatic and neuro-psychomotor development with the normal one, and allows the performance of particular controls to determined dates. Below, in this section and before presenting the flow charts, are described the guidelines of the KMM concerning:

- How the systematic control is carried out.
- What are the recommended tests to perform on the infant.
- Which are the recommended vaccines and medications.

Likewise, the ambulatory KMP complies with the guidelines of Resolution 0412 of 2000 of the Social Protection Ministry.

Finally, a general flow chart of the ambulatory follow-up on the KMP infant and the caregivers, is presented. It must be emphasized that general guidelines are given. However, the medical criterion is important for an optimum follow-up of the infant.

7.4.1 Systematic control during Kangaroo Mother Program Consultations

The systematic follow-up of the KMP is a general growth, nutrition, neurological development, psychomotor, affective and sensory development control that is carried out during all the visits of the infant to the ambulatory KMP. This consists of measuring the weight, height and cranial perimeter, and an examination by a pediatrician trained in KMM, looking for any variation in neuromotor, psychomotor or sensory development that could end having secondary sequels to prematurity and other pathologies. The information is recorded in the follow-up sheet and in the medical record (see annex with the sheet information and the kangaroo record). The kangaroo sheet is given to the infant's mother for the next consultations. The purpose of giving it to the parents is so that they are aware of their infant's development, and in the case of emergency care of the infant, the medical staff can have all the possible and pertinent information of the infant and retrieve the information of the care such as urgencies and consultations. Additionally, there is the general monitoring that is performed to the infant-caretaker dyad during consultations. Collective care allows observation of the dyad by the different members of the kangaroo team with regards to the kangaroo position, breastfeeding or other aspects such as the emotional and psychological state of the caregivers, financial difficulties and of other natures, which do not allow a proper adaptation. Any problem that is detected must be treated immediately in order to ensure the empowerment of the family with the infant, the KMM and its application.

The nurse starts the ambulatory kangaroo adaptation on the first day by exhaustively checking and reinforcing the KMM principles since, in this particular case, the mother-infant dyad returns home and they will be alone the following day (the amenities and supervision of hospital care are not available). When the infant returns in the following days and no weight has been gained, as expected, the infant automatically continues in ambulatory kangaroo adaptation and the nurse collaborating with the pediatrician and other multidisciplinary team members will look for the reasons for which the growth was not adequate and will insist on all aspects of the kangaroo position and breastfeeding for the preterm infant. These adaptation sessions can last all morning, all afternoon or all day if there are difficulties.

The psychologist supports mothers in kangaroo adaptation, facilitating the expression of fears and feelings that hinder the attachment between the mother and her infant, and the empowerment of the mother and the family in the care of the infant. The psychologist also leads periodic workshops and educational activities with new kangaroo parents to help them return and handle their preterm and/or low birth weight infant at home and integrate with other infants (if any), as well as restructure family dynamics. The psychologist handles educational activities related to development, stimulation and patterns of democratic upbringing (stimulation of the preterm infant, abuse) and performs the psychomotor development tests by giving selected exercises adapted to the results obtained by the kangaroo infant in each of the sub-scales of the development tests used.

The team identifies and handles the socio-affective problems of the vulnerable populations assisted in the Kangaroo Mother Program such as teen mothers, mothers with addiction problems and those who are victims of abuse.

This follow-up and integral handling also takes into account the important role of social work that is responsible for the detection and intervention in situations of difficulty or conflict, and that searches for aid or identification and reinforcement of support networks for the dyad, if needed.

The social worker will also be in charge of following-up on the dyads regarding non-compliance of the instructions provided by the

health staff, not attending appointments, and the solution of the problem that led the caregivers not to come to the consultation or not to adhere to the provided recommendations. The social worker documents the reason and helps the family search for support networks and strategies which will allow them to continue with the follow-up with the required intensity. Taking into account the premise that “prematurity is superimposed on the poverty map”, it can be presumed that the economic problems can affect or interrupt the adherence to the treatment due to travel difficulties to the frequent controls during the first or later phase, access to specialized services or there simply isn’t an adequate feeding of the mother which therefore produces an inadequate lactation.

7.4.2 Expanded Program on Immunization (EPI) scheme with recommendations from the Kangaroo Mother Program

Below are the vaccines established by the Expanded Program on Immunization (EPI) of the Ministry of Health and Social Protection. However, preterm or low birth weight newborn infants are considered newborns with high biological risk and as such, require particular care, especially in relation to immunization.

One of the main causes for delays in the beginning of immunizations on preterm newborns is fear to adverse reactions such as apnea, hyperthermia and bradycardia. Since the number of studies have reported an increase in the apnea, bradycardia and hyperthermia seizures episodes associated with the use of the DTcT vaccine (cellular pertussis component) and in accordance with the recommendations of the American Academy of Pediatrics and the

Spanish Academy of Pediatrics, the application of dead or inactivated polio and the acellular pertussis component in preterm and/or low birth weight newborns is recommended.

Recent data suggests that immunity in full-term patients that exclusively received the vaccine with the acellular pertussis component diminishes in adolescence both in the protection granted by primary vaccination and in reinforcements. Follow-up data shows that the duration of the protection diminishes slower in adolescents that received at least one dose of the cellular component as part of the 5 doses, especially when administered as a first dose (1).

Taking into account the new available evidence and the risk of side effects in the administering

of the acellular pertussis vaccine in newborns, the recommendation is that the infants in the KMP receive the first 2 doses of the acellular pertussis component and the following doses would correspond to the cellular pertussis component in order to ensure a lasting protection until adulthood.

JAMA Pediatr. 2016 May 1; 170 (5): 453-8.

References:

1. Skoff TH, Martin SW. Impact of Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccinations on Reported Pertussis Cases Among Those 11 to 18 Years of Age in an Age of Waning Pertussis Immunity: A Follow-up Analysis.

| AGE | VACCINE | DOSE | COMMENTS |
|-----------------------------------|---|---------|---|
| Pentavalent Newborn | Tuberculosis (BCG) | Single | In Colombia, if the infant weighs more than 2,000 grams, it is applied at birth. If the infant weighs less than 2,000 grams, it is applied at the end of the first month of life, then at the 2 months of chronological age it is provided with the first dose of the pentavalent vaccine |
| | Hepatitis B | Newborn | |
| Pentavalent At 2 months of age | Diphtheria, Pertussis and Tetanus (DPT) * | First | The biological supply with acellular pertussis component (DPaT) is highly recommended due to the high neurological risk (hyperthermia seizures), following the scientific evidence and the recommendations issued by the different societies of neonatology and pediatrics and both the European and American academies of pediatrics. It is recommended that the first two doses correspond to the acellular component, considering the new evidence available regarding the duration of protection. |
| | Haemophilus Influenzae type b (Hib) * | First | |
| | Polio * | First | The biological supply of dead or inactivated polio is highly recommended due to the absence of polio cases in Colombia, the scientific evidence and the recommendations issued by the different societies of neonatology and pediatrics and both the European and American academies of pediatrics. |
| | Hepatitis B | First | |
| | Rotavirus | First | |
| | Pneumococcus | First | |

| AGE | VACCINE | DOSE | COMMENTS |
|---------------------|---|--------------------|---|
| At 4 months of age | Diphtheria, Pertussis and Tetanus (DPT) * | Second | The biological supply with acellular pertussis component (DPaT) is highly recommended due to the high neurological risk (hypothermic seizures) following the scientific evidence and the recommendations issued by the different societies of neonatology and pediatrics and both the European and American academies of pediatrics. It is recommended that the first two doses correspond to the acellular component, considering the new evidence available regarding the duration of protection. |
| | Haemophilus Influenzae type b (Hib) * | Second | |
| | Polio * | Second | The biological supply of dead or inactivated polio is highly recommended due to the absence of polio cases in Colombia, the scientific evidence and the recommendations issued by the different societies of neonatology and pediatrics and both the European and American academies of pediatrics. |
| | Hepatitis B | Second | |
| | Rotavirus | Second | |
| | Pneumococcus | Second | |
| At 6 months of age | Diphtheria, Pertussis and Tetanus (DPT) * | Third | The third dose corresponds to the cellular component. The use of the acellular component should be considered in oxygen-dependent infants with altered or abnormal results on neurological examination. |
| | Haemophilus Influenzae type b (Hib) * | Third | |
| | Polio * | Third | The biological supply of dead or inactivated polio is highly recommended, due to the absence of polio cases in Colombia, the scientific evidence and the recommendations issued by the different societies of neonatology and pediatrics and both the European and American academies of pediatrics. |
| | Hepatitis B | Third | |
| | Seasonal influenza | First | Seasonal vaccine is provided. It is advisable to vaccinate the entire family that is in contact with the preterm infant. |
| | At 7 months of age | Seasonal influenza | Second |
| At 12 months of age | Measles, Rubella and Mumps (MRM) | Single | |
| | Chickenpox | Single | |
| | Pneumococcus | Reinforcement | |
| | Hepatitis A | Single | |

| AGE | VACCINE | DOSE | COMMENTS |
|---------------------|---|----------------------|----------|
| At 18 months of age | Diphtheria, Pertussis and Tetanus (DPT) | First Reinforcement | |
| | Polio | First Reinforcement | |
| | Yellow fever (FA) | Single | |
| At 5 years of age | Diphtheria, Pertussis and Tetanus (DPT) | Second Reinforcement | |
| | Polio | Second Reinforcement | |
| | Measles, Rubella and Mumps (MRM) | Reinforcement | |

Note: The pentavalent vaccine does not include the vaccine against Hepatitis B. In case the pentavalent vaccine is administered, an additional vaccine against Hepatitis B must be applied.

7.4.3 Screening tests to perform on the preterm and/or low birth weight infants

| TEST | AGE OF THE INFANT | THE COMMENTS |
|---|--|---|
| Evaluation of the retina by indirect ophthalmoscopy | 28 days of life or 31 to 32 weeks of gestational age | <p>Administered on all infants of <33 weeks and/or ≤2000 grams. To infants between 33 and 36 weeks and 2,000 and 2,500 grams, according to risk factors *, defined by the attending physician. To infants > 2,500 grams, according to the criteria of the attending physician.</p> <p>*Risk factors:</p> <ul style="list-style-type: none"> • Mechanical ventilation • Oxygen therapy • Chorioamnionitis • Intracranial hemorrhage • Periventricular leukomalacia • Hydrocephalus • Any neonatal resuscitation maneuvers • Given that some of the risk factors may not have been adequately documented in the medical record (e.g., neonatal resuscitation), in case of doubt, screening for ROP should be requested. |
| Neuromotor test | At 40 weeks of gestational age and at 3, 6, 9, 12, 18 and 24 months of corrected age | <p>The test is applied and interpreted by a pediatrician who is trained in administering of the neuromotor test.</p> <p>The test must be administered during the control consultation and must be integrated into the consultation. According to medical criteria, the frequency of exams can be increased.</p> <p>In case of abnormal findings, the infant is sent to physical therapy and follow-ups are performed as needed.</p> |
| Psychomotor Development Test | At 6, 12, 18 and 24 months of corrected age. | <p>The test is administered and interpreted by a psychologist, trained in the administered of the psychomotor test.</p> <p>According to the psychologist's criteria, the frequency of exams can be increased.</p> <p>It is accompanied in the parents' training on individualized home exercises.</p> <p>In case of abnormal findings, the infant is referred to</p> |

| | | |
|--|---|--|
| | | physical therapy and followed up as needed. |
| Brain ultrasound | Once entering the KMP, if it has not been carried out before, during the hospitalization process. | It is necessary to obtain at least an initial image of the infant's brain. In case of level I or II hemorrhage is not compulsorily repeated, the neurological development of the infant is followed-up on clinically. In case of level III or IV hemorrhage, the neurological development of the infant is clinically followed-up on, and a magnetic resonance imaging is performed during the follow-up before 1 year of corrected age. |
| Optometric Evaluation | Around 3 months of corrected age. | The evaluation must be performed by an optometrist trained in the evaluation of refractive disorders of the infant under one year of corrected age. Controls of refractive errors are carried out according to the examiner's criteria. |
| Audiological Evaluation | At 40 weeks of gestational age. | It is recommended to carry out the two tests (PEAA and EOA) on the preterm infant, and interpret them in parallel (however abnormal, the infant should be referred for research), a strategy that increases the sensitivity of the screening. In case the findings require it, the infant should be referred to language therapy. |
| Hip X-ray (or Hip Ultrasound, according to availability) | At 3 months of corrected age. | Detection of hip dysplasia. |

Note: If the screening tests were not performed in the established time, they must be carried out as soon as possible during the ambulatory follow-up.

7.4.4 Medications provided to ambulatory KMP infants (according to the institution's protocol and the decision of the pediatricians, this will begin in the intra-hospital KMP)

1. Fat-Soluble Vitamins

a) Vitamin K

Vitamin K is essential for the hepatic synthesis of coagulation factors (factors II VII IX and X). Due to the short half-life of these factors and the low ability of the organism to accumulate vitamin K, if the vitamin intake is insufficient and deficiency of vitamin K-dependent coagulation factors quickly develops, it gives rise to abnormal bleeding.

Sources of obtaining vitamin K are provided by the diet contributions (vitamin K1) and by the enteric production by bacteria of the intestinal flora (vitamin K2). Secondary to the low transplacental passage of vitamin K (approximately 30:1 mother to infant), newborns are born with low levels of vitamin K. As intestinal maturation progresses in newborns and with it the bacterial production of vitamin K, the levels of vitamin K will depend of feeding during the first weeks of life.

Breast milk is an insufficient source of vitamin K and, since the 1950s, the need to administer vitamin K to the newborn infant in order to prevent hemorrhagic disease has been acknowledged. In fact, since the 1960s in most high-income countries, vitamin K has been universally administered at birth.

Full-term and preterm newborns are susceptible to hemorrhagic disease of the newborn due to Vitamin K deficiency (EHRN).

There are three types of this disease. (1-5)

1. Very early beginning: Presented in the first 24 hours of life. It is more frequent in infants of mothers who receive medications that intervene with the metabolism of vitamin K so the effectiveness of exogenous vitamin K to prevent EHRN is very low.
2. "Classic" early beginning: Occurs between day 1 and day 7 of life due to a low prenatal placental contribution, low content of vitamin K breastmilk, and initial infertility of the intestine without bacterial synthesis of vitamin K2.
3. Late (2-12 weeks): Presented in infants with exclusive breastfeeding and without the neonatal administration of vitamin K prophylaxis, or with insufficient contributions (e.g. 1 or 2 doses of oral vitamin K) and/or with disorders that diminish the production or absorption of vitamin K: malabsorption syndromes, prolonged diarrhea, multiple antibiotic treatments, hepatitis cystic fibrosis, and α 1 antitrypsin deficiency, among others. More frequently, it produces central nervous system hemorrhage and thus

implies greater risks of lethality and sequels. (6 7)

Vitamin K can be intramuscularly or orally administered to the newborn. There are different vitamin K administering schemes. In general, parenteral administration of vitamin K in healthy full-term newborns requires a single dose. Oral administration requires more doses which vary according to that recommended in each guide and each country.

There is controversy concerning the optimum administration of vitamin K type dose and frequency for the prevention of hemorrhagic diseases of the newborn due to vitamin K deficiency. The evidence available indicates that the administration of vitamin K1 1 mg IM (single dose) in the infant weighing $\geq 1,500$ grams and 0.5 mg in the infant weighing less than 1,500 grams before 6 hours of age, it has a virtually 100% effectiveness in preventing classical EHRN and very close to 100% in the late form (while the incidence of EHRN with different oral vitamin K1 regimens is greater.) (8)

The preventive power of a single injection of Vitamin K1 IM was recognized in the 1950s and in 1961. The AAP recommended the systematic application of 0.5 to 1 mg of Vitamin K1 to all newborns in a single dose at birth, a recommendation that continues in force. (9)

A 2 mg oral Vitamin K1 regimen is used at birth in Denmark and then 1 mg a week until 3 months of age in infants with predominant breastfeeding (more than 50% of milk intake) which claims to be as effective as the IM administration of a single 1 mg dose of Vitamin K1. In most Nordic countries, Vitamin K is administered on a weekly basis until the infant

begins the complementary diet. (10) In contrast, the American Academy of Pediatrics and public health agencies in Canada, among others, recommend the IM administration of a single dose of Vitamin K1. (11-13)

Each of the administration methods have advantages and disadvantages. The greatest advantage of parenteral administration is a single dose that can be guaranteed prior to the hospital discharge of the newborn. In Australia, the Netherlands, and the United Kingdom (14), an increase in the EHRN cases was reported in newborns who had received oral vitamin K due to difficulties in monitoring and administering the corresponding doses of vitamin K. The disadvantages of parenteral administration are local pain and risks inherent in intramuscular injection. However, the report of adverse reactions is low having ruled out childhood cancer as a result of the administration of vitamin K.

The administration of the vitamin K is more controversial, not so much with respect to the administration of the first dose at birth, but in the repetition of the dose, especially in the infant with exclusive breastfeeding and hematologic immaturity as in the case of the preterm infant. In the light of the last discussions, the IM route is the most appropriate at birth. In the case of prolonged antibiotic treatment or digestive and hepatic pathology, supplementary IM or oral doses could be administered.

Considering that the preterm infant in the KMP has liver immaturity at least until full term and has a diet based mainly on breastfeeding. A possibly effective and safe alternative is to orally administer, on a weekly basis, 2 mg until full term if the infant receives exclusive

breastfeeding, since the artificial milk contains vitamin K supplement. The process recommended in the Kangaroo Mother Program is to orally administer, on a weekly basis, 2 mg of Vitamin K until the infant reaches full term. In case there is active bleeding in the navel, 1 mg is administered by IM. It is important to remember that the reserves of fat-soluble vitamins are carried out during the last trimester of pregnancy and that the interest is to be able to supply a physiological need during the kangaroo period. Thus, the requirements needed to promote a proper nutrition until full term are administered.

b) Vitamins A, D, E

It is widely accepted that the infant at full term and in healthy conditions who receives breastmilk, does not need vitamin supplements (except vitamin K). Breastmilk is an excellent source of water-soluble vitamins and its concentration is reflected on the nutritional state of the mother (vitamins B and C). For vitamin D, especially in temperate and subpolar zones where there is little maternal and newborn exposure to the sun or when the skin of the infant is dark, the infant breastfed without supplementation may have vitamin D deficiency. Likewise, it is seen in prematurity or when there are liver problems. The kangaroo position can be considered as a winter period in a hospitalized infant. In addition to not having the reserves of fat-soluble vitamins created during the last trimester of pregnancy, the preterm infant receives breastmilk with a low content of vitamin D since the mothers come from a low socio-economic background and live in homes with few windows and low exposure to sunlight.

The contribution of vitamin D is advised around 400-800 IU per day. However, this depends on the amount of vitamin D content in the breastmilk. In case a mother has had low exposure to sunlight during long periods of time, a higher dose is advisable in order to avoid the appearance of rickets. Vitamin A is supplemented at a dose of 1,500-2,500 IU per day and Vitamin E at 25 IU per day.

We insist that the fat-soluble vitamin reserves are done in the last trimester of pregnancy, which is why it seems reasonable to supplement until the kangaroo infant comes to full term.

The recommended average doses are in the following ranges:

Vitamin A: 2,000 to 2,500 IU per day

Vitamin D: 400 to 800 IU per day

Vitamin E: 25 IU per day

Vitamin K: 0.5 mg to 1 mg IM at birth then 2 mg orally until full term if the infant receives exclusive breastfeeding.

| Medication | Posology | Comments |
|-----------------|---|---|
| Vitamin K | Addition of Vitamin K on a weekly basis until 40 weeks of age in infants with predominantly breastmilk-based diet. | Following the recommendations based on scientific evidence, it is highly suggested to orally administer the vitamin K, avoiding possible complications (late bleeding). |
| | The oral weekly dose is of 2 mg until 40 weeks of age. | |
| | In case of bleeding from the navel, 1 mg is applied IM. | |
| Vitamin A, D, E | From the first week of age until 40 weeks of age, administer a supplementary dose of vitamins. | The fat-soluble vitamin reserves are done in the last trimester of pregnancy, reason for which they must be supplemented in preterm infants. |
| | Following the recommendations based on scientific evidence concerning the vitamins and doses administered until 40 weeks of age, should be: Vitamin A (2,000-2,500 IU/day), Vitamin E (25 IU/day) and Vitamin D (400-800 IU/day). | |

References:

1. Shearer MJ. Vitamin K. Lancet 1995; 345(8944):229-234.
2. Greer FR. Vitamin K deficiency and hemorrhage in infancy. Clin Perinatol 1995;22(3):759-777.
3. Bor O, Akgun N, Yakut A, Sarhus F, Kose S. Late hemorrhagic disease of the newborn. Pediatr Int 2000; 42(1):64-66.
4. Sutor AH, von KR, Cornelissen EA, McNinch AW, Andrew M. Vitamin K deficiency bleeding (VKDB) in infancy. ISTH Pediatric/Perinatal Subcommittee. International Society on Thrombosis and Haemostasis. Thromb Haemost 1999; 81(3):456-461.
5. Sutor AH. Vitamin K deficiency bleeding in infants and infants. Semin Thromb Hemost 1995; 21(3):317-329.

6. Aydinli N, Citak A, Caliskan M, Karabocuoglu M, Baysal S, Ozmen M. Vitamin K deficiency - late onset intracranial hemorrhage. *Eur J Paediatr Neurol* 1998; 2(4):199-203.
7. Solves P, Altes A, Ginovart G, Demestre J, Fontcuberta J. Late hemorrhagic disease of the new born as a cause of intracerebral bleeding. *Ann Hematol* 1997; 75(1-2):65-66.
8. Loughnan P. The frequency of late onset hemorrhagic disease (HD) in Australia with different methods of prophylaxis, 1993-1997. An update. *J Pediatric Infant Health* 1999; 38: a8.
9. Controversies concerning vitamin K and the newborn. American Academy of Pediatrics Committee on Fetus and Newborn. *Pediatrics* 2003; 112(1 Pt 1):191-192.
10. Golding J, Paterson M, Kinlen LJ. Factors associated with childhood cancer in a national cohort study. *Br J Cancer* 1990; 62(2):304-308.
11. Fear NT, Roman E, Ansell P, Simpson J, Day N, Eden OB. Vitamin K and childhood cancer: a report from the United Kingdom Childhood Cancer Study. *Br J Cancer* 2003; 89(7):1228-1231.
12. Roman E, Fear NT, Ansell P, Bull D, Draper G, McKinney P Et al. Vitamin K and childhood cancer: analysis of individual patient data from six case-control studies. *Br J Cancer* 2002; 86(1):63-69.
13. Passmore SJ, Draper G, Brown bill P, Kröll M. Ecological studies of relation between hospital policies on neonatal vitamin K administration and subsequent occurrence of childhood cancer. *BMJ* 1998; 316(7126):184-189.
14. McKinney PA, Juszczak E, Findlay E, Smith K. Case-control study of childhood leukemia and cancer in Scotland: findings for neonatal intramuscular vitamin K. *BMJ* 1998; 316(7126):173-177.
15. von KR, Gobel U, Hachmeister A, Kaletsch U, Michaelis J. Vitamin K and childhood cancer: a population based case-control study in Lower Saxony, Germany. *BMJ* 1996; 313(7051):199-203.
16. Kaatsch P, Kaletsch U, Krummenauer F, Meinert R, Miesner A, Haaf G Et al. Case control study on childhood leukemia in Lower Saxony, Germany. Basic considerations, methodology, and summary of results. *Klin Pediatric* 1996; 208(4):179-185.
17. McMillan DD. Administration of Vitamin K to newborns: implications and recommendations. *CMAJ* 1996; 154(3):347-349.
18. Brousson MA, Klein MC. Controversies surrounding the administration of vitamin K to newborns: a review. *CMAJ* 1996; 154(3):307-315.
19. Hansen KN, Ebbesen F. Neonatal vitamin K prophylaxis in Denmark: three years' experience with oral administration during the first three months of life compared with one oral administration at birth. *Acta Pediatric* 1996; 85(10):1137-1139.

20. von KR, Hachmeister A, Gobel U. Oral mixed micellar vitamin K for prevention of late vitamin K deficiency bleeding. *Arch Dis Infant Fetal Neonatal Ed* 2003; 88(2): F109 - F112.
21. Loughnan PM, McDougall PN. Epidemiology of late onset hemorrhagic disease: a pooled data analysis. *J Pediatric Infant Health* 1993; 29(3):177-181.
22. Loughnan PM, McDougall PN. The efficacy of oral vitamin K1: implications for future prophylaxis to prevent hemorrhagic disease of the newborn. *J Pediatric Infant Health* 1993; 29(3):171- 176.
23. Cornelissen M, von KR, Loughnan P, Schubiger G. Prevention of vitamin K deficiency bleeding: efficacy of different multiple oral dose schedules of vitamin K. *Eur J Pediatr* 1997; 156(2):126- 130.

2. Anti-Reflux

Transient lower esophageal sphincter relaxations are the main contributing factors in the pathophysiology of gastroesophageal reflux (GER). The lower esophageal sphincter is composed of smooth muscle of the lower end of the esophagus and together with the diaphragmatic hiatus constitute two active sphincter mechanisms that work together to create a high pressure area in the juncture between the esophagus and the stomach. Ideally, they function as a one-way valve that holds fluids and food inside the stomach. Gastric distention caused by feeding and abdominal effort, increase the number of transient

relaxations that may increase the number of transient loosening of the lower esophageal sphincter which could increase the likelihood of episodes of GER. (1)

The use of nasogastric or orogastric feeding tubes also contribute to GER since it influences the ability of the lower esophageal sphincter to close completely when the probe is positioned, particularly in the first postprandial hour. The use of larger probes has shown a greater impact on GER. (2)

Other particular characteristics of preterm newborns include hypotonia; a short and narrow esophagus; a lower esophageal sphincter that is positioned slightly above the diaphragm (instead of being positioned below the diaphragm) compared to full-term newborns, like the immaturity of gastrointestinal motor innervations which can delay gastric emptying. High-volume liquid feeding, supine position, and the presence of a nasogastric or orogastric tube common in the population of preterm newborns may contribute to GER. (3)

Medications frequently used in antenatal and neonatal care can also contribute to GER. A study showed a dose-response relationship between maternal use of antenatal corticosteroids and risk of newborns to develop GER. (4) The use of xanthines (theophylline) has also been implicated since they have been shown to stimulate gastric acid secretion and lower the pressure of the lower esophageal sphincter. (5) Subsequent studies have not supported this finding and showed that the use of xanthines did not influence the symptoms of GER. Newborns that have been diagnosed with GER based on clinical symptoms, were more likely to be receiving xanthines, although it seems that the use of xanthines does not affect

the clinical symptoms of the GER, either altering the number of transient lower esophageal sphincter relaxations or significantly altering acid reflux. (1, 6)

Literature suggests that the GER impact in preterm newborns is benign in most cases. However, a study performed in the United States in different neonatal intensive care units revealed different approaches and the lack of clarity that exists for the management of GER. As a sample of this, between 2% and 90% of newborns who are discharged receive medication for GER. The result of this study suggests that great confusion and controversy persist not only in the physiology of GER but also in the perception of the short and long term impact in newborns. (7)

Although the GER is common in preterm newborns, there is no strong documentation on long-term negative effects. Acid reflux is unlikely in preterm newborns, especially after feeding since a milk-based diet acts as a buffer.

The GER incidence report on preterm newborns varies between 22% and 85%, depending of the criteria used for the diagnosis. (8, 9) There is insufficient evidence concerning the identification and handling of the GER and Gastroesophageal Reflux Disease (GERD) in preterm newborns, particularly in newborns of extreme low birth weight. For this reason, there is a great variation in the interpretation and handling of the symptoms (10).

In most newborn infants, the GER is self-limited and is cured by itself between the 12 and 24 months of age, and symptoms begin to improve with the maturation of esophageal and gastric motility. In turn, the introduction of a predominantly solid diet and a vertical position

when walking, facilitate gastric emptying and contribute to the curing of the GER. (11)

The GER diagnosis has been classified according to (a) suspicion of uncomplicated GER in which these newborns present regurgitation without effort and/or painless vomiting without any other additional symptom, and (b) suspicion of GERD in which newborns present symptoms and behaviors that affect feeding growth and sleep pattern. Both newborn groups are handled by using conservative first-line strategies. However, newborns with suspicion of GERD require close monitoring and may require multidisciplinary strategies. (11)

a. Non-pharmacological measures

Kangaroo Position

There is no direct empirical evidence to support that the kangaroo position protects against GER. Kangaroo position seems not to favor gastroesophageal reflux and it would be expected that, since the newborn is constantly in a prone position with the head higher than the rest of the body, even in an almost vertical position, the frequency, duration and severity of the reflux episodes would be less than in other positions.

There are no random clinical experiments that corroborate this recommendation and little evidence is found on this subject. The statement is based on anecdotal clinical observations on pathophysiological reasoning and on the analogy between the kangaroo position and the recommended anti-reflux positions (such as the

prone position or left lateral decubitus position) in which there are fewer episodes of GER which are less prolonged. On the other hand, a lower incidence of GER has been reported in newborns fed with breastmilk, a practice favored by the kangaroo position and part of the Kangaroo Mother Method.

Although there are no studies that have directly assessed the relationship between the kangaroo position and gastroesophageal reflux, it can be assumed that given the similarities of the kangaroo position with the studied and recommended position (prone position with elevation of 30 to 45 degrees), it could have a protective effect since while on the mother's chest the baby is kept on a prone decubitus and upright position during the day and with an inclination between 30 and 45 degrees during the night or when the mother rests.

The recommendation of the prone decubitus position with an elevation of 30 to 45 degrees is approved by empirical evidence. The existing clinical studies show a trend that this position diminishes the number and intensity of the GER episodes on preterm newborns. Tobin (12) and Ewer (13) support these claims with studies where different random sequences of postures are used showing the benefits of the prone position (which resembles the kangaroo position) and of the left lateral position. They found a median reflux index of 6.7% in the prone position, 7.7% in the left lateral position, 12.0% in the right lateral position, and 15.3% in the supine position. Ornstein (14) and Dellagrammatica (15) saw better results in the prone position which favored both a better gastric emptying as well as the reduction of reflux episodes.

Providing Training to Parents

It is recommended to provide training and certainty to parents regarding the natural course of GER in newborns. Although the GER can be resolved spontaneously, it is important that parents be advised on strategies to minimize GER. (11) Additionally, in the Kangaroo Mother Program, parents must be trained to delicately move the newborn infant, especially when the infants are positioned for feeding, and then to relieve the baby of gases. Even though the kangaroo position is a position protecting against GER, parents must be trained on the proper position for diaper changing and to avoid placing the infant in a horizontal position as not to induce GER.

b. Pharmacological Measures

The medications that have been used for handling GER are divided in two categories: acid inhibitors and prokinetic or motility agents. Metoclopramide, a motility agent, is a dopamine antagonist and is thought to reduce GER by increasing the basal pressure of the lower esophageal sphincter, improving peristalsis through the esophagus and increasing gastric emptying time. There is not enough high quality evidence on the use of metoclopramide in preterm and/or low birth weight newborns. Nevertheless, non-controlled, non-blinded studies reported a progressive decrease in the number of regurgitation episodes, volume of gastric aspirate and an increase in the volume of tolerated food. (16) Likewise, other studies suggested that the response to metoclopramide is given by the baseline condition. Newborns at

full term with frequent regurgitation and prolonged gastroparesis, followed by abdominal surgery, showed significant improvement in gastric emptying. However, preterm newborns with gastroparesis related to prematurity did not show a significant improvement in gastric emptying. It is believed that preterm newborns can experience a lower response compared with full-term babies due to gastric immaturity and immaturity in motor functioning. (17) The most outstanding adverse reactions of metoclopramide are neurological, especially the extra-pyramidal symptoms which are dose-dependent adverse reactions. Many countries have limited their use on infants. For example, in 2011 the Spanish Agency of Medicines and Medical Devices (AEMPS, Spanish acronym) released an alert on the use of metoclopramide in infants and adolescents. After the revision of the efficiency and safety profile on the pediatric population, it stated that: its use is contraindicated in infants under 1 year of age because its elimination is slower, especially in newborns, and the risk of extrapyramidal reactions is greater. (18)

Due to the lack of quality evidence regarding metoclopramide in preterm and/or low birth weight newborns, in 2017 through the Kangaroo Foundation, a double blind study is intended to be carried out in order to evaluate the effectiveness and safety of metoclopramide to reduce symptoms due to GER in ambulatory preterm newborns in the Kangaroo Mother Program before reaching 40 weeks of gestational age.

Domperidone, another dopamine antagonist, has been used to treat GER symptoms in newborns. However, there is no high quality evidence that supports the use of this medication. A randomized controlled clinical trial examined its use in full-term newborns and found that

newborns increased the frequency of reflux probably associated with gastric emptying time. The authors suggest that domperidone can increase the negative effects of gastric motor incoordination given the immaturity by increasing the variability of gastric emptying that leads to stimulate reflux. The use of domperidone is associated with QT interval lengthening in newborns > 32 weeks. Therefore, domperidone is considered a non-safe medication for handling GER in preterm newborns and is expressly forbidden given the cardiac risk and sudden death (19-21).

Cisapride is another prokinetic agent which, like domperidone, has been restricted in the United States, Canada and certain countries in Europe. (22-23) It has not been shown to reduce episodes of GER in newborns > 35 weeks and in newborns < 32 weeks gastric emptying increased due to the immaturity of gastrointestinal motility which led to a worsening of GER in these newborns. (24-26)

Erythromycin is an antibiotic from the macrolide group that acts as a motility agonist in the stomach and small intestine. Studies in preterm newborns included, as a main outcome, intolerance to feeding and the time for complete oral feeding, the reduction of symptoms associated to GER have not been evaluated. A study evaluating 60 preterm newborns, classified by older or younger than 32 weeks of age with food intolerance, showed that the use of oral erythromycin was associated with better tolerance orally and a shorter duration of parenteral nutrition in newborns > 32 weeks and not in those < 32 weeks. This may be due to the inability of the erythromycin to induce the migration of motor complexes in newborns < 31 weeks. Erythromycin may be considered as an option for gastrointestinal dysmotility.

However, there is no high quality evidence that supports its use in order to handle the GER. (27)

Antacid medications or acid inhibitors are effective in increasing the pH of gastric reflux and can improve the signs and symptoms of pain and discomfort. However, it does not affect the transient lower esophageal sphincter relaxations and thus they are not effective to treat the cause of the GER. The prokinetic action mechanism agents would explain a reduction in the regurgitation volume. However, there is no high quality concluding evidence that

proves the benefits of administering these agents to preterm and/or low birth weight newborns.

Often, doctors feel committed in treating the GER in spite of the little evidence that shows long-term negative effects as a consequence of the GER, or that support the safety and efficiency of the pharmacological management. The GER is known as a “physiological” process that improves maturity and that must be treated conservatively with non-pharmacological methods such as the position, and much caution must be used before implementing medical therapies that have not been proven.



| Medication | Posology | Comments |
|-------------|--|--|
| Anti-reflux | <p data-bbox="337 457 797 758">There are no high quality concluding studies or evidence that prove the benefits of the anti-reflux medication currently available in the market of preterm and/or low birth weight newborns in ambulatory handling. Thus, its use is left to the criterion of the treating doctor.</p> <p data-bbox="337 804 797 1180">The use of non-pharmacological measures is recommended such as the Kangaroo Position and training parents on the natural course of the GER on newborns, and specify that the movement or position change when feeding, relieving gases and diaper change must be carried out delicately, especially when the infant leaves the kangaroo position.</p> | <p data-bbox="818 457 1453 680">The kangaroo position seems to protect against GER and it is expected that since the infant is constantly in prone position with the head higher than the rest of the body, even in almost vertical position, the frequency, duration and severity of the GER episodes are less than in other positions.</p> |

References:

1. Omari TI, Barnett CP, Benninga MA, Lontis R, Goodchild L, Haslam RR, Dent J, Davidson GP. Mechanisms of gastroesophageal reflux in preterm and full-term infants with reflux disease. *Gut*. 2002 Oct; 51(4):475-90.
2. Peter CS, Wiechers C, Bohnhorst B, Silny J, Poets CF. Influence of nasogastric tubes on gastroesophageal reflux in preterm infants: a multiple intraluminal impedance study. *J Pediatric*. 2002 Aug; 141(2):277-9.
3. Henry SM. Discerning differences gastroesophageal reflux and gastroesophageal reflux disease in infants. *Adv Neonatal Care*. 2004 Aug; 4(4): 235-47. Review.
4. Chin SO, Brodsky NL, Bhandari V. Antenatal steroid use is associated with increased gastroesophageal reflux in neonates. *Am J Perinatol*. 2003 May; 20(4):205-13.
5. Vandenplas Y, De Wolf D, Sacre L. Influence of xanthines on gastroesophageal reflux in infants at risk for sudden infant death syndrome. *Pediatrics*. 1986 Jun;77(6):807-10.

6. Mezzacappa MA, Rosa AC. Clinical predictors of abnormal esophageal pH monitoring in preterm infants. *Arq Gastroenterol.* 2008 Jul-Sep; 45(3):234-8.
7. Malcolm WF, Gantz M, Martin RJ, Goldstein RF, Goldberg RN, Cotten CM; National Institute of Infant Health and Human Development Neonatal Research Network. Use of medications for gastroesophageal reflux at discharge among extremely low birth weight infants. *Pediatrics.* 2008 Jan; 121(1):22-7.
8. Tipnis NA, Tipnis SM. Controversies in the treatment of gastroesophageal reflux disease in preterm infants. *Clin Perinatol.* 2009; 36: 153-164.
9. Morigeri C, Bhattacharya A, Mukhopadhyay K, Narang A, Mittal BR. Radionuclide scintigraphy in the evaluation of gastroesophageal reflux in symptomatic and asymptomatic pre-full-term infants. *Eur J Nucl Med Mol Imaging.* 2008; 35: 1659-1665.
10. Golski CA, Rome ES, Martin RJ, et al. Pediatric specialists' beliefs about gastroesophageal reflux disease in preterm infants. *Pediatrics.* 2010; 125 (1): 96-104.
11. Sherrow T, Dressler-Mund D, Kowal K, Dai S, Wilson MD, Lasby K. Managing gastroesophageal reflux symptoms in the very low-birth-weight infant postdischarge. *Adv Neonatal Care.* 2014 Dec; 14(6):381-91; quiz E1-2.
12. Tobin JM, McCloud P, Cameron DJ. Posture and gastro-esophageal reflux: a case for left lateral positioning. *Arch Dis Infant* 1997; 76(3):254-258.
13. Ewer AK, James ME, Tobin JM. Prone and left lateral positioning reduce gastroesophageal reflux in preterm infants. *Arch Dis Infant Fetal Neonatal Ed* 1999; 81(3): F201-F205.
14. Orenstein SR. Prone positioning in infant gastroesophageal reflux: is elevation of the head worth the trouble? *J Pediatric* 1990; 117(2Pt 1):184-187.
15. Dellagrammaticas HD, Kapetanakis J, Papadimitriou M, Kourakis G. Effect of body tilting on physiological functions in stable very low birthweight neonates. *Arch Dis Infant* 1991; 66(4Spec No):429-432.
16. Pinder RM, Brogden RN, Sawyer PR, Speight TM, Avery GS. Metoclopramide: a review of its pharmacological properties and clinical use. *Drugs.* 1976;12(2):81-131. Review.
17. Sankaran K, Yeboah E, Bingham WT, Ninan A. Use of metoclopramide in preterm infants. *Dev Pharmacol Ther.* 1982;5(3-4):114-9.
18. AEMPS alert of metoclopramide in infants and adolescents. www.aemps.gob.es
19. Cresi F, Marinaccio C, Russo MC, Minihero R, Silvestro L. Short-full-term effect of domperidone on gastroesophageal reflux in newborns assessed by combined intraluminal impedance and pH monitoring. *J Perinatol.* 2008 Nov;28(11):766-70.

20. Djeddi D, Kongolo G, Lefaix C, Mounard J, Léké A. Effect of domperidone on QT interval in neonates. *J Pediatr.* 2008 Nov;153(5):663-6.
21. Günlemez A, Babaoğlu A, Arisoy AE, Türker G, Gökalp AS. Effect of domperidone on the QTc interval in preterm infants. *J Perinatol.* 2010 Jan;30(1):50-3.
22. U.S. Food and Drug Administration. Propulsid (cisapride). <http://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumaMedicalProducts/ucm173074.htm>.
23. Health Canada “Dear health care provider” Propulsid® (Cisapride) <http://www.hc-sc.gc.ca/dhp-mps//medeff/advisories-avis/prof/2000/propulsidhpc-cps-eng.php>.
24. Ariagno RL, Kikkert M, Mirmiran M, Conrad C, Baldwin RB. Cisapride decreases gastroesophageal reflux in preterm infants. *Pediatrics.* 2001; 107(4): e58.69
25. Dubin A, Kikkert M, Mirmiran M, Ariagno R. Cisapride associated with QTc prolongation in very low birth weight preterm infants. *Pediatrics.* 2001 Jun; 107(6): 1313-6.
26. McClure RJ, Kristensen JH, Grauaug A. Randomized controlled trial of cisapride in preterm infants. *Arch Dis Infant Fetal Neonatal Ed.* 1999 May; 80(3): F174-7.
27. Nuntnarumit P, Kiatchoosakun P, Tantiprapa W, Boonkasidecha S. Efficacy of oral erythromycin for treatment of feeding intolerance in preterm infants. *J Pediatric.* 2006 May; 148(5):600-5.

3. Preventive Iron

| Medication | Posology | Comments |
|-----------------|---|--|
| Preventive iron | From the first month of life to the year. Ferrous Sulfate 1-2 mg/kg/day. | If the newborn received a blood transfusion, one must wait 1 month after the last transfusion to start with the ferrous sulfate. |

4. Xanthines

Henderson-Smart reported in an observational study that the incidence of recurrent apneas increases at a younger gestational age. All newborns ≤ 28 weeks of gestational age were diagnosed with apnea. After 28 weeks of geostational age, the proportion of newborns with apnea decreased from 85% of infants born

at 30 weeks of gestation to 20% in infants born at 34 weeks of gestation. This association between gestational age and apnea has important modifications for the policies of newborns units since it implies that all newborns less than 35 weeks of gestational age require cardiovascular monitoring after birth because of the risk of presenting apnea episodes. As expected in a

process related with prematurity, in the Henderson-Smart study, apnea episodes stopped in 92% of infants at 37 weeks of gestation and in more than 98% of infants at 40 weeks of gestation. (3)

Prophylactic use

A meta-analysis by Cochrane (1) that included studies published until August 2010, only found a study that assessed the prophylactic effect of caffeine in reducing apneas in prematurity. This study with a limited number of patients did not clinically or statistically find a difference in the number of apnea episodes at day 4 (RR 0.87 IC 95% [0.52 1.45]) or at day 10 (RR 0.86 IC 95% [0.49 1.50]) of prophylactic treatment. The meta-analysis concludes that caffeine does not prevent the appearance of apnea in prematurity. Theophylline is equally ineffective and is also less tolerated than caffeine.

Therapeutic use

Studies have proven that xanthines are efficient in treating primary apnea of prematurity. When administered prophylactically or therapeutically (compared to placebo), it was observed that in the subgroup of intubated preterm newborns

who received caffeine before withdrawing ventilatory support, the need for reintubation and the development of subsequent DPB were less frequent, suggesting that its administration is useful to facilitate the successful extubation of preterm infants but not for the prevention of primary apnea. In turn, a better neurodevelopmental outcome was observed in this subgroup of preterm infants who received caffeine at 18 months. This study suggests that the therapeutic use of caffeine can have unknown additional benefits. However, the prophylactic use of caffeine exclusively for the potential benefit on neurodevelopment (increased survival without disability in neurodevelopment between 18 to 21 months of corrected age) requires further studies. (3)

| Medication | Posology | Comments |
|------------|---|--|
| Xanthines | <p data-bbox="337 604 683 932">It is recommended to continue the use of xanthines in those newborns with a history of primary apnea, of preterm newborns who are discharged from the NICU with a medical prescription, specifying their use and treatment continuity.</p> <p data-bbox="337 972 683 1157">The use of xanthines is recommended for infants under 34 weeks up to 40 weeks of gestational age, for the prevention of apneas at home.</p> | <p data-bbox="699 604 1487 905">According to the KMM, early discharge is given to the newborns regardless of their chronological age and gestational age. However, this does not allow monitoring of the newborns at home, as it could be performed in a NICU. Since 20% of newborns under 34 weeks of gestational age can present apnea episodes, the KMP protocol includes the prophylactic use of xanthines in newborns that are discharged from the hospital with less than 34 weeks (and enter the ambulatory KMP) in order to avoid the apnea episodes at home until reaching full term.</p> <p data-bbox="699 940 1487 1066">Related to the use of xanthines on infants on oxygen until weaning, current evidence does not allow a recommendation regarding its use and therefore remains in the judgment of the attending physician.</p> |

References:

1. Henderson-Smart DJ, De Paoli AG. Prophylactic methylxanthine for prevention of apnea in preterm infants. *Cochrane Database Syst Rev* 2010;(12):CD000432.
2. Skouroliahou M, Bacopoulou F, Markantonis SL. Caffeine versus theophylline for apnea of prematurity: a randomized controlled trial. *J Pediatric Infant Health* 2009 October; 45(10):587-92
3. Eichenwald EC; COMMITTEE ON FETUS AND NEWBORN. Apnea of Prematurity. *Pediatrics*. 2016 Jan; 137(1):1-7. doi: 10.1542/peds.2015-3757. Epub 2015 Dec 1.

FOLLOW-UP FLOWCHART OF THE PRETERM AND/OR LOW BIRTH WEIGHT INFANT IN AN AMBULATORY KANGAROO MOTHER PROGRAM (KMP)

| Kangaroo Mother Program - Intra-hospital care | Characteristics and actions on the infant | Characteristics of the caregivers and activities with the same | Considerations for the health professionals of the health institution |
|---|---|---|--|
| | <p>Maximum 24 to 48 hours after leaving the NICU.</p> <ul style="list-style-type: none"> - Systematic control. - Dynamic oximetry for infants on oxygen. | | <p>Receiving the new family in the KMP.</p> <ul style="list-style-type: none"> - Opening of the medical record and delivery of kangaroo consultation card. - Delivery and explanation of information brochures concerning ambulatory KMP. - Ambulatory kangaroo adaptation in the first session. - Medical staff explanation regarding the management protocol of ambulatory KMP. - Full clinical examination. - Nursing assessment of the KP and the KN. - Delivery of the required medications. |
| | <p>Preterm and/or low birth weight newborns.</p> <ul style="list-style-type: none"> - Newborns who arrive at the ambulatory KMP with 37 weeks or more, and weighing more than 2,500 grams, enter the high-risk follow-up of the ambulatory KMP until they reach 2 years of corrected age. - No serious pathology. - Increased weight for two consecutive days. - Good coordination suction-swallowing-breathing. - Up to 1/2 liter of oxygen per nasal cannula. - Anemia discarded. | <ul style="list-style-type: none"> - Motivated family. - The family follows directions and applies the KMM at home. - Family with available time. - The family accepts the KMP with knowledge of the requirements and advantages of the same. - Commitment by the family to follow the KMP guidelines. | <p>The staff (pediatrics and nursing) provides constant support and follow-up of the KP and the KN.</p> <p>Psychology supports caregivers in ambulatory kangaroo adaptation, facilitating the expression of fears and empowering the mother and family.</p> <p>The staff conducts workshops and periodic educational activities to assist caregivers in returning home and handling the preterm and/or low birth weight infant.</p> |
| | <ul style="list-style-type: none"> - Systematic control. - Daily dynamic oximetry for infants who have oxygen. - Taking of anthropometric measurements. - Vaccines, screenings and medications. - If signs of alarm continue to rise, the infant can be re-hospitalized at any time before the 40 weeks of age. - The infant will be re-hospitalized in the first NICU as a first option. - Daily controls until obtaining an adequate growth of 15 g/kg/day. | | |
| | <p>Weight gain equal to or greater than 15 g/kg/day. The clinical examination is normal.</p> | <p>The mother and the family feel competent and confident.</p> | <p>The medical staff decides at their discretion if they switch to weekly check-ups according to the clinical examination and the family's competence. It can be supported by other health professionals according to the need.</p> |

| Kangaroo Mother Program - Intra-hospital care | Characteristics and actions on the infant | Characteristics of the caregivers and activities with the same | Considerations for the health professionals of the health institution |
|---|---|--|---|
| | <ul style="list-style-type: none"> - Systematic control. - Screening to rule out ROP at 28 days of age or 31-32 weeks of gestational age, according to the protocol with controls, according to the diagnosis. - Taking of anthropometric measurements. - Weekly dynamic oximetry for infants using oxygen. - Vaccines, screening and medicines. | | <p>The health staff provides constant support and follow-up of the KP and the KN.</p> <p>The staff conducts workshops and periodic educational activities to assist caregivers in returning home and handling the preterm and/or low birth weight infant.</p> |
| | <ul style="list-style-type: none"> - Systematic control. - Taking of anthropometric measurements. - Weekly dynamic oximetry for infants using oxygen. - Vaccines, screening and medication. - First neuromotor development test for the evaluation of muscle tone. - Audiological screening. - Ultrasound of the brain. | | <p>The health staff provides constant support and follow-up of the KP and the KN.</p> <p>The staff conducts workshops and periodic educational activities to assist caregivers in returning home and handling the preterm and/or low birth weight infant.</p> |
| | <ul style="list-style-type: none"> -Systematic control up to 2,500 grams, in case the infant has reached 40 weeks of gestational age weighing less than 2,500 grams. -Taking of anthropometric measurements. -Weekly dynamic oximetry for infants using oxygen. -Vaccines, screening and medicines. | | |
| | | | |

| Kangaroo Mother Program - Intra-hospital care | Characteristics and actions on the infant | Characteristics of the caregivers and activities with the same | Considerations for the health professionals of the health institution |
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| | In case of oxygen-dependence, the oximetry control will be carried out every 8 days and the pediatric control will be performed every 15 days until the weaning of oxygen. | It is recommended to keep the oxygen tank at home for at least 15 days after weaning, in case of oxygen-dependence. | |
| | <ul style="list-style-type: none"> - Systematic control. - Taking of anthropometric measurements. - Clinical examination performed by the pediatrician. - Vaccines, screening and medicines. - Ophthalmometric assessment at 3 months of corrected age. - Radiograph or ultrasound for the detection of hip dysplasia at 3 months of corrected age. - Stimulation workshops given through physical therapy at 3 and 9 months of corrected age. | Educational talks to parents, concerning the handling of the infant during the first two years of life of corrected age. (Breastfeeding, vaccines, diversification of food, dangers at home, abuse and stimulation according to the infant's age, etc.) | The health staff gives support and does follow-up on high risk infants in the ambulatory KMP. |
| | <ul style="list-style-type: none"> - As bare minimum, evaluation of neuromotor development at 40 weeks, 3, 6, 9, 12, 18 and 24 months of corrected age. - If the infant presents problems, he/she will be referred to physical therapy and in the next consultation the neuromotor development is evaluated again. - Evaluation of psychomotor development at 6, 12, 18 and 24 months of corrected age. - If the development is not adequate, exercise packages are ordered to be performed at home and in the next consultation. The psychomotor development is reevaluated. | | The staff carries out educational activities with the family concerning the health of the infant during the first two years of life of corrected age. (Breastfeeding, vaccines, diversification of food, dangers at home, abuse and stimulation according to the infant's age, etc.) |
| | In case a recurrent pathology appears of a type of difficulty to handle oxygen dependence, malnutrition that cannot be managed in the consultation, presence of seizures, neurological pathologies, independent of prematurity and its sequels, the infant must be referred to the corresponding specialist and the period for the infant to be attended is maximum 8 days, after having requested the consultation. | | Appointment attendance by the infants and their families is controlled by the staff. If the family does not go to the appointment, the social worker performs a follow-up telephone call to reschedule the appointment or to eventually carry out a home visit, as needed (infant in special follow-up due to pathology, suspected abuse, among others). |
| | If the infant has a neurological or developmental pathology, related to prematurity or low birth weight, a nuclear magnetic resonance can be contemplated (if possible) before the end of the follow-up in order to obtain greater clarity and visualization of the pathology and so that the infant is referred to a specialist when discharged from ambulatory KMP. The clinical handling does not change. | | |
| | The status of the infant is evaluated and he/she is referred to the different specialties according to need. | | |
| | <ul style="list-style-type: none"> - At 18 and 24 months of corrected age, the pediatrician administers the neuromotor development test. - At 18 and 24 months of corrected age, the psychologist administers the psychomotor development test. - Stimulation workshops given through physical therapy at 18 and 24 months of corrected age. | The parents must have a pediatrician in their health insurance entity when the infant presents pathologies that are common for their age. | |
| | It is considered that a preterm or low birth weight infant should continue high risk follow-up, even after reaching two years of corrected, at least until school age. | | There is scientific evidence that documents the appearance of cognitive problems up to school age related to prematurity and low weight. These interfere in the school and social integration of the infant. This justifies high-risk follow-up. |

8 TECHNICAL GUIDELINES AND REQUIREMENTS FOR THE HEALTH INSTITUTES ON INTRA-HOSPITAL AND AMBULATORY CARE OF THE KANGAROO MOTHER PROGRAM (KMP)

The Kangaroo Mother Programs (KMP) have been conceived under two types of closely coordinated care: intra-hospital and ambulatory. The KMP starts from the hospital as soon as, and for as long as, the state of the mother and the infant allow it. It is recommended, as a minimum, until 2 years of corrected age.

8.1 Technical guidelines and requirements for the implementation of the intra-hospital Kangaroo Mother Method (KMM) in the Newborn Unit (NU)

The conditions for the development of the processes of the Kangaroo Mother Program in a health institute has been classified as Minimum (“M”) which is MANDATORY, and Optimum (“O”). The criterion to be qualified as minimum and mandatory means that a KMP that does not have it, cannot be considered as such and cannot work until the identified gap is corrected. Optimum is not mandatory and does not compromise the operation of the program by not fulfilling it.

M: Minimum (Mandatory)

O: Optimum

Taking into account the criteria established in the mandatory compliance standards, in order to enable the health services, in accordance with

Resolution 2003 of 2014 (Health and Social Protection Ministry), “in all degrees of complexity where care is offered to the newborn, the Kangaroo Mother Program can be implemented in order to initiate its handling according to protocol. If this program is not offered, the patient will be referred to a location that does have this offer and can continue the process”. The referral process of the infant will be carried out by observing the recommendations of said program.

The priority processes where the obstetric hospitalization service of low, medium and high complexity is offered, must have “protocols for handling the preterm infant in the Kangaroo Program which must be learned by the caregivers in order to initiate the handling of

preterm newborns in case an emergency occurs in the hospital and handling and referral should be initiated where comprehensive care to the preterm newborn is offered. All this based on the guidelines that the Health and Social Protection Ministry establishes for this program”.

According to the activities contemplated in the Kangaroo Mother Program, the health institutions must comply with the minimum standards and criteria for all services according to that established in the Suppliers Inscription Manual of Resolution 2003 of May 30 2014 *“by which the procedures and conditions are defined which must be followed by the health service providers in order to enable the services, and other provisions are dictated”*, human talent, infrastructure, provision, medicines, medical devices and supplies, priority processes, clinical history, and records and interdependence.

The enabling standards are the minimum essential technological and scientific conditions for the provision of health services applicable to any health service provider regardless of the service it offers. The enabling standards are mainly for structure and delimit the point at which the benefits outweigh the risks. The risk approach in the enabling seeks for the design of the standards to comply with this basic principle and that these aim at the principle risks. (Health and Social Protection Ministry 2014.)

The Kangaroo Mother Program must be registered as a specific protection and early detection service that includes: general external consultation with medical specialties, diagnostic support group and therapeutic complementation, and low complexity pharmaceutical service, meeting the standards and specific criteria established in Resolution 2003 of 2014.

8.1.1 Organization

| INTRA-HOSPITAL KMP | | |
|--|----------------|--|
| Criterion | Classification | Observation |
| 1. ORGANIZATION | | |
| 1.1 General | | |
| To belong and operate in a care level II or III health institution that has a neonatal intensive care unit (NICU) enabled by corresponding agents. | M | In principle, every infant born in a level II health institution and who requires, or is likely to require, an intensive care unit (ICU), must be referred in a timely manner to a level III health institution. The health system must allow each infant to be referred to a level III health institution in case it is subsequently needed. |
| The health institution must have motivated personal that has knowledge of KMM and as a minimum have a sensitization for the three (3) shifts. | M | This can be achieved through training exercises by explaining the processes related with the KMM and the KMP. |

| INTRA-HOSPITAL KMP | |
|--|-------------|
| Observation | Observation |
| To have a written institutional policy accepted by the administration of the institution to support the KMM (kangaroo position and kangaroo nutrition). | M |
| Allow 24-hour parent access the NICU and allow interaction with the same. | M |

8.1.2 Health Professionals

Below are established the profile experience and dedication profiles, among others, of the health professionals that must be part of the intra-hospital KMP. Likewise, medical professionals appear who are not hired by the KMP but by the NICU of the institution, or who work directly with the health institution but whose availability is necessary for the KMP to operate correctly.

| INTRA-HOSPITAL KMP | |
|--|---|
| Health professionals that belong to the Intra-hospital KMP | Health professionals that belong to the NICU that are required by the intra-hospital KMP (availability) |
| Nursing Professional | Pediatrician |
| | Psychologist |
| | Social Worker |
| | Ophthalmologist |
| | Physiotherapist |

INTRAHOSPITAL KMP

Criterion

Qualification Observation

1.2 Health professionals of the health service institution

Professionals of the intrahospital KMP

1.2.1 Nursing Professional with degree.

Minimum 1 year experience in the handling of newborns and breastfeeding. Trained in KMM with certificate or proof of competence. Both the certification and proof of competence must demonstrate theoretical and practical knowledge of the KMM.

- Dedication vs ability

Full time according to the total number of beds in the NU. Exclusive dedication to the KMP (KMP administration, intrahospital kangaroo adaptation).

M

If the health institution has an ambulatory KMP at the start of the program, the same nurse could work in both the intrahospital and ambulatory services. As the ambulatory KMP grows and the number of consultations increase, a greater number of hours of dedication will be required in relation to its operation.

INTRAHOSPITAL KMP

Criterion

Qualification Observation

Newborn unit professionals to collaborate with the intrahospital KMP. The intrahospital KMP requires their availability.

1.2.2 Pediatrician or neonatologist- *Availability*

To work with the NU.

Motivated and knowledgeable of the KMM.

To support the intrahospital KMP and respect the intrahospital kangaroo protocol.

M

Medical assistant to the NU cooperating and promoting the intrahospital kangaroo program as part of his/her normal job functions.

Supports the nurse in decisions that favor the application of the KMM.

Appointed by the health institution to direct the KMP in the NU.

1.2.3 Psychologist - *Availability*

To work with the health institution.

Demonstrable experience in pediatrics.

Motivated and knowledgeable of the KMM.

- Dedication vs. ability

Sufficient availability for the intrahospital KMP.

M

Ideally, if the health institution has an ambulatory KMP, it can be the same psychologist of the ambulatory program. If not, it will be the psychologist of the health institution. Ideally, he/she should have clinical training in the development of preterm newborns and child neuropsychology.

1.2.4 Social Worker - *Availability*

To work with the health institution.

Demonstrable experience in pediatrics.

Motivated and knowledgeable of the KMM.

- Dedication vs. ability

Sufficient availability for the intrahospital KMP.

M

Due to the social problems of the kangaroo population, the intervention of a social worker is required. If the health institution has an ambulatory KMP and sufficient income, it should have an exclusive social worker to work in the ambulatory and intrahospital KMP. If not, the social worker of the health institution can conduct the work.

1.2.5 Ophthalmologist - *Availability*

To work with the NU.

M

Ideally, if the health institution has an ambulatory KMP, it can be the

Trained in retinal evaluation of newborns that are preterm or of low birth weight born with dilatation and without anesthesia.

- Dedication vs. ability

Availability for the newborns that are preterm or of low birth weight born in the newborn unit, including those participating in the intrahospital KMP.

same ophthalmologist of the ambulatory program. If not, it will be the ophthalmologist of the NU.

1.2.6 Physiotherapist - *Availability*

To work with the health institution.

Trained in pediatrics and newborns.

Motivated and knowledgeable of the KMM.

- Dedication vs. ability

Availability for the newborns that are preterm or of low birth weight born in the newborn unit, including those participating in the intrahospital KMP.

M

Ideally, if the health institution has ambulatory KMP, it can be the same physiotherapist of the ambulatory program. If not, it will be the physiotherapist of the NU.

1.2.7 All staff of the gynecological-obstetric and NU services of the health institution should know and use the KMP.

M

8.1.3 Administrative Support

INTRAHOSPITAL KMP

Criterion

1.3 Administrative Support

No additional support is required. The administrative tasks of filling out and filing the forms are carried out by the nurse assigned to the KMP.

8.1.4 Infrastructure

| INTRAHOSPITAL KMP | | |
|--|---------------|--|
| Criterion | Qualification | Observation |
| 2. INFRASTRUCTURE | | |
| 2.1 Installations | | |
| a Adaptation of a physical space for the intrahospital kangaroo program: education, training and adaptation of the mother or caregiver to the KMM (maintaining the kangaroo position and kangaroo nutrition with practice). If there is no space, the adaptation can be made next to the incubator, cradle or hospitalization room with the mother. | M | |
| b Wash basin for the parents. | M | |
| c Bathroom – access. | M | |
| d Locker for the items of parents. | M | |
| e Desk with cabinet – shared. | O | It can be shared. It is used to file the forms to process. |
| 2.2 Medical Equipment | | |
| a Pulse oximeter – Access. | M | It can be the NU or ICU oximeter, but it would be better if it belonged to the KMP since it is requested that an oximeter be in the adaptation room. |
| b Vital Signs Monitor – Access. | M | |
| c Electronic scale with scale division of 5 grams. | M | |
| Electronic scale with scale division of 1 gram. | O | |
| d Infantometer. | M | |
| e Standard medical millimetric tape measure. | M | |
| 2.3 Other equipment | | |
| Equipment for audiovisual aids (DVD, video | O | |

projector, screen, white board, among others).

8.1.5 FURNITURE AND SUPPLIES

INTRAHOSPITAL KMP

| Criterion | Qualification | Observation |
|---|---------------|---|
| 3. FURNITURE AND SUPPLIES | | |
| a Oxygen and air source with gauge with neonatal flowmeter. | M | Adequate access to medicinal oxygen with the appropriate characteristics for preterm babies. |
| b A chair with backrest and armrest per infant in the intrahospital KMP which must be next to the incubator or in the kangaroo adaptation room. | M | |
| c Two kangaroo bands per infant in the KMP. | M | The bands must meet the specifications of the KMM. |
| d Front opening gowns for caregivers of the infant in the intrahospital KMP. | M | A sufficient number of gowns for adequate changing and to provide the necessary conditions and hygiene for skin-to-skin contact. |
| e Breastfeeding pillows that follow biosafety protocols. | O | |
| f Footrest for breastfeeding. | O | |
| g Teaching aids (educational brochures, portfolios and bulletin boards). | M | Training material, information gathering forms, brochures, bulletin boards, explaining to mothers and caregivers what a KMP is, the consultation procedure, and where they should go after hospitalization. |
| h Paper to print forms and training material. | M | |

8.1.6 Priority Assistance Processes

INTRAHOSPITAL KMP

Criterion

Qualification

4. PRIORITY ASSISTANCE PROCESSES

a A KMM application protocol must exist in the NU which should include:

- The starting kangaroo position whether in intensive, intermediate or minimal care units.
- The intrahospital kangaroo adaptation and eligibility criteria for admission to the ambulatory KMP with or without prior joint accommodation.
- This protocol must follow the Technical Guidelines for the Implementation of Kangaroo Mother Programs and the Clinical Practice Guide for Preterm Infants of the Ministry of Social Protection. These must be accepted and applied by all health personnel (of all 3 shifts) of the newborn unit, the delivery room of the institution and the hospital administration.
- This protocol must also define the criteria to establish what infant is likely to require referral to a level III health institution.

M

b The NU must have, and its personnel must know and apply, the protocols for handling newborns that are preterm or of low birth weight. Among these protocols, the NU must have the following as a minimum:

- Protocol for the handling of preterm and/or low birth weight newborns, and an intrahospital kangaroo program that includes eligibility criteria for early (timely) hospital discharge in kangaroo position. Likewise, protocols should be available to reduce stress in the newborn (minimal manipulation, decrease of noise, light, pain, among others).
- Protocol for breastfeeding preterm and/or low birth weight newborns.

M

-
- Protocol for handling anxiety and/or depression of mothers of preterm and/or low birth weight newborns.
 - Protocol to facilitate communication of the parents with the kangaroo program 24 hours a day.
 - Detection and follow-up protocol for mothers without a family support network.
 - Referral protocol for neonatal auditory screening.
 - Protocol for the detection and handling of retinopathy of prematurity.
 - Intrahospital vaccination protocol for preterm and/or low birth weight newborns.
 - Protocol for handling attachment disorder of the mother-infant, family-infant, caregiver-infant dyad.
 - Protocol for the humanization of neonatal care (open units).
 - Referral and counter-referral protocol.
-

8.1.7 Clinical history and support records

INTRAHOSPITAL KMP

Criterion

Qualification

5. CLINICAL HISTORY AND SUPPORT RECORDS

Mechanisms to guarantee the recording of:

- Mother-infant tolerance of the kangaroo position.
- Skills acquired by the mother for:
 - Maintaining the kangaroo position.
 - Identifying warning signs in the baby.
 - Breastfeeding and techniques.
 - Identifying warning signs in the infant.
 - Feeding the baby at the breast.
 - Extracting breast milk and handling it with a dropper, syringe or cup
- Acceptance of the family for the KMP.
- Mother's access to a family support network
- Skills acquired by the baby for:
 - Coordinating suction-swallowing-breathing.
 - Feeding.
- The attendance history of the mother or caregiver to educational talks, as well as verification that an organized education process is carried out, will be documented in the clinical record.

M

8.1.8 Referral and counter-referral of patients

INTRAHOSPITAL KMP

Criterion

Qualification

6. REFERRAL AND COUNTER-REFERRAL OF PATIENTS

To guarantee referral to an institution that has an ambulatory KMP immediately after the hospital discharge is signed.

M

The above is an essential requirement for authorizing a hospital discharge.

8.1.9 Tracking risks in the provision of services

INTRAHOSPITAL KMP

Criterion

Qualification

7. TRACKING RISKS IN THE PROVISION OF SERVICES

To carry out evaluation and follow-up processes for the risks inherent to the type of service that is provided through the design and operationalization of indicators, which implies:

- The indicator's data sheet.
- The standardization of sources.
- The definition of those responsible for the analysis of the indicator, trends and fulfillment of objectives.

M

QUALITY INDICATORS OF THE INTRAHOSPITAL KMP²

Adherence indicators

“Initial desertion”.

“Initial delay in admission to an ambulatory KMP”.

“Intrahospital KMP exit criteria not followed”.

“Accessibility to the neonatal care unit”.

M

Outcome indicators

“Breastfeeding exclusively at the exit of kangaroo adaptation”.

“Exposure to the kangaroo position in the neonatal care unit”.

8.2 Guidelines and technical requirements for the implementation of an Ambulatory Kangaroo Mother Program

8.2.1 Organization

| INTRAHOSPITAL KMP | | |
|-------------------|---------------|---|
| Criterion | Qualification | Observation |
| 1. ORGANIZATION | | |
| 1.1 Generalities | | |
| a | | Belong to and operate in a health institution of level II or III assistance. |
| | M | Ideally, the ambulatory KMP would be in the same institution as the intrahospital KMP, but many times this is not possible due to the shortage of patients necessary to guarantee its cost-effectiveness. If the ambulatory KMP is not within the facilities of the health institution of level II or III assistance, it must be at a distance that allows immediate access in a serious emergency of a kangaroo infant, after being stabilized in the ambulatory KMP. The protocols must be written and known by all staff. |
| b | M | Have a written institutional policy of KMM application in the institution that is accepted by its managerial department. All level II and III health institutions with a NU must have an intrahospital KMP. (Level II health institutions can have an ambulatory KMP if they can ensure the minimum mandatory criteria.) |

8.2.2 Health professionals

The profile, experience, dedication, etc., of the healthcare professionals who should be a part of the nucleus of the ambulatory KMP are described below. Likewise, medical professionals are listed who are not contracted by the KMP but rather by the health institution and whose availability is necessary for the KMP to operate

correctly. Depending on whether the health institution is level II or III, these professionals will be a part of the staff. However, if the health institution is level II and does not have these professionals, what must be ensured is that in the event an infant requires medical attention, they receive it from the health institution of that level or higher.

| INTRAHOSPITAL KMP | |
|---|---|
| Health professionals who belong to the ambulatory KMP | Health professionals of the level II or III health institution that are required by the ambulatory KMP (availability) |
| Pediatrician | Ophthalmologist |
| Nurse | Phonoaudiologist |
| Assistant nurse | Optometrist |
| Psychologist | Physical Therapist; *teaches stimulation workshops. |
| Social worker | |

* It is recommended to conduct an initial collective workshop at 3 months of corrected age after the application and results of the first neuromotor examination, where explanations are given about the condition of prematurity and low birth weight, the functioning of the central nervous system, how to stimulate the newborn, as also to strengthen the skills of parents and caregivers through basic exercises in relation to visual, auditory and tactile stimulation. Collective workshops are also proposed for 6, 9, 12, 18 and 24 months of corrected age in which the knowledge and skills learned by parents are reinforced.

Health professionals of level II or III health institutions required for the ambulatory KMP (referral)

Physical therapist**

Occupational therapist**

Language Therapist **

Neuropediatric

Child Orthopedist

Child Pulmonologist

Nutritionist

They can eventually be hired by the ambulatory KMP. Otherwise, the health institution must guarantee a system of referral and counter-referral to these services. A minimum of 8 days must be guaranteed for referral appointments.

** It is recommended that these services form an integral intervention for preterm and/or low birth weight newborns as a complementary system of infant rehabilitation, where the pathologies of these infants are known, and they can receive individual and personalized attention, but not collectively.

| AMBULATORY KMP | | |
|--|---------------|---|
| Criterion | Qualification | Observation |
| 1.2 Healthcare professionals | | |
| Healthcare professionals of the ambulatory KMP | | |
| 1.2.1 Pediatrician | | |
| <p>With diploma</p> <p>Demonstrable experience in handling of newborns.</p> <p>Trained in KMM with a written qualification or proof of competence (theoretical-practical).</p> <ul style="list-style-type: none"> • Dedication <p>According to the number of infants being assisted:</p> <p>On average, part time for 200 infants assisted per year, of up to two years of corrected age.</p> <p>Full time for 350 infants assisted per year, of up to two years of corrected age.</p> <p>This averages to 2 patients per hour.</p> <p>It does not correspond to a fixed number of patients. It can vary according to the type of patients and their different pathologies.</p> | M | |
| 1.2.2 Head nurse | | |
| <p>With diploma</p> <p>Demonstrable experience in handling of newborns.</p> <p>Trained in KMM with a written qualification or proof of competence (theoretical-practical).</p> <ul style="list-style-type: none"> • Dedication <p>Full time.</p> | M | <p>At the beginning of the KMP, the same nurse can manage both the intrahospital and ambulatory KMP part-time each. On average, with a flow of 200 patients a year, one and a half nurses are required: one full-time for the intrahospital KMP and one part-time for the ambulatory KMP. Ideally, the nurse of the intrahospital service and the nurse of the ambulatory service would rotate and rely on the KMM (kangaroo position and</p> |

breastfeeding, among others).

1.2.3 Assistant nurse with diploma.

Trained in vaccination, if the vaccination unit is in the ambulatory KMP.

Demonstrable experience in handling of newborns.

Trained in KMM with written qualification or proof of competence (theoretical-practical).

- Dedication

Full time

M

Exclusively dedicated to the ambulatory KMP.

1.2.4 Psychologist

With diploma

Demonstrable experience in pediatrics.

Trained in KMM, especially in the handling of mothers in crisis and in the application of psychomotor development tests, with a written qualification or proof of competence (theoretical-practical).

- Dedication

With availability for the ambulatory KMP.

For the ambulatory KMP, half-time for up to 300 patients per year, full-time for up to 600.

M

Preferably a professional or specialist in child development or child neuropsychology.

1.2.5 Social worker

With diploma

Trained in KMM with written qualification or proof of competence (theoretical - practical).

- Dedication

With availability for the ambulatory KMP.

M

If the health institution has both an intrahospital and ambulatory KMP, the social worker can dedicate time to both programs, according to the flow of patients.

Trained in the detection of the social risks of patients for the ambulatory KMP, in the handling of high-risk patients participating in the KMP, in the handling of

patients in crisis and in the recovery of patients who are absent or who have dropped out of the KMP.

AMBULATORY KMP

Criterion

Qualification Observation

Professionals of level II or III health institutions to collaborate with the ambulatory KMP. The ambulatory KMP requires their availability.

1.2.11 Ophthalmologist

With diploma

Trained in detecting retinopathy of prematurity with dilation and without anesthesia.

- Dedication

With availability for the ambulatory KMP.

Timely access and without barriers.

With availability for the ambulatory program.

Timely access and without administrative barriers. A cost-effective strategy could be to schedule the consultation once a week in the same ambulatory KMP to ensure that all new patients of the week and control patients attend.

M

Need for an indirect retinoscope, a suitable exam table (with wheels), medication to dilate pupils for application according to his/her protocol. Access to referral to a retina specialist with experience in ROP surgery, for cases requiring such.

Phon audiologist
 With diploma
 Experience in the handling of AEP and impedanciometry in infants. M
 • Dedication
 With availability to attend the consultation of the ambulatory KMP.

Optometrist
 With diploma
 Trained in the evaluation of refraction disorders in infants under one year of corrected age. M
 • Dedication
 With availability to attend the consultation of the ambulatory KMP.

Physical Therapist
 With diploma
 Experience in pediatrics, especially in the handling of infants.
 Experience in the stimulation of newborns. M
 • Dedication
 With availability to teach the stimulation workshops and work in the consultation of the ambulatory KMP.
Eventually hired by the ambulatory KMP.

If the health institution has intrahospital and ambulatory KMP, the physical therapist can dedicate time to both programs, according to the flow of patients.

8.2.3 Vaccination

AMBULATORY KMP

Criterion

Qualification

Observation

3. VACCINATION

M

If the health institution has a vaccination service available during the same hours as the ambulatory KMP and with the requirements of the KMM vaccines, there is no need to duplicate the service.

If the health institution decides to have a vaccination unit, this unit can take advantage of the ambulatory KMP to vaccinate patients, reducing missed opportunities.

The existing unit must comply with the requirements of the Secretariat of Health of the department and with current

regulations.

8.2.4 Infrastructure

| AMBULATORY KMP | | |
|--|---------------|---|
| Criterion | Qualification | Observation |
| 4. INFRASTRUCTURE | | |
| 4.1 Installations | | |
| a Collective service room with a pediatric consultation area. Collective KMP area with capacity for waiting, training, education, patient observation and archiving. There is an area within the collective service room designated for taking anthropometric measurements and another area for pediatric consultation where families can wait for their consultation. | M | In this room, the pediatrician, nurse, psychologist, parents/guardians, and the infants of the program should be able to interact. The collective service room must comply with the same requirements as a waiting room for ambulatory and emergency visits. |
| b Three areas for individual consultation. (1) Consultation room with privacy to perform individual social work activities and attention for emergencies of less than 40 weeks and reanimation maneuvers. (2) Private consultation room to be used in accordance with the scheduled appointments for ophthalmology, optometry and audiology. (3) Private consultation room to perform psychology activities such as consultations and the application of the psychomotor development test. | M | |

| | | |
|--|---|--|
| c Area for the adaptation of ambulatory kangaroo. (Area designated for nursing.) | | It is an area where data is collected on admission, kangaroo education and strict follow-up of mother-infant adaptation (dyad) to the program. |
| d Three washbasins. | M | -Two located in the collective consultation room for medics and patients. -The other one in the kangaroo adaptation room. |
| e Diaper changing area for patients of the ambulatory KMP. | M | |
| f Bathroom – availability. | M | The available bathroom should be near the ambulatory care site. |

8.2.5 Medical equipment

AMBULATORY KMP

Criterion

Qualification

Observation

4.2 Medical equipment

4.2.1 Generalities for any ambulatory care area.

| | | | |
|--|---|---|---|
| a | Perform verifications, preventive and corrective maintenance for medical devices according to essential medical requirements. | M | |
| b | Source of medical oxygen and supplies (cannulas, humidifiers, portable oxygen, neonatal flowmeter). | M | Availability for the entire ambulatory care area. |
| 4.2.1 Equipment for the collective service room | | | |
| A | Pulse oximeter | M | |
| B | Equipment for the examination of sense organs. | M | |
| C | Thermometer | M | |
| D | Neonatal or pediatric stethoscope | M | |

E Life support cart containing: (amount)
 Adrenaline 1 mg/ml (2)
 Alcohol (1)
 Cotton (1)
 Mayo cannula 0 (1)
 Mayo cannula 1 (1)
 Pediatric nasal cannula (1)
 Neonatal nasal cannula (1)
 Ventilatory support (1)
 Dexamethasone 8mg/ml (1)

| | |
|--------------------------|---|
| Buretrol (1) | |
| Sterile gloves (3) | |
| Humidifier (1) | |
| 1 cc syringe (2) | M |
| 3 cc syringe (3) | |
| 10 cc syringe (5) | |
| 20 cc syringe (2) | |
| Solu-medrol 40 mg/ml (1) | |
| Nelaton probe No. 10 (1) | |
| Nelaton probe No. 8 (1) | |
| Nelaton probe No. 6 (1) | |
| SSN 0.9% x 100ml (1) | |
| SSN 0.9% x 500ml (1) | |
| Yelco No. 22 6x1 (2) | |
| Yelco No. 24 6x3/4 (2) | |

Note: Amounts are subject to the number of events presented each year. This amount is suitable for two events per year.

| | |
|---|---|
| G Electronic scale for babies with 5 to 10 g of scale division. | M |
| With 1 g of scale division. | O |
| H Standardized medical tape measure | M |
| I Infantometer | M |

8.2.6 Other equipment

AMBULATORY KMP

| Criterion | Qualification | Observation |
|-----------|---------------|-------------|
|-----------|---------------|-------------|

4.3 Other equipment

4.3.1 Generalities for the entire ambulatory care area

| | | |
|---|---|--|
| Have a communication channel (landline, mobile) 24 hours a day attended by a pediatrician. INDISPENSABLE REQUIREMENT FOR AN AMBULATORY KMP UP TO 40 WEEKS. | M | Through this channel parents can get answers 24 hours a day. The health institution ensures that a pediatrician is available to answer. |
| Have a communication channel (landline, mobile) 24 hours a day attended by a pediatrician from 40 weeks to 2 years of corrected age. | O | |
| 4.3.2 Other equipment for the administrative area (if any). | | |
| Telephone landline for appointments and contacting parents, especially those who do not attend appointments. | M | |

8.2.7 Furniture and supplies

| AMBULATORY KMP | | |
|---|---------------|-------------|
| Criterion | Qualification | Observation |
| 5. FURNITURE AND SUPPLIES | | |
| 5.1 Generalities for the ambulatory care area | | |
| a Oxygen tank with flow meter and manometer. | M | |
| b Elements of cleanliness. | M | |
| 5.2 For the ambulatory kangaroo adaptation area. | | |
| a Nursing chair (with backrest and arms). | M | |
| b Footrest. | M | |
| c Breastfeeding pillows that guarantee hygiene measures. | M | |
| d Kangaroo bands made of lycra or cotton that allow the kangaroo position to be maintained safely. (2 bands per family.) | M | |
| e Audiovisual material, educational material: billboards, portfolios, brochures, educational activities of the kangaroo position, alarm signs at home, ambulatory oxygen handling, breastfeeding, general aspects of the program. | M | |
| 5.3 For the collective service room. | M | |

| | | | |
|-----|---|---|--|
| a | Table for the medical examination and data collection. | M | Stretchers should have an inclination of 20 to 30 degrees to avoid GOR. |
| b | Chair for the doctor. | M | |
| c | Washable chairs or benches for waiting during the collective consultation. | M | |
| e | Dispenser of antiseptic solutions. | M | |
| f | Specific records for information collection, kangaroo health card. | M | |
| 5.4 | For the private consultation area for psychology and social work. | M | |
| a | Material according to the standards for psychological consultation and social work. | M | |
| b | Chairs. | M | |
| c | Audiovisual and educational material. | M | |
| e | Mat for psychomotor development evaluations. | M | |
| f | Proper material (test application kits) for psychomotor development evaluations. | M | |
| 5.5 | For the administrative area | | This can be a small area but it must ensure coordination of the ambulatory care with the records and files of the information of consultations, infants and families of the KMP. |
| g | Desk. | M | |
| h | Archive of medical records if it is a health institution independent of the hospital. | M | |
| i | Manual or electronic appointment scheduling system. | M | |
| j | Chairs. | M | |
| k | Computer and printer. | M | |
| l | Telephone. | M | |
| m | Stationery. | M | |

8.2.8 Medication

AMBULATORY KMP

| Criterion | Qualification | Observation |
|-----------|---------------|-------------|
|-----------|---------------|-------------|

6. MEDICINES

Guarantees access to medicines according to protocols.

M

If the ambulatory KMP does not provide the medication directly, it has to make sure that there are no administrative barriers for access to the pharmacy service.

Additionally, it is the responsibility of the ambulatory KMP to ensure that the details of the medicine administration are fully understood. Parents may be required to return to the ambulatory KMP once they have purchased the medication to explain to them the correct administration.

8.2.9 Priority assistance processes

AMBULATORY KMP

Criterion

Qualification

7. PRIORITY ASSISTANCE PROCESSES

a This protocol must follow the Technical Guidelines for the Implementation of Kangaroo Mother Programs and the Clinical Practice Guide for Preterm Babies of the Ministry of Social Protection. It must be accepted and applied by all the KMP personnel.

M

b The health institution must have, and its personnel must know and use, the handling protocols for preterm or low birth weight babies. At the very least, the protocols that must be implemented are:

- Handling protocol for breastfeeding preterm and/or low birth weight babies.
- Protocol for the handling of retinopathy of prematurity.
- Handling protocol for bronchopulmonary dysplasia and other respiratory disorders.
- Gastroesophageal reflux handling protocol.
- Handling protocol for anxiety disorders and/or depression in the mother of the preterm baby.

M

- Protocol to facilitate communication of the parents with the kangaroo program 24 hours a day.
 - Protocol for referral to a vaccination service.
 - Blue code handling protocol (according to each health institution).
-
- c
- Follow the current regulations of the EPI and the Ministry of Social Protection with the exception of the specifications for preterm and/or low birth weight babies. M
 - The starting date of vaccinations (2 months of chronological age) must not be moved earlier.
 - The application of inactivated polio and the acellular pertussis component of the DPT vaccine during the first two doses is recommended.
-

8.2.10 CLINICAL HISTORY

AMBULATORY KMP

Criterion

Qualification

8. CLINICAL HISTORY AND ASSISTANCE RECORDS

This is the mechanism to guarantee the registration of:

- Somatic growth. M
 - Weight gain per kilo per day.
-

- Monitoring of the oxygen-dependent kangaroo infant.
- Neurological monitoring and psychomotor development.
- Sensory screening (audiology, optometry).
- User updates (desertion).
- Rehospitalization, reasons and hospital stay.

8.2.11 Referral and counter-referral of patients

| AMBULATORY KMP | | |
|--|---------------|---|
| Criterion | Qualification | Observation |
| 10. REFERRAL AND COUNTER-REFERRAL OF PATIENTS | | |
| Ensures the referral to a health institution that has a neonatal intensive care unit, enabled by the corresponding entities. It also ensures referral to an emergency room if necessary. | M | Referral should be ensured in case of health problems of the infant in a level II health institution. |
| It has the processes defined for the referral of patients to screening optometry, audiology, ophthalmology, vaccination and neuropsychomotor development | M | In the event it is a level II health institution. |
| It has the processes defined for referral to subspecialties and integral therapy as needed. | M | In the event it is a level II health institution. |

8.2.12 TRACKING RISKS IN THE PROVISION OF SERVICES

| AMBULATORY KMP | | |
|--|---------------|-------------|
| Criterion | Qualification | Observation |
| 11. TRACKING RISKS IN THE PROVISION OF SERVICES | | |
| Conducts the evaluation and monitoring processes of the inherent risks of the provided services by means of the design | M | |

and operationalization of indicators. This includes:

- The technical datasheet of the indicator.
- The standardization of sources.
- Defining persons in charge of the analysis of the indicator, of the trends and of the fulfillment of goals.

QUALITY INDICATORS OF THE AMBULATORY KMP UP TO 40 WEEKS³

Adherence indicators

- “Desertion at 40 weeks”.
- “Ophthalmology at 40 weeks”.
- “Ultrasound at 40 weeks”
- “Neurological evaluation at week 40 of gestational age”.
- “Vaccinations at 40 weeks”.

Outcome indicators

- “Exclusive breastfeeding at 40 weeks”.
- “Rehospitalization at 40 weeks”.
- “Mortality at 40 weeks”.
- “Mortality at home 40 weeks”.
- “Growth in weight, size and cephalic perimeter at 40 weeks”.
- “Compliance with the taking of anthropometric measurements at 40 weeks”.
- “Emergency visits before the 40th week of gestational age”.

M

AMBULATORY KMP QUALITY INDICATORS UP TO ONE YEAR OF CORRECTED AGE⁸

Adherence indicators

- “Desertion at 1 year of corrected age”.
- “Optometry and audiology at 1 year of corrected age”.
- “Neurological development and psychomotor development at 1 year of corrected age”.
- “Complete scheme of vaccinations at 1 year of corrected age”.

M

Outcome indicators

-
- “Breastfeeding at 1 year of corrected age”.
 - “Rehospitalization at 1 year of corrected age”.
 - “Mortality at 1 year of corrected age”.
 - “Growth in weight, size and cephalic perimeter at 1 year of corrected age”.
 - “Compliance with the taking of anthropometric measurements at 1 year of corrected age”.
-

8.3 List of activities by health personnel and the time required

To give a better understanding of the activities carried out by the health personnel in order to facilitate the calculation of the personnel required for the operation of a KMP, a list of the activities and their average execution time is presented below.

Psychology Service

| Activity | Average Time/day |
|--|------------------|
| Psychomotor development evaluation 6 months. | 35 minutes |
| Psychomotor development evaluation 12 months. | 60 minutes |
| Development guidance and parenting guidelines workshop. | 35 minutes |
| Bonding development and crisis coping workshop. | 35 minutes |
| Individual-family attention to mothers - 1st time. | 60 minutes |
| Individual-family attention to mothers - follow-up. | 60 minutes |
| Workshops for at-risk populations – adolescents. | 120 minutes |
| Review and/or elaboration of educational material. | 30 min./week |
| Emotion workshop with families in pre-registration or admission of ambulatory KMP. | 90 minutes |
| Individual-family attention to mourning mothers. | 120 minutes |
| Administrative activities: monthly and weekly reports, individual health service provision records and clinical history. | 60 minutes |

Social Work Service

| Activity | Average Time/day |
|----------|------------------|
|----------|------------------|

| | |
|--|---------------------------------|
| Evaluation of patients. | 60 minutes |
| Report and monitoring of special cases. | 45 minutes |
| Home visit of special cases. | 6 hours |
| Strengthening of life project. | 30 minutes |
| Follow-up on non-attending patients. | On average 5 to 10 min./patient |
| Reminder calls. | On average 5 min./patient |
| Workshop for teen parents. | 2 hours |
| Administrative activities: monthly and weekly reports. | 60 minutes |

Intrahospital Nursing Service

| Activity | Average Time/day |
|---|------------------|
| Capture: review books, location of mother and newborn. | 15 minutes |
| Opening clinical history and education in breastfeeding and general care. | 45 minutes |
| Daily intrahospital adaptation: educational talks, signs of alarm, care of the newborn, importance of ambulatory follow-up, importance of family support. | 45 minutes |
| Home oxygen handling. | |
| Review of clinical history for discharge of newborns. | 30 minutes |
| Workshops: expression of fears, massage during skin-to-skin contact, nasal wash. | 45 minutes |
| Support for breastfeeding. | 30 minutes |
| Support for other forms of feeding. | 15 minutes |
| Participation in medical rounds (review of criteria for KMP entry and exit). | 60 minutes |
| Registry in the clinical history of the KMP and NU of activities performed. | 15 minutes |
| First time skin-to-skin placement of the newborn. | 30 minutes |

| | |
|---|------------|
| Skin-to-skin placement of the newborn in other opportunities. | 10 minutes |
| Administrative activities: monthly and weekly reports. | 60 minutes |

ambulatory Nursing Service

| Activity | Average Time/day |
|---|---|
| Opening of the clinical history and generalities of the KMM. | 45 minutes |
| Review of the infant's feeding: mother's milk extraction, posture during breastfeeding, other forms of feeding newborn. | 30 minutes |
| ambulatory kangaroo adaptation. | 45 minutes |
| Clinical history review of mother and newborn. | 15 to 45 min. depending on days of life and days of hospitalization of the newborn. |
| Record in the KMP clinical history of activities carried out. | 15 minutes |
| Various educational lectures. | 15 minutes |
| Various educational workshops. | 45 minutes |
| Hospitalization procedures (if presented). | 30 minutes. |
| Referral procedures (if presented). | 30 minutes. |
| Administrative activities: inventories, orders, charts of staff rotation and assignment of activities. | 60 minutes |

9 SET OF MINIMUM ACTIVITIES PER INFANT IN A KANGAROO MOTHER PROGRAM

Taking into account *DECREE 4747 OF 2007 (December 7), MINISTRY OF SOCIAL PROTECTION*, by means of which some aspects of the relation between the health service providers and the entities responsible for the payment of health services of the population and other provisions are dictated. Article 4. Payment mechanisms applicable to the purchase of health services. Payment by case, comprehensive set of assistance, package or group related by diagnosis: Mechanism through which sets of activities, procedures, interventions, supplies and medicines are paid, provided or loaned to a patient, related to an event in health, diagnosis or group related by diagnosis. The payment unit is each case, group, package of services rendered, or group related by diagnosis, with previously agreed upon rates.

Chapter II Contracting between health service providers and entities responsible for the payment of health services. Article 6 and Article 8. It is expected to make agreements of will for the provision of services by applying the established annual rates in the NATIONAL GOVERNMENT TARIFFS MANUAL - DECREE 2423 OF 1996. GUIDELINES FOR LIQUIDATION OF ACTIVITIES, INTERVENTIONS AND

PROCEDURES MANUAL SOAT AND TARIFFS MANUALS OF THE INSTITUTIONS.

During the exercise of updating the technical guidelines for the implementation of kangaroo mother programs, a nationwide review was conducted and health institutions were consulted on billing models for the care activities of preterm and/or low birth weight babies. It was demonstrated that there is a great variety of models, coverage of activities, and rates established by each institution according to their administrative costs of assistance and volume of users.

To define the frequency of the activities, data from the Integral Kangaroo Mother Program of the Kangaroo Foundation was used which has accurate and valid information from 2001 to date. The following were averaged (among others): the number of oxygen-dependent newborns and identified cases of psychosocial risk, percentage of newborns being exclusively breastfed for the calculation of breast milk supplementation. Based on this analysis, the frequency was defined and standardized in the set of proposed activities.

The package includes in its structure: an integral set of services distributed by each stage of care

according to the infant's age which include consultations, screening tests, diagnostic support, vaccinations and medications. Additionally, it includes activities such as dynamic oximetry, stimulation workshops, formulation of family plans managed at home, group education conducted by nurses, home visits for identified cases of psychosocial risk, priority follow-up and direction carried out by mobile phone, transportation, accommodation and food for specific cases, bands for the mother and father or other caregiver, the required card and stationery. For each of these activities, the frequency of fulfillment is described as the number of activities to be carried out with each infant, including the mother or caregiver.

Each health institution, with its eligibility criteria, will have the power to establish agreements of wills regarding the payment method for the set of activities, as established in the billing of activities of minimum conditions defined in Decree 4747 of 2007 and Resolution 3374 of 2000 regarding the individual records of provision of services. These records will be the support for each activity contained in the package of the Integral Care Kangaroo Mother Program.

With the integration of the care sets, the aim is to standardize the activities at the institutional level and to be able to reply in an interdisciplinary, comprehensive and timely manner, thus reducing the consequences of low-quality care for preterm and/or low birth weight babies.

The objective of the care package is to create institutional strategies that ensure adherence to monitoring, treatment and rehabilitation of preterm and/or low birth weight babies, and to encourage the active search of these cases in health institutions where childbirths are assisted in order to provide timely assistance and greater coverage.

According to data from the Kangaroo Foundation, an ambulatory kangaroo mother program can be self-sustaining with a number of 400 patients per year. All health institutions that assist childbirths are obliged to begin the KMM, either for transportation to another institution or to be initiated intra-hospital until departure. Ideally, the ambulatory KMP should be in the same institution as the intrahospital KMP, but it is often not possible if there is not a high enough number of patients to guarantee its cost-effectiveness. The ambulatory KMP works under the scale economy model. Such is the case of consultations by ophthalmology, audiology and optometry, where patient appointments are done in a group manner guaranteeing that a certain group of patients is attended to instead of attending them one by one sporadically. By grouping and collectively assisting patients, the expansion of the service is obtained. In turn, the health professionals gain expertise given the number of diagnostic tests and screening tests performed during the day. A similar situation would be the purchase of a nuclear magnetic resonance machine. Since it is

an expensive machine, there is only a limited number of them in certain hospitals, but they serve a large number of patients not only of that hospital but of others who are referred there. The volume of patients covers the cost and operation of that machine.

SET OF AVERAGE ACTIVITIES PER INFANT IN A KANGAROO MOTHER PROGRAM *

* These activities allow evaluating the price of the set of activities, known as the kangaroo package.

| SET OF ACTIVITIES OF THE KANGAROO MOTHER PROGRAM "UP TO 24 MONTHS AGE CORRECTED" | | |
|---|---------------------------|---|
| ACTIVITY | PROFILE | AVERAGE FREQUENCY (Minimum-Maximum) |
| INTRAHOSPITAL PHASE: ADAPTATION OF THE KANGAROO POSITION AND NUTRITION BEFORE THE DISCHARGE | | |
| Valuation of the preterm and/or low birth weight baby in the newborn unit which includes neonatal adaptation and/or joint accommodation for capture, eligibility and inclusion in the ambulatory Kangaroo Mother Program. Initial consultation at the entrance and then at the exit. This activity is included in the care of the newborn in the NU. <u>Explanatory note:</u> This activity does not correspond to a direct cost for the KMP since its cost is included in the operation of a NU and the routine activities of a pediatrician in a NU that an intrahospital KMP has implemented. | Pediatrics | 2 (Valuation at the beginning of the kangaroo adaptation and then prior to the exit of the infant from the NU) |
| Education, training and monitoring of the mother, father and support family (grandparents, uncles, siblings). It includes: counseling and promotion of breastfeeding, stimulation, intrahospital kangaroo adaptation, handling of the kangaroo position and nutrition, identification of risk factors. In the newborn unit and/or joint accommodation. (average hospitalization: 15 days) | Nursing | 20 (1-60) |
| Family or group consultation for social work or psychology: intervention session to evaluate and determine biopsychosocial risk factors. Duration of the activity: 60 minutes. | Social Work or Psychology | 1 (1-2) |
| Kangaroo band (support to carry the infants in the kangaroo position and adequately maintain it. Composition: 96% cotton, 4% elastic, must have double stitching). | | 2 |
| FIRST STAGE: FROM HOSPITAL DISCHARGE TO 40 WEEKS OF GESTATIONAL AGE | | |
| Entry consultation done by pediatrics: complete physical examination, analysis of history, diagnoses and management plan. Duration of the activity: 60 minutes. | Pediatrics | 1 |

SET OF ACTIVITIES OF THE KANGAROO MOTHER PROGRAM

“UP TO 24 MONTHS OF CORRECTED AGE”

| ACTIVITY | PROFILE | AVERAGE FREQUENCY (Minimum-Maximum) |
|--|------------|--|
| Follow-up consultation by pediatrics: control of weight, size, cephalic perimeter, suction, swallowing and complete physical examination. Performed daily until achieving adequate growth and then weekly according to the care protocol until reaching 40 weeks of gestational age. Neurological evaluation after completing 40 weeks of gestational age. (2 patients per hour on average) | Pediatrics | 8 (3-8) |
| ambulatory adaptation at entry and during the daily consultation when needed. Verification of the eligibility criteria including counseling and practice of breastfeeding. Review of the hospital medical record. Duration of the activity: 60 minutes (minimum). | | Nursing 3 (1-3) |
| Educational activity for the mother, father and/or family support group. Contemplates: breastfeeding counseling, kangaroo position, adequate stimulation, massage, childcare and warning signs. Weekly sessions until completing 40 weeks of gestational age. | Nursing | 5 (3-8) |
| Valuation of the family (if required). The aspects for considering if the family is suitable for receiving the kangaroo infant are: to want and accept participating in the Kangaroo Mother Program; have the physical and mental ability to handle the infant; show discipline, commitment and sufficient availability; understand and respect the KMM. Duration of the activity: 60 minutes. | Psychology | 1 (0-1) |
| Psychology workshop on different topics such as: abuse, father participation, handling siblings, teen pregnancy, stimulation, parenting guidelines, beliefs, psychotherapy or crisis support when required by a family. | Psychology | 2 (1-3) |

| | | |
|--|---|---|
| ambulatory valuation (screening test) by pediatric ophthalmology and/or retinology before the 40 weeks of gestational age, with subsequent controls if necessary. Done for all preterm newborns < 33 weeks of gestational age and/or < 2,000 grams, from 2,000 grams to 2,500 grams and/or from 33 to 36 weeks of gestational age according to the risk factors (see list), > 2,500 grams and/or 36 weeks of gestational age according to the pediatrician's criteria. Valuation of the retina by indirect ophthalmoscopy at 28 days of age, or 31 to 32 weeks of gestational age. | Ophthalmologist Pediatrician or Retina Specialist | 2 (until complete retinal vascularization or normality after a ROP diagnosis) (1-4) |
| Transfontanellar brain ultrasound, up to 40 weeks of gestational age. | Radiology | 1 (0-3) An infant can enter a KMP with a transfontanellar brain ultrasound done during the hospitalization process or may require additional ultrasounds in case of post-hemorrhage cerebral control. |
| Auditory screening at around 40 weeks of gestational age (AEP and OAE). | Phonoaudiology | 1 (1-2) |
| Dynamic pulse oximetry (1-hour serial) in oxygen-dependent patients, weekly or biweekly controls until supplemental oxygen suspension. (This corresponds on average to 30% of infants before 3 months of corrected age; oximetry every 8 days, 9 on average per infant with oxygen dependence at admission). In Bogotá, two additional consultations are carried out, given the large volume of infants on oxygen. | Nursing | 3 (3-8) |
| Vaccination service (if infant weighs over 2,000 g). | Nursing | 1 |
| MEDICINES | | |
| Application of BCG vaccine (newborn over 2,000 g). | Nursing | 1 |
| Ferrous sulphate starting at age of 1 month (1-2 mg/kg/day) until 12 months of corrected age. | Nursing | 1 (0-1) |
| Multivitamin in oral drops (containing vitamins A, E, D). | Nursing | 2 (1-2) |
| Supply of vitamin K (orally). | Nursing | 5 |

| | | |
|--|------------------|----------------------|
| | | (1-5) |
| Dilators for ophthalmologic screening. | Ophthalmology | 1 |
| Breast milk supplement in case of need; 30% liquid milk according to case (supplementation 30% of infants for 6 weeks with 4 ounces daily = 60 ounces per infant, 1 bottle = 2 ounces). | Pediatrics | 10 bottles (0-30) |
| Xanthine | Pediatrics | 1 (0-1) |
| SECOND PHASE: FROM 40 WEEKS TO 12 MONTHS OF CORRECTED AGE (CA) | | |
| Follow-up consultation by pediatrics when the following conditions are met: 2,500 grams of weight and 40 weeks of gestational age up to 12 months of corrected age. Frequency: every 15 days if the infant has oxygen until weaning, every month and a half for infants without oxygen up to 12 months of corrected age. | Pediatrics | 9 (5-15) |
| Application of psychomotor development test at 6 and 12 months of corrected age, plus two additional controls in 30% of infants. Duration of the activity: 60 minutes. | Psychology | 2 (2-4) |
| Optometry screening plus an additional control: detection of the most frequent refractive disorders in the preterm or LBW baby (myopia and myopic astigmatism). | Optometry | 1 (1-2) |
| X-ray of the hips (or hip ultrasound according to availability) at 3 months of corrected age for the detection of hip dysplasia. | Radiology | 1 (1-2) |
| Valuation by social work (valuation to identify risk factors and define intervention and monitoring for the adherence to the program). | Social work | 2 (0-4) |
| Home visit, monitoring to reduce risk factors. (Only patients with an identified biopsychosocial risk, about 30% of infants. May vary according to the base population.) | Social work | 1 (0-1) |
| Stimulation workshop given by physical therapy at 3, 6, 9, 12. | Physical therapy | 4 (0-4) |
| Psychology workshop on different topics such as: abuse, father participation, handling siblings, teen pregnancy, stimulation, parenting guidelines, beliefs, psychotherapy or crisis support when required by a family. | Psychology | 4 (4-8) |
| Accompaniment and constant monitoring through educational activities to the mother, father and/or family support group. It includes: nutrition counseling, breastfeeding, diversification, vaccines, massages, prevention and promotion workshops, childcare and warning signs. 30-minute session to complete the follow-up. | Nursing | 4 (4-8) |
| Dynamic pulse oximetry (1-hour serial) for oxygen-dependent patients: weekly or biweekly controls until supplemental | Nursing | 4 |

| | | |
|---|------------------|------------|
| oxygen suspension. (This corresponds to 10% of infants after 40 weeks, oximetry every 8 days until weaning.) | | (0-12) |
| Vaccination service (the KMP must be able to provide the vaccination service. If the infant is vaccinated outside the KMP, it must be registered on his/her card). | Nursing | 12 |
| MEDICINES | | |
| Ferrous sulphate starting at age of 1 month (1-2 mg/kg/day) until 12 months (bottle). | Nursing | 2 (2-4) |
| Pentavalent Acellular ^a | Nursing | 2 |
| THIRD PHASE: FROM 12 MONTHS OF CA TO 24 MONTHS OF CA | | |
| Controls will be carried out every 3 months for infants 12 to 24 months of corrected age in order to detect alterations in their neuromotor development and growth. (Neuromotor test at 18 and 24 months of corrected age.) | Pediatrics | 4 (4-6) |
| Application of psychomotor development test at 18 and 24 months of corrected age plus two additional controls for 30% of infants. Duration of the activity: 60 minutes. | Psychology | 2 (2-4) |
| Stimulation workshop dictated by physical therapy at 18 and 24 months of corrected age. | Physical therapy | 2 |

While the pentavalent vaccine is not covered by the Expanded Program of Immunization (EPI) of Colombia, the Kangaroo Mother Programs or the health insurance entities, according to the agreements, must try to assume their cost, following the recommendation of supplying the Pertussis Acellular component (DPaT) during the first two doses. The rest of the vaccination scheme is covered by the EPI.



10 JUSTIFICATION OF THE INTEGRAL MONITORING OF THE PRETERM AND/OR LOW BIRTH WEIGHT INFANT FROM ONE YEAR OF CORRECTED AGE TO THE SECOND YEAR OF CORRECTED AGE

The World Health Organization (WHO) estimates that 10% of the population of any country is composed of people with some type of disability. If we add to this the percentage of infants who are at risk during their development, we are faced with the presence of a problem that needs to be addressed as a priority. Developmental disorders as a whole affect 10% of infants, so it is not encouraging that 25% of them, even the severe cases, are diagnosed late, after 3 years of age. These disorders include different neurological or sensory alterations that can affect the course of infant development.

Brain immaturity in any case, may be the main culprit for neurological disabilities observed in the long-term neurological development in this population. Although the data on brain maturation in late preterm infants is limited, autopsy and MRI show that, at 35 weeks of gestation, the brain weighs 65% of the brain of a full-term newborn, and the outer surface has fewer grooves. This immaturity can increase the brain's vulnerability to long-term injuries. Thus, delays or neurodevelopmental disabilities are described in the preschool stage, cerebral palsy, mental retardation, intellectual disability, schizophrenia, psychological development disorders, behavior and emotion (1).

75% of morbidity for extremes low birth weight babies (< 1500 grams) or extreme prematurity (< 32 weeks) is evident after the first year of life, leading to a series of difficulties in school, family, social, etc. These problems reduce the life quality of infants and their families and generate high costs for the social security system in health and society.

This statement is evidenced in a Colombian article from the magazine *Salud Pública*, 2015, *Quality of clinical and neurological monitoring in a cohort of very preterm newborns, 2002-2012*. This study explored, through a telephone survey in Bogotá, how clinical monitoring is carried out for extreme preterm infants after the first year of life and the morbidity and mortality of these patients in the long term. *From a cohort of 569 patients, 72% of the recovered infants were monitored by a pediatrician, 23% had controls by a general practitioner and 3.6% were controlled by a nurse. The most frequent morbidities, 30% had pulmonary problems, 5.2% paralysis or mental retardation, and 2.7% had a history of seizures. The mortality of the cohort up to three years was 6% (6 times compared to the global mortality in the KMP up to the first year).* (2)

The need to conduct comprehensive monitoring beyond the first year of corrected age, where

longitudinal evaluations are carried out by qualified professionals who identify “subtle” problems in this population, allows planning, designing and intervening in a timely manner, thus diminishing the effects of prematurity or low birth weight that affect the behavior and social integration of these infants in adulthood.

Actions that are reaffirmed with the establishment of the new integral model of health care (Ministry of Health and Social Protection 2016) that seeks integrality in private and collective care by risk groups, in special health services to achieve coverage of continuous actions, within the framework of the *first one thousand days of life action plan 2012-2021*, for the care of the preterm and/or low birth weight baby.

Therefore, in the update of the technical guidelines for implementation of the Kangaroo Mother Programs in Colombia, a series of parameters and multidisciplinary, continuous and integral interventions defined by stages, was established under scientific evidence and consensus of experts.

1. Stage 0: Intrahospital stage
2. Stage 1: Ambulatory follow-up until 40 weeks of gestational age.
3. Stage 2: Ambulatory follow-up from 40 weeks of gestational age to 1 year of corrected age.
4. Stage 3: Ambulatory follow-up from 1 year of corrected age up to 2 years corrected age.

The actions that were included in stage 3 up to two years of corrected age are the following:

1. **Pediatric consultation every 3 months, equivalent to 4 additional consultations.**
2. **Neuromotor development test, 18 and 24 months.**
3. **Psychomotor development test, 18 and 24 months.**
4. **Neuromotor stimulation workshop, 18 and 24 months.**

References:

1. Hurtado Suazo JA, García Reymundo M, Calvo Aguilar MJ, Ginovart Galiana G, Jiménez Moya A, Trincado Aguinagalde MJ, Demestre Guasch X. [Recommendations for the perinatal management and follow up of late preterm newborns]. *An Pediatr (Barc)*. 2014, Nov;81(5):327.
2. Charpak Nathalie, Montealegre Adriana. Calidad del seguimiento clínico y neurológico en una cohorte de recién nacidos muy prematuros, 2002-2012. *Salud Pública magazine*. 2015 Vol 17 (4).

11 ANNEXES

ANNEX A

QUALITY ASSURANCE (ADHERENCE AND OUTCOME INDICATORS) OF A KMP

Initially, the technical guidelines for the implementation of kangaroo mother programs have a specific scope which is to guide the health institution in their fulfillment of the minimum standards and requirements of mandatory compliance for the habilitation of kangaroo mother programs as a health service under the Sole System of Habilitation in Health within the framework of the Mandatory System for Quality Assurance of Health Care of the General System of Social Security in Health, Decree 1011 of 2006. To achieve the accreditation process, it is mandatory that the health service is enabled and registered in the REPS (Special Registry of Health Providers, Spanish acronym) and have the institutional willingness to perform said accreditation, among other criteria. However, although this process is part of the Sole System of Accreditation in Health, it is very different from the habilitation.

The following indicators are intended to measure the quality of the benefit of the service, that is, the activities proposed to be carried out in each phase of the kangaroo mother programs.

A. GLOSSARY

KMM: Kangaroo Mother Method.

KMP: Kangaroo Mother Program.

PATIENTS: Preterm of less than 37 weeks and/or infants of low birth weight of less than 2,500 gr.

NU: Newborn Unit.

PHASE I: Period from admission to the ambulatory kangaroo program until reaching 40 weeks of gestational age.

PHASE II: Period from 40 weeks of gestational age until completing one year of corrected age.

A: Accreditation.

H: Habilitation.

SD: Standard Deviation

B...QUALITY INDICATORS OF INTRAHOSPITAL KMP

1. Adherence indicators.

-**"Initial desertion"**: Patients captured by the intrahospital KMP but not admitted to the ambulatory KMP. Index "capture": Number of patients coming to the ambulatory KMP vs. number of eligible patients discharged from a neonatal intensive care unit or an insurer.

A: 80% of all candidates for a KMP. Missing cases should be explained.

H: > 90% of patients less than or equal to 1,800 g and 100% of those less than or equal to 34 weeks of EG at birth. Missing cases (10%) can be explained.

REQUIREMENT

The exit criteria include the mother's commitment to come to a KMP. If not, the exit is not given. If the mother cannot return, an alternative must be sought such as kangaroo accommodation or shelter before giving the exit. At the very least it must be ensured that the little ones do not defect in order to be habilitated as an intrahospital KMP.

"Initial Delay of entry to an ambulatory KMP":

Number of patients admitted to an ambulatory KMP after the first 48 hours following their discharge from an intrahospital KMP vs. the number of patients that exit an intrahospital KMP.

A: less than or equal to 10%. Missing cases can be explained. It must be taken into account when there is a holiday of over 48 hours that parents must have an emergency telephone number to call a pediatrician in case of need.

H: less than or equal to 15%. It must be taken into account when there is a holiday of over 48 hours that parents must have an emergency telephone number to call a pediatrician in case of need.

REQUIREMENT

The KMM is ambulatory neonatology (day hospital). In the hospital, initially the infant must be evaluated daily, when their physical state allows it and the mother feels capable. The control becomes weekly until the infant reaches their full term.

- **"Intrahospital KMP exit criteria not followed"**:

number of patients admitted to an ambulatory KMP without meeting the eligibility criteria for the hospitalization exit vs. number of kangaroo patients who exit the hospital.

A: less than 5%

H: less than 10%

Negotiable: *patient in period of physiological weight decrease (less than 10 days of chronological age), the weight decrease does not correspond to a failure in the exit criteria.*

- **“Accessibility of parents (family) to the Neonatal**

Care Unit”: Number of daily hours of access of parents in kangaroo adaptation to the neonatal care unit over 24 hours.

A: Same as **24 hours**

H: greater than or equal to **12 hours**.

Accessibility means not only physical access but physical structure (bathrooms, lockers, bands and chairs if 12 hours, add food (3 meals a day), living room and shower if 24 hours, that allow the stay and written procedures that allow verifying compliance. These last points should be considered in the structure quality indicators of an intrahospital KMP.

2. Outcome indicators

- **“EMB Exclusive maternal breastfeeding at the exit**

of hospital kangaroo adaptation”: Number of patients who exit the intrahospital KMP practicing exclusive maternal breastfeeding vs. the number of patients who exit the intrahospital KMP.

A: greater than or equal to 70% of hospitalized patients who exit the kangaroo adaptation, 90% of patients not hospitalized in the neonatal unit with a mother that wants to, and can, breastfeed.

H: greater than or equal to 60% of patients exiting the kangaroo adaptation.

Preterm and/or low birth weight infant breastfeeding is the most difficult component of the KMM, but it is also the most precious and adequate source of nutrition for these infants. It must be

stimulated without exaggerating. The nutritional status of the infant always prevails.

“Exposition in kangaroo position in the Neonatal

Care Unit”: Number of hours per day in which the patient was held in the kangaroo position during the adaptation of the three days prior to exit.

A: greater or equal to 12 hours or 24 hours a day for infants who do not regulate temperature in institutions with accommodation for the mother.

H: greater than or equal to 8 hours a day for the 3 days prior to exit.

It must be ensured that an infant who does not regulate temperature will be in a neutral thermal environment continuously before and after the exit until he/she no longer needs it. Why 8 hours? To ensure adequate training of the mother before exit and to verify that the infant is correctly gaining weight in the kangaroo position (at least one third of the time) plus incubator.

INTRAHOSPITAL KMP QUALITY INDICATORS

Adherence indicators

“Initial desertion”.

“Initial delay in admission to an ambulatory KMP”.

“Ambulatory KMP exit criteria not followed”.

“Accessibility of parents to the neonatal care unit”.

Outcome indicators

“EMB exclusive maternal breastfeeding at the exit of the kangaroo adaptation”.

“Exposition in kangaroo position in the neonatal care unit”.

C. AMBULATORY KMP QUALITY INDICATORS FROM ADMISSION UNTIL 40 WEEKS OF GESTATIONAL AGE (PHASE I OF THE AMBULATORY FOLLOW-UP OF THE KANGAROO PATIENT)

1. Adherence indicators

- **“Desertion at 40 weeks”**: Number of patients who dropped out of the ambulatory KMP in phase I vs. the number of patients admitted to ambulatory KMP.

A: less than or equal to 10%

H: less than or equal to 15%

Phase I of the ambulatory KMP is the most delicate phase with these fragile infants. When a kangaroo infant does not come to the consultation in phase I, the family and relatives must be called to know what happened and immediately reschedule the appointment for the next day.

- **“Ophthalmology 40 weeks”**: Number of patients who underwent an ophthalmology exam at the end of phase I vs. the number of infants who completed phase I of the program.

A: and **H**: greater than or equal to 95% of infants under 33 weeks of gestational age at birth and/or under 1,800 grams at birth, and 95% of patients of 33

weeks of gestational age or more and/or between 1,800 and 2,000 grams at birth that have specific risk factors.

Retinopathy of prematurity is the number 1 cause of blindness in Latin America.

- **“Ultrasound 40 weeks”**: Number of patients who underwent brain ultrasound at the end of phase I vs. the number of patients who completed phase I of the program.

A: greater than or equal to 90%. Missing cases can be explained.

H: greater than or equal to 85%. Missing cases can be explained.

- *Clarifications:*

✓ If the infant underwent brain CT or brain MRI, it is included as if a brain ultrasound had been done.

✓ In an institution without an ultrasound scan: 0% in patients without risk factors and normal PC, 80% in the other patients.

Ultrasound allows an initial image of the brain of a low birth weight infant in a high-risk follow up.

- **“Neurological evaluation at week 40 of the gestational age”**: Number of patients who received neurological assessment for tone test at the end of phase I vs. the number of infants who completed phase I of the program.

A: greater than or equal to 90%. Missing cases can be explained

H: greater than or equal to 85%. Missing cases can be explained.

There is nothing to discuss here. All kangaroo infants should at minimum have a tone test done at 40 weeks.

- **“Vaccines at 40 weeks”**: Number of patients who have received hepatitis B and BCG vaccination upon reaching 2,000 g vs. the number of infants who reached 2000 g.

A: and H: greater than or equal to 95% of the candidates who have no contraindications and if the BCG is part of the immunization program.

There is nothing to discuss here. All infants should receive vaccines from the national immunization program.

AMBULATORY KMP QUALITY INDICATORS UP TO 40 WEEKS

Adherence indicators

- “Desertion at 40 weeks”.
- “Ophthalmology 40 weeks”.
- “Ultrasound 40 weeks”
- “Neurological evaluation at week 40 of gestational age”.
- “Vaccines 40 weeks”.

2. Outcome indicators

- **“Exclusive breastfeeding at 40 weeks”**:

Number of infants exclusively fed breast milk at 40 weeks vs. the number of infants who completed phase I of the program (categorizing by gestational age at birth).

A: Greater than or equal to 70% in patients over 34 weeks of gestational age at birth. Greater or equal to 50% in patients less than or equal to 34 weeks of gestational age at birth.

H: Greater than or equal to 60% in patients over 34 weeks of gestational age at birth. Greater than or equal to 40% in patients less than or equal to 34 weeks of gestational age at birth.

- **“Re-hospitalization at 40 weeks”**: Number of patients who attend an ambulatory KMP and who were re-hospitalized at least once during the first phase of the ambulatory kangaroo program vs. the number of infants who completed phase I of the Program.

A: less than or equal to 18%.

H: less than or equal to 13%.

The re-hospitalization before 40 weeks of gestational age shows the fragility of kangaroo infants who entered the KMP with respect to the exit criteria and to the correct practice of the kangaroo consultation.

- **“Mortality at 40 weeks”**: Number of patients who entered the ambulatory KMP and who died before 40 weeks vs. number of infants that enter the ambulatory KMP.

A: less than or equal to 1%.

H: less than or equal to 2%.

REQUIREMENT

- **“Mortality at home at 40 weeks”**: Number of patients dying at home vs. total number of patients dying during follow-up up to 40 weeks.

A: less than or equal to 20%.

H: less than or equal to 30%.

Mortality at home (apart from sudden death or the death of an infant with multiple malformations and/or very low life expectancy that goes home to die with dignity) represents the quality of the ambulatory clinic and the ease of access to the hospital. Kangaroo patients should have access to a telephone number to ask advice in case of doubt about the health condition of their infant at home.

- **“Growth in weight, size and cephalic perimeter at 40 weeks”**:

- Patients must be classified according to Lubchenco (preterm suitable for gestational age, preterm small for the gestational age and full-term small for the gestational age) using the Fenton curve. All infants

under the 10th percentile correspond to small for the gestational age.

- Percentage of the total number of patients participating in the phase I who reach size, weight and cephalic perimeter (harmonic growth) greater than -2 SD of the curves of the WHO.

- 80% of preterm infants suitable for gestational age.
- 60% of preterm infants small for the gestational age.
- 60% of full-term infants small for the gestational age.

These figures were calculated in a cohort of more of 20,000 kangaroo infants followed up to 40 weeks of gestational age.

- **“Compliance with the taking of anthropometric measurements at 40 weeks”**: Measurements of weight, size and cephalic perimeter located in the curves of growth of an infant attending a follow-up consultation in a KMP.

A: and **H**: 100% of the infants attending the follow-up consultation in a KMP must be measured for weight gain, size, and cephalic perimeter located in a curve of increase, with the exception of infants who for specific reasons it is not possible (e.g., postoperative condition, among others).

REQUIREMENT

- **“Consultations to emergency services before week 40 of gestational age”**: Number of patients who went to emergency services at least once vs. the number of patients who entered phase I of the ambulatory KMP.

A: less than or equal to 15%.

H: less than or equal to 20%.

This indicator shows the assistance provided to parents during phase I of ambulatory KMP if a KMP does not receive priority consultations scheduled before 40 weeks or if there is no phone number parents can call if they have questions about their infant's health.

AMBULATORY KMP QUALITY INDICATORS UP TO 40 WEEKS

Outcome indicators

- “Exclusive breastfeeding at 40 weeks”.
- “Re-hospitalization at 40 weeks”.
- “Mortality at 40 weeks”.
- “Mortality at home at 40 weeks”.
- “Growth in weight, size and cephalic perimeter at 40 weeks.”
- “Compliance with anthropometric measurements at 40 weeks”.
- “Emergency visits before week 40 of gestational age”.

D. AMBULATORY KMP QUALITY INDICATORS UP TO 1 YEAR OF CORRECTED AGE

1. Adherence indicators

- **“Desertion at 1 year of corrected age”**: Number of patients who dropped out of the KMP in phase II vs. number of patients admitted to the KMP phase II.

A: less than or equal to 15% (not including patients that insurers lose).

H: less than or equal to 20% (not including patients that insurers lose).

- **“Optometry”**: Number of patients who were given an optometry exam at the end of phase II vs. the number of infants who completed phase II of the program.

A: **Ideal: 90%**. Missing cases can be explained.

H: Minimum Acceptable: 80%. Missing cases can be explained.

REQUIREMENT

- **“Audiometry”**: Number of patients who were given an audiometry exam at the end of the phase II vs. the number of infants who completed phase II of the program.

A: Ideal: 90%. Missing cases can be explained.

H: Minimum Acceptable: 80%. Missing cases can be explained.

REQUIREMENT

- **“Neurological and psychomotor development at 1 year of corrected age”**: Number of patients given a neurological and psychomotor evaluation at the end of phase II vs. the number of patients who completed phase II of the program.

A: greater than or equal to 90%. Missing cases can be explained.

H: greater than or equal to 85%. Missing cases can be explained.

REQUIREMENT

- **“Complete vaccination at 1 year of corrected age”**: Number of patients who have received a scheme of complete vaccination for the first year of age at the end of phase II vs. the number of patients that culminated phase II of the program.

A: greater than or equal to 90%. Missing cases can be explained.

H: greater than or equal to 85%. Missing cases can be explained.

REQUIREMENT**AMBULATORY KMP QUALITY INDICATORS UP TO 1 YEAR OF CORRECTED AGE****Adherence indicators**

- “Desertion at 1 year of corrected age”.
- “Optometry and audiology at 1 year of corrected age”.
- “Neurological and psychomotor development at 1 year of corrected age”.
- “Complete vaccination schedule after 1 year of corrected age”.

2. Outcome indicators

- **“Breastfeeding during the first year of corrected age”**: Number of patients receiving breast milk at 3 and 6 months of corrected age vs. the number of patients who completed these program cut points.

A: greater than or equal to 80% at 3 months of corrected age and greater than or equal to 50% up to 6 months of corrected age

H: greater than or equal to 50% at 3 months of corrected age.

These figures were calculated with a sample where more than 50% of the women returned to the job force at 3 months of corrected age of their baby.

- **“Re-hospitalization at 1 year of corrected age”**: Number of patients who, at the end of phase II, were re-hospitalized at least once during the second phase of the program vs. the number of infants who completed phase II of the program.

A: less than or equal to 20%.

H: less than or equal to 25%.

- **“Mortality at 1 year of corrected age”**: Number of patients who die during phase II vs. the number of infants who enter the KMP in phase II.

A: less than or equal to 2%.

H: less than or equal to 4%.

REQUIREMENT

- **“Growth in weight, size and cephalic perimeter at 1 year of corrected age”**:

- Patients must be classified according to Lubchenco (preterm adequate for gestational age, preterm small for gestational age and full-term small for gestational age) using the Fenton curve. All infants below the 10th percentile correspond to small for gestational age.

- Percentage of the total number of patients participating in phase I who reach size, weight and cephalic perimeter (harmonic growth) greater than -2 SD of the WHO curves or 80% of preterm infants adequate for the gestational age or 60% of preterm

infants small for the gestational age or 60% of full-term infants small for the gestational age

These figures were calculated from a cohort of more of 20,000 kangaroo infants followed up to 40 weeks of gestational age.

- **“Compliance with the anthropometric measurements at 1 year of corrected age”**: Measurements of weight, size and cephalic perimeter located in the curves of growth of an infant who attends follow-up consultation in a KMP.

A and H: 100% of the infants attending follow-up consultation in a KMP must have their weight gain, size and cephalic perimeter located in a curve of increase measured, with the exception of infants who for specific reasons it is not possible (e.g., postoperative conditions, among others).

REQUIREMENT

AMBULATORY KMP QUALITY INDICATORS UP TO 1 YEAR OF CORRECTED AGE

Outcome indicators

- “Breastfeeding at 1 year of corrected age”.
- “Re-hospitalization at 1 year of corrected age”.
- “Mortality at 1 year of corrected age”.
- “Growth in weight, size and cephalic perimeter at 1 year of corrected age”.
- “Compliance with anthropometric measurements at 1 year of corrected age”.

E. AMBULATORY KMP QUALITY INDICATORS UP TO 2 YEARS OF CORRECTED AGE

The following indicators are proposed for monitoring kangaroo infants up to 2 years of corrected age. These will require a validation process.

1. Adherence indicators

- Desertion at 2 years of corrected age.
- Neurological and psychomotor development at 2 years of corrected age
- Complete vaccination scheme at 2 years of corrected age.

2. Outcome indicators

- Rehospitalization at 2 years corrected age.
- Mortality at 2 years corrected age.
- Age of independent walking.

ANNEX B

THE ROLE OF THE PSYCHOLOGIST IN THE KANGAROO MOTHER PROGRAM

The preterm birth of a baby and the ensuing hospitalization in a newborn unit is an unexpected and stressful event for which parents are not prepared physically or psychologically. It causes a real psychological crisis (not pathological) which can lead to a great deal of anxiety, guilt, impotence, concern, and makes the parents unable to respond appropriately to the situation or their infant.

A baby born prematurely is immature, barely communicative and responsive, and needs a lot of technical and human support. These babies are often separated from their parents and family, and are stimulated inadequately. They are considered high risk babies and can present problems or dysfunctions in their psychomotor, behavioral, cognitive or socio-affective development in the short and long-term.

In the Kangaroo Mother Program, baby and family have a trained and empathetic multidisciplinary team awaiting them, willing to help them reunite, overcome the crisis, recover their well-being and confidence, and attain an adequate development for the infant.

One of the team members of the Kangaroo Mother Program is the psychologist whose functions include:

1. Following up on the psychomotor, cognitive and socio-affective development of the preterm and/or low birth weight baby during the first and second year of corrected age. The psychologist intervenes in the event of detecting a dysfunction or risk in the family.
2. Guiding and educating families to create a family environment that is optimal for the development of

the preterm baby and providing parenting guidelines that adapt to the baby's health situation.

3. Facilitate and rebuild affective ties between the mother and baby that were interrupted by the preterm birth and subsequent separation by the hospitalization in the newborn unit.

4. Provide physical and emotional support to the mother and family to help them overcome the crisis caused by the preterm birth of the baby while stimulating the processes of normalization, guilt elimination, empowerment and redefinition of parent roles.

5. Encourage the creation in the Kangaroo Mother Program of an open, supportive, empathetic environment where the mother and family can feel

safe and confident, stimulating adherence to the KMP and adaptation to the maternal and paternal role.

6. Stimulate the processes of shared responsibility and care between the health personnel of the KMP and the kangaroo family.

7. Encourage and promote teamwork in the KMP by supporting breastfeeding, the kangaroo position and follow-ups.

8. Make research hypotheses and/or participate in ongoing research to get to know better the preterm and/or low birth weight baby and the Kangaroo Mother Method.

CRITERIA FOR REFERRAL TO PSYCHOLOGY

| Criterion | Qualification |
|---|---|
| Socio-emotional Criteria | |
| Teen mother. | The mother is between 13 and 19 years of age. |
| Mature woman as a first-time mother. | The mother is 35 or older and it's her first time as a mom. If she has other infants, this criterion does not apply. |
| Mother with a psychiatric or psychological history. | The mother states she has been diagnosed and/or treated for a known pathology (e.g. depression, suicide attempt, eating disorders, etc.) and has received treatment in the past or currently. |
| Mother who is experiencing anticipatory or recent grief which is affecting her relationship with the baby or her adherence to the | Anticipatory grief is when the baby has a serious pathology or has a reserved prognosis of disability |

recommendations of the Kangaroo Mother Program.

or death, and the mother and family are grieving before the death occurs. The grief is recent when death of a loved one such as an infant, parent, spouse, etc. has occurred recently.

Mother with high level of anxiety that persists for several days after admission to the ambulatory Kangaroo Mother Program.

The mother shows several of the following emotions or behaviors: feelings of inability or inferiority, indecisiveness, mood swings throughout the day, insecurity, irritability, difficulties communicating and interacting with others, negative and obsessive thoughts, constant complaining, questioning or demands.

Mothers with failures in their maternal role stemming from attachment failures, open or hidden* rejection of the pregnancy or baby.

*Hidden rejection is understood to be when the mother claims to want or accept her pregnancy but does not adapt proper care behaviors, go to prenatal check-ups, have physical or emotional symptoms without an organic cause identified, cannot feel, imagine her baby during pregnancy etc.

The process of developing trust and competence of the mother to care for, protect and stimulate the baby, while experiencing pleasure and gratification in doing so, *is altered and expected behaviors are not produced.*

Mother is experiencing a family conflict that hinders her attachment, adherence or performance of her maternal role.

The mother expresses, or the health staff observes, behaviors or attitudes which denote problems with her partner, her other infants or with the families of origin which hinder support and create problems of communication and interaction between them and possible violence. Corresponds to a reaction to the crisis of the family members.

Mother with serious health problems.

Such as systemic lupus erythematosus, diabetes mellitus, cerebrovascular accidents, HIV, among others.

Mother who rejects the kangaroo position or breastfeeding after the technical support has been exhausted (ambulatory kangaroo adaptation, childcare, use of final milk, etc.)

Breastfeeding is considered rejected when, despite the nurse seeing the contrary, the mother claims milk doesn't come out; doesn't position the baby appropriately to breastfeed; affirms feeling a lot of pain when breastfeeding; says that the baby doesn't like the breast milk; believes that her milk is not feeding the baby; says she does not want to breastfeed.

| | |
|--|---|
| | <p>The kangaroo position is considered rejected when the mother brings the baby dressed and/or outside the kangaroo position; pulls the baby out of the kangaroo position before the determined time; regardless of the weight, states that the baby doesn't like the position; states that she has no one to help her and pulls out of the position because of it.</p> |
| <p>Mother who is suspected to have postpartum depression <u>with symptoms persisting for more than a week after admission to the ambulatory KMP</u> and it is evident that it is affecting several areas of its operation.</p> | <p>The health staff observes in the mother one or more of the following symptoms: frequent crying, facial expressions of defeat, diminished attitude, poor communication, problems eating, sleeping and interacting, sad expression, guilt, anxiety, loss of interest and energy, can also manifest that she feels unable to take care of herself and her baby.</p> |
| <p>Development Criteria</p> | |
| <p>Being a preterm or low birth weight infant with 6 to 12 months of corrected age.</p> | <p>The health staff identifies the infants that at the moment of attending the medical appointment is 6 or 12 months of corrected age and are not sick.</p> <p>(In the KMP, infants are not allowed to attend control when they have an infectious disease that can alter their mood or performance during the exam, in addition to possibly infecting other patients in the consultation.)</p> |
| <p>Being a preterm or low birth weight infant with 18 to 24 months of corrected age.</p> | <p>The health staff identifies the infants that at the moment of attending the medical appointment is 18 or 24 months of corrected age and they are not sick.</p> <p>(In the KMP, infants are not allowed to attend control when they have an infectious disease that can alter their mood or performance during the exam, in addition to possibly infecting other patients in the consultation.)</p> |

ANNEX C

THE ROLE OF SOCIAL WORK IN A KANGAROO MOTHER PROGRAM

The need for intervention by social work in the Kangaroo Mother Program is justified by the indexes of desertion of mothers and the risks associated in preterm and/or low birth weight babies who don't go to the KMP for ambulatory follow-up.

For this reason, UNICEF in 1987 supported conducting a study on the causes of desertion of the Kangaroo Mother Program in a very disadvantaged socio-economic environment (IMI), which had the participation of two social workers who after a year of follow-up found that the main cause of desertion was the lack of adequate information regarding the importance of continuing with the KMP, lack of support of the father and/or close relatives, and economic instability, among other reasons (Girón & Roldán, 1988).

Since then, the Kangaroo Mother Program has included a social worker in its multidisciplinary team who is responsible for developing strategies to achieve the adherence of parents and family to the KMP, assess the family and their social environment to detect possible risk factors, and promote favorable changes in the handling of these aspects for the successful implementation of the Kangaroo Mother Method (Girón & Moreno, *"Intervención de Trabajo Social en un Programa de Salud en Bogotá, el Programa Madre Canguro"*, 1989).

Social work as a profession seeks to contribute to development and increase social wellbeing and quality of life. It also seeks to boost and promote both individual and collective capacities and resources of users themselves by strengthening organizations, social structures and ways of life that reinforce social wellbeing.

Its goal is the elimination or reduction of inequalities regarding access to health. In this sense, its work must fulfill a series of objectives that are inserted or correlate directly with the general objectives of the health institution of which it is a

part of, focused from the point of view of the social problems and needs.

As part of the service offered in a Kangaroo Mother Program, the objectives of social work are:

1. To identify the physical, social and emotional environment where the preterm or low birth weight baby will live in. This is to detect possible risk factors and seek favorable changes for the wellbeing and healthy development of the baby.
2. To provide special attention that facilitates identifying family or social problems that interfere with the wellbeing of baby and/or mother, follow up the cases of kangaroo babies that do not show an optimal evolution and which medical problems have already been ruled out, propose management strategies so that these conditions do not prevent the proper monitoring of the baby.
3. Monitor the attendance and adherence of babies to the program in order to prevent the interruption of the follow-up of high risk up to the second year of corrected age.
4. Detect the causes of infant desertion from the KMP in order to generate the changes that are necessary in the dynamics of the consultation.
5. Establish an inter-institutional support network to promote specific protection for families with higher risk factors.
6. Help families identify and use the support networks they have in order to ensure the care of the mother and infant.
7. Intervene and support families with conflictive situations created by the change in routines and dynamics demanded by the KMM.

In this sense, it is clear that no follow-up program can be successful if the social, economic and cultural variables that affect at any given moment the efficiency of parents and the family in the application of the KMM are not taken into account.

The environmental risks and the complex problems of each family must be addressed through comprehensive strategies, which let the parents of the infant feel supported despite their difficulties, seeking short and long-term solutions, allowing them to act in an early stage with a preventive perspective.

The social worker may contribute to the health team of the KMM with the reading and the analysis of the socioeconomic variables that may affect the care of the preterm and/or low birth weight infant at home.

Before being released from the hospital, it is necessary to have clear knowledge regarding the parents and the family group of the preterm and/or low birth weight newborn who will undergo ambulatory follow-up. To this end, it is necessary to approach the mother as soon as possible in order to identify her characteristics, living conditions, family group, family support networks and to know if the father is present or not.

This will help identifying high psychosocial risk families in a timely fashion, understanding the physical, biological or environmental factors as risk that may affect the development in an adverse fashion or increase the possibility of a negative evolution of the infant. The risk provides us a measurement of the health care needed. Therefore, identifying it or the probability of future health problems lets us anticipate an adequate and timely care.

The identification of families with a doubtful capacity to exercise the maternal-paternal function,

has the purpose at offering them adequate guidance and assistance. They require additional attention and personalized interventions in order to avoid or diminish the function deficit and to achieve the best performance possible in terms of the upbringing of the infant.

It is worth highlighting that caring for preterm infants demands effort, responsibility and commitment from the mother, the father or the caretakers, and even though KMM is the best option for every infant born prematurely or with low birth weight, an adult is required to care for the baby in the kangaroo position.

The father or a close relative of the mother must be involved from the beginning in order to help her during the process of regaining her confidence, to accompany her and to contribute to the preparation of the home environment, adapting the same for the arrival of the kangaroo baby.

The social worker and the other professionals of the Kangaroo Mother Program are available to support parents with this difficult task. To this end, they use instruments such as the social history, interviews with the mother, father, relatives, and house visits. It is with this last activity that they obtain more accurate knowledge regarding the actual family situation, as well as request their collaboration if necessary, propose changes that will foster the optimum development of the infant, and answer questions they may have in this regard.

General Conditions

Supplies:

- Doctor's office.
- Clinical history.
- Consultation for social work evaluation and follow-up.
- Criteria protocol for referral to social work.
- Specialized human resources (social worker and interdisciplinary).

Composition and Functions of the Team:

The social work area receives patients who have been programmed for consultation, taking into consideration pre-established referral criteria from the following areas:

- Pediatrics.
- Nursing.
- Psychology.

Professional who programs consultation: (Process)

The consultation professional prepares the consultation after establishing the referral criterion for the patient, which is then submitted to the

evaluation request folder. The request must be registered in the appointments card of the KMP.

Patients considered for priority evaluation must be personally commented with the social worker, personally handing over the consultation in order to comment about the patient and give opportunity to define the action immediately.

The folder of referrals to social work is reviewed on a daily basis at the beginning of the day in order to organize the agenda and assess and respond to the same.

Professional who receives the consultation:

After giving a response to the consultation and initiating the intervention, the social worker must archive the copy of the consultation in the clinical history of the patient, as well as the evolution of the work with the patient and the intervention plan that the interdisciplinary team considers that needs to be known to ensure the comprehensive treatment of the infant and/or its parents and family.

It is worth clarifying that the intervention by the social work must begin from the intra-hospital treatment of the patient. Depending on whether the institution has an intra-hospital KMP and an ambulatory one eventually, the social worker may be shared by both services. However, while the patient is hospitalized in the neonatal care unit, the

detection of, and intervention regarding, the social risk is responsibility of the social worker of the health institution. From the moment the infant is

admitted into the KMP, it will continue to be treated by the social work area of the KMP.

Criteria of Referral to Social Work

| Criterion | Definition |
|---|--|
| 1 Physical Abuse | Abuse or mistreatment of minors covers physical and/or emotional abuse, sexual abuse, abandonment or negligent treatment, commercial exploitation or any other type of exploitation that generates potential or actual damages to the health, survival, development or dignity of minors in the context of a relationship of responsibility, trust or power. |
| 2 Psychological or Emotional Abuse | Means the damage intentionally done to the attitudes or skills of an infant. It affects their self-esteem, capacity to relate and feel, deteriorates their personality, socialization and, in general terms, the harmonic development of their emotions and skills. There are different categories of psychological and emotional abuse: <ul style="list-style-type: none"> A. Ignoring the child, which refers to ghost children. Their emotions, anxieties, fears and affective needs are completely imperceptible to their parents or caretakers. B. Rejection from adults with respect to the needs, values and requests of the child. C. Isolation. When a child is deprived from their family and/or community, denying them the human contact they need. D. Terrorism. When the child is exposed to verbal attacks and is threatened with objects. This creates a climate of fear, hostility and anxiety. |
| 3 Abandonment and Negligence | Abandonment occurs when, in the context of the resources that are reasonably available for the family or caretakers, the child is not given what they need for their development in all areas: health, education, emotional development, nutrition, protection and safe living conditions. As a result, the health of the child and their physical, mental, spiritual, moral or social development are damaged or |

at risk. Not supervising children and not protecting them from harm to the extent possible can be included here.

4 Family Violence

This is the action or omission that any member of a family exerts against another member of the family, which produces physical or psychological harm.

| Criterion | Definition |
|---------------------------|---|
| 5 Little Adherence | <p>The definition of adherence has been defined as the context in which the behavior of the person matches the recommendations in terms of health, and includes the capacity of the patient to:</p> <ul style="list-style-type: none"> • Attend the scheduled consultations (doctor’s office/hospital) • Take the medications in the manner they were prescribed • Perform the lifestyle changes recommended • Completing the analyses or tests requested (WHO 2004) <p>This occurs when the parents do not follow the child care indications given by the professionals of the KMP. This behavior endangers the evolution of the infant.</p> |
| 6 Teenage Parents | <p>Teenage parents are understood as those admitted to the hospital between the ages of 13 and 19.</p> <p>An evaluation is performed in order to identify a support network and to establish commitments and accompaniment of an adult during the consultation.</p> <p>NOTE: All the parents who enter the program must be referred to the teenage parents’ workshop.</p> |
| 7 Support Network | <p>Family relationship of the person who lives with the patient, commitment, bond, availability of the caretaker. Economic support. A support network, therefore, is a structure that provides some sort of support from something or someone.</p> |
| 8 House Visit | <p>Attention provided in the household of the individual or the family in order to know the socioeconomic, environmental and cultural reality, to supplement the diagnosis, to stimulate the active participation of the family, to perform a social intervention with the purpose of fostering, protecting and recovering health. (MINISTRY OF HEALTH, 1993).</p> <p>Upon request from the pediatrician, psychologist or social criterion. When it is identified that despite the consultation intervention, a situation of risk persists for the infant.</p> |

ANNEX D

THE ROLE OF PHYSICAL THERAPY IN A KANGAROO MOTHER PROGRAM

Physical therapy is an extremely important part of the interdisciplinary and multidisciplinary team of the Kangaroo Mother Program. The inherent mission of physical therapy is related more to prophylaxis than therapy. It is not enough to determine if the intervention must be performed or not, the patient must be observed and any alteration, asymmetry, movement quality and abnormality signs must be registered. When treating a preterm infant, the task is aimed at contributing with the best levels of integral development to achieve development of a structure that is undergoing a continuous process of maturation and organization.

The physical therapist decides, defines and develops -along with the pediatric team that controls the infant- physical and mechanical techniques and procedures for preterm hospitalized and ambulatory infants with direct and individual care, and applies the treatments required for the integral habilitation and/or recovery of the locomotive system.

Physical therapy has the purpose of detecting and preventing motor impairments and/or learning difficulties, improving the psychomotor development, assimilating the environment, staying calm, maintaining the breathing capacity and strengthening the trust and bond between the preterm infant and the parents and caretakers using the daily activities of stimulation in the incubator and then at home.

Intra-hospital treatment

Objectives with the patient

- Evaluating the neurologic and biologic development of the preterm and/or low birth weight infant and obtain an early diagnosis.
- Achieving and/or improving the cervical control.
- Initiating the control of the scapular and pelvic girdle.
- Normalizing the muscle tone.
- Performing balance and equilibrium work.
- Promoting gross and fine motor skills.
- Stimulating the cognitive area.

- Achieving postural milestones as action platform for specific movements.
- Improving the sensory condition. Stimulating the vision and the hearing as basis for learning that require prior motor coordination: visual and hearing detection.

- Improving the sensory condition. Stimulating the vision and the hearing as basis for learning that require prior motor coordination: visual and hearing detection, progressive programming.
- Achieving the adaptation of the patient to their environment.
- Educating parents with respect to the handling of the hospitalized preterm infant.

The physical therapist must collaborate in the treatment of preterm patients in the intensive care unit and in the basic care unit, especially with respect to the patients that show a history of neurological risk or general intervention.

It is essential to prepare infants for changes of position, containing them same so that their extremities do not remain behind during the movement of the entire body, checking that their head is supported and that it is aligned with their body (if in supine position).

- Position them softly.
- The infants must always feel contained (with the hands of the therapist and/or blankets) during the change of position to the lateral decubitus position.

- Normalizing the muscle tone.
- Performing balance and equilibrium work.
- Stimulating the cognitive area.
- Achieving postural milestones as action platform for specific movements.

- Hold the infants when they are not in that position inside the incubator (or crib), or when they are supported on the forearm of the caretaker, maintaining their head alignment.
- Holding them with your arms or placing them on their side may help reduce the responses of stress, and also prevents complete prone to supine movements or vice versa.
- Maintain a good posture in the nest to favor the ventilation and posture prophylaxis.

The neurologic development evaluation must be based on the interpretation of the following items.

- Adequate evaluation of the gestational age at birth.
- Rigorous knowledge of the perinatal events.
- Evaluation of the passive and active tone.
- Evaluation of the primitive and other reflexes.
- Evaluation of the posture reactions and the balance and psychomotor acquisitions (psychomotor development scales, INFANIB).

The following are the three conditions for the evaluation:

- The infant needs to be awake.

- The infant must have eaten one or two hours before, especially in case of reflux.
- Calm setting.
- Well-lit place.

The physical therapist assesses pathophysiological changes such as the following.

- Functional limitations.
- Bone and soft tissue problems.
- Incorrect posture.
- Development deviations.
- Abnormal patterns of motion.
- Position and alignment of limbs and head to prevent the appearance of muscle-tendon and ligament strains.

This means all the nervous system disturbances that can interfere or interrupt the physiological processes of the central nervous system or the development with one or more pathologies of the same.

During the initial evaluation, it is important to identify what is interfering with the development of the newborn and to establish treatment priorities, since any disturbance will lead to another disturbance and this interferes with the independency of the infant.

The postural treatment will be essential for the future development of various pathologies.

- Soft movements must be made with the infant.
- If possible, evaluate the infant when the mother is present.

Therefore, the use of functional or posture aids will be necessary in some cases.

Newborns often remain in the position we place them, even if it is not comfortable, which may lead to modifications in the extension and elasticity of the muscles or muscle contractions. Due to the fact that their cartilage tissues are undergoing a process of maturation and the bones, muscles and tendons are live and dynamic structures, whenever we hold them with inadequate external forces, they may suffer deformities and have neuromotor development disturbances.

All these disturbances may be prevented by using a balance between the flexion and the extension, which is achieved adopting adequate and individualized positioning of the newborn along with frequent changes of position. The positioning affects the physiological and behavioral parameters.

An adequate positioning facilitates the following aspects of preterm infants.

Flexion

- Maintaining the midline.
- The notion of the body in space.

- The visual and hearing development.
- Prevention of skin injuries and bone deformities.
- Improved digestion.
- Parent-infant interaction.
- Self-regulation capacity.

- When rocking infants, balance them at different speeds in a non-aggressive manner: forward, backwards, move close to and far from you.

- Get the infants accustomed to soft and strong sounds and to different-weight toys.

- Show them objects with strong contrast of colors so that they will follow them with their eyes, play music and let them observe picture books. Toys that move and play sounds are ideal, such as rattles, cot mobiles and balls.

- Massage and bathe them with different-textured items: prepare gloves with sponge fabric (soft, rough, lukewarm and moist), towels or velvet, foam, brushes, among others.

- Stimulation inside and outside the mouth, since the mouth, as a significant regulatory center, is a key player, not only because the baby feeds using it, but also because the maturity of the oral area is much more developed than other areas that in a few months will replace it as sources of touch discrimination.

- Superficial massage as sensory, thermal and proprioceptive stimulus. Passive assisted or free movements of the ankles, hands and elbows mainly, as well as isometric contractions

- Stress prevention.

The head is where the problems that will be transferred to the rest of the body begin. Therefore, we must create functions with body movement purposes. Motor learning is the most important part.

of large muscles such as quadriceps, when appropriate.

Handling of outpatients

After the patient is released from the hospital and the pediatrician considers it appropriate to begin their ambulatory treatment, the physical therapist must begin their work by preparing the ambulatory clinical history, the physical therapist must begin the physical therapy clinical therapist including the following variables.

Anamnesis with:

Personal, family history and parent expectation; demand; pathology timeline; risk factors, protection factors related to the coverage of a health insurance, the availability of parents or family network.

Physical therapy evaluation with:

- Observation of the muscle tone, reflexes and strengthening reactions.
- Posture.
- Flexibility.
- Gross motor skills.
- Equilibrium and balance.
- Coordination.

- Diagnosis.
- Physiotherapy prognosis.
- Treatment.

The treatment begins with massages and progressive exercises, as indicated below.

1. Perform massages with canola or gourmet oil and with elements with different textures such as gloves with sponge fabric, towels, stuffed animal stuffing, foam and brushes, among others. The massages may be performed first on one side and then on the other in a symmetrical manner, focusing on the bottom of the foot so that the baby will obtain more organized information. These shall be done in an upward motion favoring the venous return and in an outward fashion with good posture.
2. It is important to expose the baby to temperatures with soft changes; lukewarm water, cold water and different color gel.
3. Stimulate the hearing perception using sounds with different tones, reading infants stories, songs, beats and taste stimulation according to the age and the food authorized for the baby.
4. Place the infant in prone position and seek the lineal visual fixation and tracking of images with different shapes, sizes and colors in horizontal, vertical and diagonal directions, and also achieving head control.
5. For the sense of smell, it is convenient to make it perceive the aroma of natural fruits.
6. Apply the techniques of Kabat, Bobath, Doman and Vojta according to the specific needs of the patient in terms of the muscle tone, the stage of development and the health conditions.
7. Use the roll, ball, hammock, swing, hand-over-hand bars, inclined plane and other tools to stimulate the vestibular system, weight transfers and rotational motions of the core and the body.
8. Perform visual-motor coordination, cognitive stimulation and help the patient achieve the maximum functional capacity possible.
9. Stimulate movement according to the stage of psychomotor development of the preterm infant and create motor engrams of motion adequate for their age.
10. Enable the physical condition by building the motor activity and the normal control of posture.
If the infants has a good foundation of sensory integration, they will be able to develop new and more complex skills, such as fine motor skills, and then academic skills such as drawing, reading and writing.

GUIDE FOR THE DETECTION OF RETINOPATHY OF PREMATURE (ROP)

Introduction

Retinopathy of Prematurity (ROP) is the main cause of childhood blindness in Latin America. Retinopathy of Prematurity is a retina disorder in preterm and low birth weight infants characterized by the proliferation of the vascular tissue that grows in the limit between the vascular and avascular retina, which potentially can cause blindness. With the advancement of technology and the availability of the use of oxygen, the survival of preterm infants has increased which has affected an increase in cases of retinopathy. Even though a huge percentage of the cases are spontaneously solved, in some cases they progress to the point of noticeable loss of vision or even total blindness (1).

The serious consequences can be prevented almost entirely with a timely treatment based on laser surgery or cryotherapy. To obtain this diagnosis, it is necessary to perform a screening on all the preterm infants at risk seen in the neonatal intensive care unit (NICU) in which the participation of ophthalmologists trained in evaluating newborns, neonatologists, pediatricians, general physicians, physical therapists, nurses and administrators is required, who detect this risk in a conscious and committed manner with respect to the preterm newborn. It

is possible to prevent a damage that in the long-term creates high economic, social and family repercussions using a well done examination. Therefore, it is essential to detect and treat retinopathy at an early stage within two to three days after its diagnosis, in accordance with the national and international protocols.

The main cause of ROP is the indiscriminate use of oxygen in a specific situation, this being prematurity and low birth weight. However, there are other associated factors that have been reported in the literature such as the use and duration of respiratory support, anemia, blood transfusions, sepsis and shock, among others. (2) The screening consists in examining the retina using indirect ophthalmoscopy performed by an ophthalmologist with proven training and experience.

The problem has been controlled in developed countries by means of a limited and controlled use of oxygen and early diagnosis programs and timely interventions directly intended for extremely preterm newborns under 1,500 grams or with less than 32 weeks of gestational age. (3) Newborns with a higher gestational age and weight are only examined if there are risk factors. However, the information from low and middle

income countries suggest that our newborns have characteristics of the newborns in the 'first epidemic'³ who developed ROP.

This implies that older and more mature newborns will need to be included in the screening program. The screening criterion in these developed countries does not apply in countries where the resources for neonatal care are scarce.

It has been estimated that the incidence of ROP in a population of preterm infants under 1,500 grams and/or under 30 weeks of gestation in developed countries ranges between 16% and 56%, depending on the neonatal care. The frequency of ROP in developing countries has been reported between 21.7% and 71.2%. Few studies have evaluated the frequency of ROP in infants born weighing more than 1,500 grams, which has been reported between 1.3 and 19%.

It is clear that in a country such as Colombia where the survival probability of more immature newborns has increased, a screening process is necessary to detect ROP at an early stage and to provide timely intervention with respect to all preterm babies under 2,000 grams and with less than 33 weeks of gestational age.

³ The first large epidemic of children born blind occurred between 1948 and 1952, and was related for the first time with oxygen, which led to a strict control of the same, restricting its use in Neonatal Intensive Care Units in the U.S.

Definition

Retinopathy of prematurity has been defined as a proliferative disease of the blood vessels of the retina, where there is a suspension in the normal development of the eye and growth of the atypical blood vessels that essentially affects preterm newborns (born before reaching 37 weeks of gestation). (1)

This disease is often presented in two phases (which will indicate certain degree). The first stage is the acute phase in which the normal vasculogenesis is interrupted and a retinal response to an injury can be observed. The second is a phase of delayed or chronic proliferation of membranes to the vitreous in which tractional retina detachments, ectopy and scarring of the macula occur, which leads to a considerable loss of vision, and may result in a total loss of vision. (1)

Risk Factors

The association between ROP and the excessive supplementation of oxygen was identified soon after the initial description of the disease in the 1940's. (4) This led to the creation of new and improved protocols in terms of the control of oxygen supplementation to maintain adequate levels of oxygen in the blood. Even with strict monitoring of the levels of oxygen, the incidence of ROP has increased due to an increase in the

survival rate of preterm newborns with extreme low birth weight. Even though the exposure to oxygen supplementation and the gestational age and weight at birth are the main risk factors of ROP, other factors that reflect changes in the postnatal condition of the newborn, such as sepsis, anemia and the respiratory distress syndrome have been linked to the development of ROP. (5)

Postnatal weight gain, followed by the levels of insulin-like growth factor (IGF-1) and hyperglycemia (6), have recently been identified as significant predictors for the risk of developing ROP.

Other risk factors associated to the development of retinopathy are the constant exposure to ambient light, candidemia, transfusions, shock and hypoperfusion, acidosis, use of postnatal steroids, patent ductus, vitamin E deficiency, use of indomethacin, respiratory support. However, none of these have demonstrated a direct causal relationship. (1)

| References | Identified Risk Factor |
|--|---|
| Terry TL. Retrolental Fibroplasia in the Preterm Infant: V. Further Studies on Fibroplastic Overgrowth of the Persistent Tunica Vasculosa Lentis. <i>Trans Am Ophthalmol Soc.</i> 1944; 42:383–396. Campbell K. Intensive oxygen therapy as a possible cause of retrolental fibroplasias; a clinical approach. <i>Med J Aust.</i> 1951; 2(2):48–50. | Use of Supplementary Oxygen |
| Smith LE. Pathogenesis of retinopathy of prematurity. <i>Semin Neonatol.</i> 2003; 8(6):469–473. Tasman W, Patz A, McNamara JA, Kaiser RS, Trese MT, Smith BT. Retinopathy of prematurity: the life of a lifetime disease. <i>Am J Ophthalmol.</i> 2006; 141(1):167–174. Lutty GA, Chan-Ling T, Phelps DL, et al. Proceedings of the Third International Symposium on Retinopathy of Prematurity: an update on ROP from the lab to the nursery (November 2003, Anaheim, California). <i>Mol Vis.</i> 2006; 12:532–580. | Gestational Age Birth Weight |
| Chen Y, Li XX, Yin H, Gilbert C, Liang JH, Jiang YR, et al. Risk factors for retinopathy of prematurity in six neonatal intensive care units in Beijing, China (Retraction in: <i>British Journal of Ophthalmology</i> (2008) 92:8 (1159)). <i>British Journal of Ophthalmology.</i> 2008;92(3):326-30. Chen J, Stahl A, Hellstrom A, Smith LE. Current update on retinopathy of prematurity: screening and treatment. <i>Current opinion in pediatrics.</i> 2011;23(2):173-8. | Sepsis Anemia Chronic Lung Disease |
| Lofqvist C, Engstrom E, Sigurdsson J, et al. Postnatal head growth deficit among preterm infants parallels retinopathy of prematurity and insulin-like growth factor-1 deficit. <i>Pediatrics.</i> 2006; 117(6):1930–1938. Hellstrom A, Engstrom E, Hard AL, et al. Postnatal serum insulin-like growth factor I deficiency is associated with retinopathy of prematurity and other complications of preterm birth. <i>Pediatrics.</i> 2003; 112(5):1016–1020. | Postnatal Weight Gain Insulin-Like Growth Factor |

| References | Identified Risk Factor |
|---|---------------------------------------|
| Holmstrom G, Thomassen P, Broberger U. Maternal risk factors for retinopathy of prematurity—a population-based study. <i>Acta Obstet Gynecol Scand.</i> 1996; 75(7):628–635. | Chorioamnionitis (Maternal Infection) |
| Garg R, Agthe AG, Donohue PK, Lehmann CU. Hyperglycemia and retinopathy of prematurity in very low birth weight infants. <i>J Perinatol.</i> 2003; 23(3):186–194. Ertl T, Gyarmati J, Gaal V, Szabo I. Relationship between hyperglycemia and retinopathy of prematurity in very low birth weight infants. <i>Biol Neonate.</i> 2006; 89(1):56–59. | Hyperglycemia |
| Chen Y, Li XX, Yin H, Gilbert C, Liang JH, Jiang YR, et al. Risk factors for retinopathy of prematurity in six neonatal intensive care units in Beijing, China (Retraction in: <i>British Journal of Ophthalmology</i> (2008) 92:8 (1159)). <i>British Journal of Ophthalmology.</i> 2008;92(3):326-30. Romagnoli C. Risk factors and growth factors in ROP. <i>Early Hum Dev.</i> 2009Oct; 85(10 Suppl): S79-82. Epub 2009 Oct 14. PubMed PMID: 19828269. | Blood Transfusion |

Classification

The presence of ROP is evaluated in preterm newborns in a standard manner by a trained ophthalmologist using indirect ophthalmoscopy and the international retinopathy of prematurity classification system. (13) This method provides information in terms of the severity of the disease (stages 1 to 5), the location (zones I to III), the extension (clock hours) and the presence or absence of plus disease. Plus, disease is a descriptive term that refers to the dilation and tortuosity of the blood vessels in the retina (in the posterior pole of the eyeball) that may accompany any stage of retinopathy. (5) It corresponds to a sign of severity and rapid progression of the disease and is an indication for urgent or priority treatment.

Stage 1 is the slightest form of ROP and stage 5 refers to its most severe form which corresponds to

the total detachment of the retina. The location of the ROP is a line where the non-vascularized zone of the retina meets the vascularized zone of the same. For classification purposes, the retina is divided into three concentric regions. Zone I extends in a circular manner around the optic disk, with a radius of two times the distance between the optic disc and the center of the macula. The maturation in this zone is extremely important for the development of visual acuity. Zone II continues from the edge of zone I to the center of the retina in their temporal side and to the ora serrate in their nasal side. Zone III extends from the peripheral area of zone II temporal to the ora serrate in the shape of a half moon and corresponds to the remaining crescent space. The abnormal proportion of growth of the blood vessels is described in clock hours, where each hour is equal to 30 degrees. (5)

INTERNATIONAL CLASSIFICATION OF RETINOPATHY OF PREMATUREITY

STAGES

Stage 1. Demarcation line: A fine white line that separates the vascular retina from the avascular retina.

Stage 2. Crescent lifted to the vitreous (ridge): the demarcation line that appears in stage 1 increases in volume and extends outside the plane of the retina.

Stage 3. There is a growth of the vascular tissue towards the vitreous space.

Stage 4. Subtotal retinal detachment. Subdivided in 4A if the macula is applied and 4B if the macula is detached.

Stage 5. Total retinal detachment. Plus, Disease is a descriptive term that refers to the dilation and tortuosity of the vessels of the posterior pole and indicates that there is disease activity and severity. It can accompany any stage of retinopathy.

Sub threshold Retinopathy gathers the following three combinations:

Zone I Stage 1 and 3 without plus disease

Zone II, stage 3 without plus disease

Threshold Retinopathy refers to the existence of continuous 5 clock hours or 8 cumulative ones with stage 3 "plus" in Zone I or II.

LOCATION

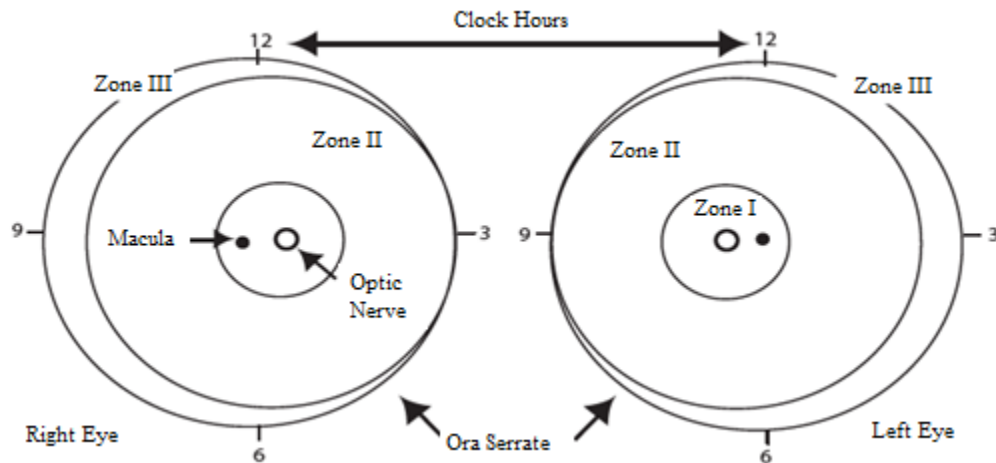
Zone I. Circle with a radius of 2 times the distance between the papilla and the fovea.

Zone II. Comprises a retina belt from the limit of Zone I to the nasal ora serrate in the horizontal meridian and approximately to the equator of the temporal side.

Zone III. The remaining crescent space outside zone II.

EXTENSION

The extension of the retinopathy is described in clock hours



The classification of ROP can then be summarized in two types that belong to sub threshold retinopathy.

TYPE 1 ROP: Requires immediate treatment and has the worst diagnosis.

Zone I with plus disease or stage 3 of ROP.

Zone II with plus disease and stage 2 or 3 of ROP.

TYPE 2 ROP: Requires close observation and is treated only if it evolves to type 1 disease or to threshold retinopathy.

Zone I without plus disease, stage 1 or 2 of ROP.

Zone II without plus disease, stage 3 of ROP.

The classification occurs according to the location and the degree of scarring that occurred in the retina; the degree of retina involvement derives the follow-up conduct with the possibility of self-limitation of the pathology or progression of the same with the need of laser treatment or cryotherapy.

Since this is a preventable disease that can cause a severe level of disability, it is important to define

what newborns and in what period of their postnatal life must they undergo screening to detect ROP in an early stage.

Severity Criteria

The diagnosis of ROP in zone I requires early surgical treatment since once it reaches the threshold, the spontaneous regression is low and approximately 95% of the cases evolve naturally towards retinal detachment. (1)

Treatment

Despite the high number of preterm underweight newborns diagnosed with ROP, less than 6% require treatment. (14)

The main treatment modality for ROP is surgery. There are two types of surgery; cryotherapy and laser photocoagulation. Both procedures seek the ablation of the non-vascularized portion of the retina in order to stop the production and secretion of VGF and other growth factors that promote the progression of ROP. (8) Once the newborn has been diagnosed with threshold retinopathy, the goal of

the treatment is preventing the detachment of the retina and promoting the best visual outcome possible. However, there are complications associated to the surgical procedure, such as the loss of certain level of peripheral vision. (3)

Complications

The most common consequences in newborns diagnosed with ROP include myopia, astigmatism, nystagmus, glaucoma, cataracts, anisometropia and retinal detachment. (8) The unfavorable outcomes are grouped in two categories: structural and functional problems. Cryotherapy reduced the number of structural problems by 40% and of functional problems by 30%. (15) The CRYO-ROP study followed newborns with ROP for 15 years and demonstrated that the retinal detachment continued occurring for newborns who underwent treatment as well as for those who did not undergo treatment. Due to this, the study focuses on the need for strict monitoring until adolescence. (16)

ROP in Colombia

The proportion of blind children or children with severe visual limitations with a history of ROP ranges between 4.1% and 38.6% in Latin America. This same source quotes the evaluation of 94 blind children in Colombia in 1997, from which 10.6% had a history or evidence of ROP. (17)

A more recent report by the same author estimates that the percentage of ROP in the blind population of the country is 23.9%, (18) while a national study done in Cali reports an estimate of 33.8%. (19)

Recommendations

In 2012, the Ministry of Health and Social Protection published the Clinical Practice Guide for the care of preterm newborns, which included recommendations on the identification and diagnosis of ROP. The recommendation is based on a general report of ROP incidence from the database of the Integral Kangaroo Mother Program.

In 2013, the Ministry of Health and Social Protection included in Resolution 1441, which regulates the operation authorization criteria for clinics and hospitals in the entire national territory, the Implementation of processes for the handling of retinopathy of prematurity and the referral protocol of the preterm infant to monitoring in the kangaroo plan.

The database of the Integral Kangaroo Mother Program of the Kangaroo Foundation has valid and accurate information in order to estimate the incidence in Bogotá between 2001 and 2011.

The analysis of the data from the Integral Kangaroo Mother Program confirms the findings reported in some low and middle income countries. There is a significant risk for ROP in preterm infants born after week 32 in Bogotá. The incidence of ROP of any level ranges between 1.7% (above week 37) and 3.2% (weeks 33 and 34) and the incidence of ROP that threatens vision and requires urgent intervention (photocoagulation or cryocoagulation) is approximately 0.5% from week 33 of gestational age. In fact, 4 out of the 9 preterm babies that have presented a loss of vision or serious visual consequences in 10 years were born between weeks 33 and 36 gestational age. See Table 1.

Table 1. Integral Kangaroo Mother Program Incidence of ROP according to Gestational Age at Birth. Bogotá, 2001 – 2017

| Gestational Age at Birth | No ROP | Regressive ROP | Eye surgery (laser or cryotherapy) | ROP Serious consequences – blindness | Total infants screened or diagnosed |
|--------------------------|----------------|----------------|------------------------------------|--------------------------------------|-------------------------------------|
| < 31 weeks | 1,970 (77.4%) | 396 (15.6%) | 171 (6.7%) | 9 (0.4%) | 2,546 (100.0%) |
| 31-32 weeks | 2,689 (93.0%) | 155 (5.4%) | 46 (1.6%) | 2 (0.1%) | 2,892 (100.0%) |
| 33-34 weeks | 6,076 (97.6%) | 127 (2.0%) | 18 (0.3%) | 5 (0.1%) | 6,226 (100.0%) |
| 35-36 weeks | 8,321 (99.9%) | 70 (0.8%) | 8 (0.1%) | 4 (0.0%) | 8,403 (100.0%) |
| 37 weeks and above | 4,081 (99.3%) | 22 (0.5%) | 6 (0.1%) | 1 (0.0%) | 4,110 (100.0%) |
| Total | 2,3137 (95.7%) | 770 (3.2%) | 249 (1.0%) | 21 (0.1%) | 24,117 (100.0%) |

Data monitoring KMP 2001-2017. Copyright Kangaroo Foundation

16.1.1.1 Clinical Practice Guide Recommendation in Colombia:

Screening all preterm infants with less than 33 weeks of gestational age at birth.

Regarding preterm babies with gestational ages at birth ranging between 33 and 36 weeks, screen every infant who has a risk factor other than the gestational age. Since some of the risk factors could not have been properly documented in the clinical history. In case of doubt, request ROP screening.

Strong recommendation in favor of intervention.

Level of evidence: high (+)(+)(+)(+)

Screening consists in an evaluation of the retina with indirect ophthalmoscopy performed by an ophthalmologist with demonstrated training and experience. The screening must be done at least 4 weeks after birth and after week 32 of gestation age in case of ambulatory patients.

Strong recommendation in favor of intervention.

Level of evidence: high (+)(+)(+)(+)

The use of local anesthesia in drops is recommended in order to reduce the pain during the ophthalmologic examination for retinopathy of prematurity if a blepharostat is to be used.

Strong recommendation in favor of intervention.

Level of evidence: high (+)(+)(+)(+)

Recommendation of the societies:

By consensus of experts of the Society of Colombian Ophthalmology (SCO) and the Association of Colombian Neonatology (ASCON), it is recommended to examine all the patients with:

1. Birth weight lower than or equal to 2,000 grams
2. Birth weight between 200 – 2,500 grams with risk factors
 - a. Respiratory support

- b. Oxygen therapy, infection
- c. Intracranial hemorrhage
- d. Periventricular leukomalacia, and
- e. Hypoxia

3. Weight > 2,500 grams as decided by the neonatologist and according to the associated risk factors.

When should the ophthalmological evaluation be done?

The first examination must be done on the fourth week of life for those under (<) 27 weeks.

For those over (>) 28 weeks, when they complete 31 weeks of birth (or chronological age), and always before being discharged from the NU (unless they have an appointment scheduled with an Ambulatory Kangaroo Mother Program).

| Gestational Age (Weeks) | Age of First Evaluation: Chronological Age (weeks) | Age of First Evaluation: Corrected Age (weeks) |
|----------------------------|---|---|
| 32 | 4 | 36 |
| 31 | 4 | 35 |
| 30 | 4 | 34 |
| 29 | 4 | 33 |
| 28 | 4 | 32 |
| <27 | 4 | 31 |

Recommendation of the Technical Guidelines for the Implementation of Kangaroo Mother Programs in Colombia.

| Exam | Age of the Infant | Comments |
|--|---|---|
| Retina evaluation using indirect ophthalmoscopy. | 28 days of life or 31 to 32 weeks of gestational age. | Performed on every infant < 33 weeks and/or ≤ 2,000 grams. For infants between 33 and 36 weeks and 2,000 and 2,500 grams according to the risk factors*, defined by the treating physician. Infants > 2,500 grams, at the discretion of the treating physician. |

* Risk factors:

- Respiratory support
- Oxygen therapy
- Chorioamnionitis
- Intracranial hemorrhage
- Periventricular leukomalacia
- Hydrocephaly
- Any neonatal resuscitation maneuver
- Since some risk factors could not have been properly documented in the clinical history. In case of doubt, request ROP screening

The coordination of the screening is the responsibility of the head nurse of the Kangaroo Mother Program (or the person in charge of the NICU) and the pediatric ophthalmologist or retinal specialist of the institution.

One specific day per week must be established to assess all the newborns with risk for ROP who entered in that week into the ambulatory Kangaroo Mother Program, and they must be scheduled at least 2 hours before the visit of the pediatric ophthalmologist or retinal specialist.

Newborns detected with ROP under medical supervision by the pediatric ophthalmologist and retinal expert must also be scheduled every 4, 8 or 15 days, as medically required.

The collective consultation of the Kangaroo Mother Program allows the pediatric ophthalmologist and retinal expert to assist all the newborns that require so in an established period of time.

The structural requirements and supplies are listed below:

- Adequate timely referral system.
- Access to a trained ophthalmologist.
- Indirect ophthalmoscopy equipment.
 - 28 or 30 diopters lenses.
- Pupil dilation drops: Tropicamide 1% and Phenylephrine 2.5%.
- Registration stationery.
- Medical Records (ROP) of the Prevention Program in the Kangaroo Mother Program.

Procedure

- It is important to take the clinical picture into consideration during the evaluation of the newborn, as well as establishing an integral evaluation and reporting the findings of the physical exam, highlighting risk factors and criteria that may lead to suspect ROP.
- The head nurse of the Kangaroo Mother Program will prepare the medical records of the patients that will be examined and will register in the medical records the full name of the patient, medical record number, telephone number, address, name of parents, date of follow-up appointments, gestational age, weight and level of ROP.
- The pupil dilation will be performed by the head nurse of the Kangaroo Mother Program.
- The medications will be provided by the institution.
- The medications and dosage employed are: 1 drop of Tropicamide 1% plus Phenylephrine 2.5%.
- The drops must be applied half an hour before the exam in both eyes and then they will be reapplied 10 minutes later. (Maximum three administrations.)
- The use of blepharostat is avoided since it may be painful for the newborn.
- All the forms of evaluation, control, parent authorization and surgical procedures must be completed, signed and sealed.
- After defining the need for cryotherapy or laser surgery, the administrative area will

participate in order to speed up the authorization before the respective health insurance, health risk administrators, or health service. Send a FAX as Vital Urgency.

This procedure must be done within a maximum period of 48 hours.

Follow-ups

- The follow-ups will be performed until reaching retinal maturation if the retina is not mature, or until the ophthalmologist releases the patient in case of ROP of any level in regressive state, and these follow-up appointments will be registered in the database of the follow-up program.
- The parents must always be informed regarding the dates assigned for the ophthalmological follow-up appointments.
- The information provided must always be registered in the medical record in writing and be signed by the parents.

References:

1. Yin H, Li XX, Li HL, Zhang W. [Incidence and risk factor analysis of retinopathy of prematurity]. [Zhonghua yan ke za zhi] Chinese journal of ophthalmology. 2005;41(4):295-9. Epub 2005/06/01.
2. Askin DF, Diehl-Jones W. Retinopathy of prematurity. Critical care nursing clinics of North America. 2009;21(2):213-33. Epub 2009/05/23.
3. Chen Y, Li XX, Yin H, Gilbert C, Liang JH, Jiang YR, et al. Risk factors for retinopathy of prematurity in six neonatal intensive care units in Beijing, China (Retraction in: British Journal

- of Ophthalmology (2008) 92:8 (1159)). British Journal of Ophthalmology. 2008;92(3):326-30.
4. Terry TL. Retrolental Fibroplasia in the Preterm Infant: V. Further Studies on Fibroplastic Overgrowth of the Persistent Tunica Vasculosa Lentis. Transactions of the American Ophthalmological Society. 1944;42:383-96. Epub 1944/01/01.
 5. Chen J, Stahl A, Hellstrom A, Smith LE. Current update on retinopathy of prematurity: screening and treatment. Current opinion in pediatrics. 2011;23(2):173-8. Epub 2010/12/15.
 6. Ertl T, Gyarmati J, Gaal V, Szabo I. Relationship between hyperglycemia and retinopathy of prematurity in very low birth weight infants. Biology of the neonate. 2006;89(1):56-9. Epub 2005/09/13.
 7. Shastry BS. Genetic susceptibility to advanced retinopathy of prematurity (ROP). Journal of biomedical science. 2010;17:69. Epub 2010/08/27.
 8. Harrell SN, Brandon DH. Retinopathy of prematurity: the disease process, classifications, screening, treatment, and outcomes. Neonatal network : NN. 2007;26(6):371-8.
 9. Shih SC, Ju M, Liu N, Smith LE. Selective stimulation of VEGFR-1 prevents oxygen-induced retinal vascular degeneration in retinopathy of prematurity. The Journal of clinical investigation. 2003;112(1):50-7. Epub 2003/07/04.
 10. Smith LE. Pathogenesis of retinopathy of prematurity. Seminars in neonatology : SN. 2003;8(6):469-73. Epub 2004/03/06.
 11. Hellstrom A, Perruzzi C, Ju M, Engstrom E, Hard AL, Liu JL, et al. Low IGF-I suppresses VEGF signaling in retinal endothelial cells: direct correlation with clinical retinopathy of prematurity. Proceedings of the National Academy of Sciences of the United States of America. 2001;98(10):5804-8. Epub 2001/05/02.
 12. Hellstrom A, Engstrom E, Hard AL, Albertsson-Wikland K, Carlsson B, Niklasson A, et al. Postnatal serum insulin-like growth factor I deficiency is associated with retinopathy of prematurity and other complications of preterm birth. Pediatrics. 2003;112(5):1016-20. Epub 2003/11/05.
 13. Rush R, Rush S, Ighani F, Anderson B, Irwin M, Naqvi M. The effects of comfort care on the pain response in preterm infants undergoing screening for retinopathy of prematurity. Retina (Philadelphia, Pa). 2005;25(1):59-62. Epub 2005/01/19.
 14. Palmer EA. Implications of the natural course of retinopathy of prematurity. Pediatrics. 2003;111(4 Pt 1):885-6. Epub 2003/04/03.
 15. DeJonge MH, Ferrone PJ, Trese MT. Diode laser ablation for threshold retinopathy of prematurity: short-full-term structural outcome. Arch Ophthalmol. 2000;118(3):365-7. Epub 2000/03/18.
 16. Palmer EA, Hardy RJ, Dobson V, Phelps DL, Quinn GE, Summers CG, et al. 15-year outcomes following threshold retinopathy of prematurity:

final results from the multicenter trial of cryotherapy for retinopathy of prematurity.

Arch Ophthalmol. 2005;123(3):311-8. Epub 2005/03/16.

17. Gilbert C, Rahi J, Eckstein M, O'Sullivan J, Foster A. Retinopathy of prematurity in middle-income countries. Lancet. 1997;350(9070):12-4. Epub 1997/07/05.

18. Gilbert C, Fielder A, Gordillo L, Quinn G, Semiglia R, Visintin P, et al. Characteristics of infants with severe retinopathy of prematurity in countries with low, moderate, and high levels of development: implications for screening programs. Pediatrics. 2005/5;115(5):e518-e25.

19. Zuluaga C. Causas de ceguera infantil en Cali, Colombia. Colombia Médica. 2005;36(4).

20. Gilbert C, Rahi J, Eckstein M, O'Sullivan J, Foster A. Retinopathy of prematurity in middle-income countries. Lancet. 1997/7/5;350(9070):12-4.

21. Aggarwal R, Deorari AK, Azad RV, Kumar H, Talwar

D, Sethi A, et al. Changing profile of retinopathy of prematurity. Journal of tropical pediatrics. 2002;48(4):239-42. Epub 2002/08/31.

22. Yang CS, Chen SJ, Lee FL, Hsu WM, Liu JH.

Retinopathy of prematurity: screening, incidence and risk factors analysis. Zhonghua yi

xue za zhi = Chinese medical journal; Free China ed. 2001;64(12):706-12. Epub 2002/04/02.

23. Eckert GU, Fortes Filho JB, Maia M, Procianny RS.

A predictive score for retinopathy of prematurity in very low birth weight preterm infants. Eye (London, England). 2012;26(3):400-6. Epub 2011/12/24.

24. Wu C, Vanderveen DK, Hellstrom A, Lofqvist C, Smith LE. Longitudinal postnatal weight measurements for the prediction of retinopathy of prematurity. Archives of ophthalmology. 2010;128(4):443-7. Epub 2010/04/14.

25. Zepeda-Romero LC, Hard AL, Gomez-Ruiz LM, Gutierrez-Padilla JA, Angulo-Castellanos E, Barrera-de-Leon JC, et al. Prediction of retinopathy of prematurity using the screening algorithm WINROP in a Mexican population of preterm infants. Archives of ophthalmology. 2012;130(6):720-3. Epub 2012/07/18.

26. Binenbaum G, Ying GS, Quinn GE, Dreiseitl S, Karp K, Roberts RS, et al. A clinical prediction model to stratify retinopathy of prematurity risk using postnatal weight gain. Pediatrics. 2011;127(3):e607-14. Epub 2011/02/16.

ANNEX F

INFORMATION ON THE KANGAROO CARD AND CLINICAL HISTORY

INFORMATION OF THE HEALTH CARD FOR THE KANGAROO MOTHER PROGRAM (KMP, IN SPANISH)

Below we present the minimum information that must be included in the health card of the KMP. The purposes of this information are:

- Information regarding the health condition of the infant and the medical interventions it has received may be requested at any time.
- The health institution must maintain the information necessary to create and perform follow-up on the management and quality indicators.

The cards can be differentiated in physical terms, e.g., one color for boys and another color for girls.

1. RIGHTS AND DUTIES OF PATIENTS

2. IDENTIFICATION

- 2.1. Medical Record Number
- 2.2. health insurance
- 2.3. Code Number
- 2.4. Name
- 2.5. Surnames
- 2.6. Civil Birth Certificate Number
- 2.7. Mother's Name
- 2.8. Father's Name
- 2.9. Address, neighborhood telephone No.

3. INFORMATION REGARDING THE MOTHER AND GESTATION

- 3.1. Age of the mother

- 3.2. RH Blood Type
- 3.3. Obstetric-Gynecological History
- 3.4. Amenorrhea
- 3.5. Height
- 3.6. Weight
- 3.7. Current diseases
- 3.8. Treatments
- 3.9. History of preterm deliveries
- 3.10. Family history

4. INFORMATION REGARDING THE BIRTH OF THE INFANT

About the Birth:

- 4.1. Date and place of birth
- 4.2. Type of birth
- 4.3. APGAR (1', 5', 10')
- 4.4. Birth weight
- 4.5. Height
- 4.6. Blood type
- 4.7. RH Factor
- 4.8. Gestational age
- 4.9. Lubchenco

About the hospitalization:

- 4.10. Weight on release
- 4.11. Height on release
- 4.12. Head Circumference on release
- 4.13. Release date
- 4.14. Oxygen and number of days
- 4.15. Incubator and number of days
- 4.16. Transfusion

- 4.17. Phototherapy and number of days
- 4.18. Exchange transfusion
- 4.19. Treatments received
- 4.20. Release diagnosis

5. GRAPHIC TABLES

- 5.1. Head circumference of the infant from birth to 2 years of age (Fenton curves up to 40 weeks and WHO up to 2 years)
- 5.2. Size of the year from birth to 2 years of age (Fenton curves up to 40 weeks and WHO up to 2 years)
- 5.3. Weight of the infant from birth to 2 years of age (Fenton curves up to 40 weeks and WHO up to 2 years)

6. OPHTHALMOLOGY, OPTOMETRY AND AUDIOLOGY EVALUATION

- 6.1. Date (Year-month-day)
- 6.2. Evolution

7. MEDICAL FOLLOW-UP APPOINTMENTS OF THE INFANT

- 7.1. Date (Year-month-day)
- 7.2. Chronological age
- 7.3. Corrected age
- 7.4. Weight
- 7.5. Height
- 7.6. PC
- 7.7. Type of food
- 7.8. Oxygen
- 7.9. Nutritional evaluation, treatment and diagnosis
- 7.10. Identification of the professional

8. NEUROLOGIC AND DEVELOPMENTAL EXAMINATION

NEURODEVELOPMENT TEST (THE ONE SELECTED BY THE INSTITUTION)

- 8.1. Date (Year-month-day)
- 8.2. Chronological age
- 8.3. Corrected age
- 8.4. Transitory
- 8.5. Abnormal
- 8.6. Diagnosis – Plan

PSYCHOMOTOR DEVELOPMENT TEST (THE ONE SELECTED BY THE INSTITUTION)

- 8.7. Date (Year-month-day)
- 8.8. Chronological age
- 8.9. Corrected age
- 8.10. Locomotive
- 8.11. Personal Social
- 8.12. Hearing – Language
- 8.13. Eye-hand coordination
- 8.14. Execution
- 8.15. Total
- 8.16. Diagnosis – Plan

PSYCHOMOTOR DEVELOPMENT TEST (THE ONE SELECTED BY THE INSTITUTION)

- 8.17. Date (Year-month-day)
- 8.18. Chronological age
- 8.19. Corrected age
- 8.20. Attention
- 8.21. Involvement
- 8.22. Emotional regulation
- 8.23. Motor quality
- 8.24. Additional

8.25. Total

8.26. Diagnosis – Plan

9. PHYSICAL AND OCCUPATIONAL THERAPY EVALUATION

9.1. Date (Year-month-day)

9.2. Evolution

10. DIAGNOSTIC AIDS

10.1. Date (Year-month-day)

10.2. Results

11. MEDICATIONS

11.1. Dosage

11.2. Frequency

11.3. Route of administration

11.4. Date of initiation and suspension

12. VACCINE SCHEME

12.1. Biological

12.2. Dosage

12.3. Batch

12.4. Reinforcement

12.5. Observations

13. APPOINTMENT CONTROL

Optional

ALARM SIGNS FOR KANGAROO INFANTS

ALARM SIGNS FOR INFANTS ON OXYGEN

BENEFITS OF BREASTFEEDING

RECOMMENDATIONS

MEDICAL RECORD INFORMATION FOR THE KANGAROO MOTHER PROGRAM (KMP)

Below we present the minimum information that must be included in the medical record of the KMP. The information can be found in the body of the record or in the epicrisis. The reasons for maintaining this information are:

- The information of the health condition of the infant and the medical interventions it has received can be requested at any time.
- The health institution must maintain the information necessary to build and perform follow-up on management and quality indicators.

1. BASIC INFORMATION (IDENTIFICATION OF THE USER AND THEIR GUARDIAN(S))

There is a norm to this end (Resolution 1995 of 2007). The following information will be specific for patients received in the KMP and respond to the quality indicators that will evaluate the impact on the health of the interventions.

2. MEDICAL EVOLUTION OF THE INFANT

2.1. Date (Year-month-day)

2.2. Chronological age

2.3. Corrected age

2.4 Weight (g)

2.5 Height (cm)

2.6. Head circumference (cm)

2.7. Type of food

2.8. Oxygen

2.9. Vitamin K (Route and dosage)

2.10 Re-hospitalization during the period, release diagnosis, duration of hospitalization.

3. GRAPH TABLES

3.1. Head circumference at birth of the infant until year 3 (Initiates from week 27 post-conception).

3.2. Height of the infant until year 3 (Initiates from week 27 post-conception).

3.3. Birth weight of the infant until year 3 (Initiates from week 27 post-conception).

4. OPHTHALMOLOGIC EVALUATION

4.1. Date

4.2. Results

5. OPTOMETRY EVALUATION

5.1. Date

5.2. Diagnosis

6. USER UPDATES

In order to establish the causes of desertion, a special record of updates will be kept where the date, reason for absence, appointment re-scheduling and the cause in case of desertion will be registered.

7. INFORMATION OBTAINED FROM THE MEDICAL RECORDS AND VERBAL INFORMATION FROM THE CARETAKER (OPTIONAL RECOMMENDED) – REGISTER OR RECOVER THEM FROM THE INTEGRAL MEDICAL RECORD IN THE EVENT OF INTEGRATED HCL, SHALL AUTOMATICALLY ACCESS ALL THIS INFORMATION, BUT THE MINIMUM INFORMATION THAT MUST BE DRAWN IS:

7.1. Social-professional characteristics of the family:

- Origin
- Type of household
- Marital status
- Age of the mother
- Educational level
- Occupation
- Age of the father

- Educational level
- Occupation
- No. of individuals who attended during admission
- Desired pregnancy
- Help with the baby during the first month
- Worked during pregnancy (for how long)
- Month of initiation of prenatal control
- Number of control visits
- Blood type and RH factor of the mother
- Smoked
- Consumes alcohol
- Consumes drugs
- Other comments

7.2. Delivery:

- Date
- Type of delivery
- Instrumented
- Program
- Place
- PROM Duration
- Duration of labor
- Medications: Pre-delivery:
 - Anti-depressive
 - Antibiotics
 - Uterine inhibitor
 - Corticoids
 - Others
- Fetal suffering (Yes – No)
- Reduced movements
- LA mentioned
- Tachycardia
- Bradycardia

- Fetal monitoring
- Reactive
- Not reactive
- Doubtful
- Other
- Complications on delivery:
 - Placenta previa
 - Abruptio
 - Multiple
 - Cord pathology
 - Pre eclampsia
 - Amnionitis
 - Other
 - Presentation of infant
 - Placenta
 - Duration of hospitalization
 - ICU (Days)
 - Condition of the mother on release
 - Other comments

7.3. Examination of the newborn

- Weight (g)
- Height (cm)
- Head circumference (cm)
- Sex
- Gestational Age by FUM
- Ballard
- Gestational Age by ECO first trimester
- APGAR:
 - 1 mm
 - 5 mm
 - 10 mm
- Lubchenco

- Neonatal resuscitation
 - Spontaneous
 - Conduced
 - Induced
- Other comments
- Hospitalization in a newborn unit
 - Referred
 - Where
- Hospitalization with mother, how many days.
- Other comments

7.4. Hospitalization and Diagnosis:

- Date of admission
- Release date
- Days of hospitalization
- Total days with oxygen
- Total days with respirator
- Total CPAP days
- Total Hood days
- Total days with Cannula
- Total days in Incubator
- Total days in ICU
- Total days in parenteral nutrition
- Total days in phototherapy
- Bran ultrasound and results
- Brain CT Scan and results
- Hearth ultrasound and results
- Genetic exam and results
- Ophthalmological exam and results
- TORCHS
- Other exams
- Medications:
 - Surfactant – Dosage

- Indometacina - Dosage
 - Ibuprofen – Dosage
 - Antibiotics – Days
 - Aminoglycoside – Days
 - Other medications (reflux, anticonvulsant, aminophylline)
 - Blood transfusion
 - Last result of hemoglobin and hematocrit
 - Bilirubin
 - Release diagnosis
 - Intra-ventricular hemorrhage
 - Degree
 - Method of diagnosis
 - Primary apnea
 - Secondary apnea
 - Pathological jaundice
 - Hypoglycemia
 - Respiratory distress syndrome
 - Meningitis
 - Neonatal sepsis
 - Late sepsis
 - Nosocomial infection
 - Umbilical cord infection
 - Neonatal sepsis
 - Late sepsis
 - Nosocomial infection
 - Arthritis
 - Neonatal sepsis
 - Late sepsis
 - Nosocomial infection
 - E.C.N.
 - Neonatal sepsis
 - Late sepsis
 - Nosocomial infection
 - Bronchopneumonia
 - Neonatal sepsis
 - Late sepsis
 - Nosocomial infection
 - Other infections
 - Neonatal sepsis
 - Late sepsis
 - Nosocomial infection
 - Neurological state
 - Abnormal tone
 - Convulsion
 - Other release diagnosis
 - Blood type and RH Factor of the infant
 - Oxygen dependent
 - How many liters
 - Bronchopulmonary dysplasia diagnosis
 - Weight on release from hospitalization
 - Type of nutrition
 - Breastfeeding
 - Breastfeeding + Artificial Feeding
- 7.5. Adaptation of intra-hospital kangaroo:
- The patient meets the eligibility criteria
 - Total days of adaptation in the newborn unit
 - Newborn unit
 - Rooming in
 - Hours per day in kangaroo position
 - Training of another provider
 - Neonatal intensive care unit
 - Newborn unit
 - Rooming in
 - How was the adaptation to the breast

- How was the mother's milk extraction technique
- How was the dropper administration technique
- Does the mother wish to breastfeed
- Does the infant get tired suctioning
- Results of the adaptation to release:
 - Acquired
 - Under acquisition
 - Not acquired
- Other comments

ANNEX G

NUTRITIONAL SURVEILLANCE DURING THE FIRST 24 MONTHS OF CORRECTED AGE

Preterm and/or low birth weight newborns are considered high-risk newborns and require particular care. The analysis of the nutritional situation of these fragile newborns differs from what has been described in the Resolution of the Ministry of Health and Social Protection 212 of 2010.

The monitoring of growth must be approached as part of an integral intervention that includes activities of food/nutritional education, regular anthropometric measures, evaluation and accompaniment of development, care and promotion of health, vaccinations, among others, in the framework of integral programs intended to improve the health care.

During the first year of life, the supervision of growth can be used to evaluate the breastfeeding results, the appropriate moment for supplementary nutrition and of response to nutritional advice. The supervision of growth acquires sensitivity as a positive indicator of health.

Knowing the particularities of preterm and low birth weight newborns and the results of their long-term metabolic follow-up, this goal has been reiterated: these infants should not 'change lanes' in terms of their weight, height and head circumference between their birth and 24 months of corrected age. The monitoring of these infants is focused on the growth speeds referring to weight, height and

head circumference and the harmony between these three measurements.

Below, we present the kangaroo strategy for the nutritional follow-up and supervision of infants during the first two years of follow-up in a Kangaroo Mother Program, where individual and specific information will be analyzed in the various cutoff points and the speeds of growth. Fenton Curves will be used up to 40 weeks and the curves of the World Health Organization will be used from 40 weeks (point 0) to 24 months of corrected age.

1. Drawing of anthropometric measurements

- Weight, height, head circumference by sex and automatic calculation of weight for the height and BMI.
- These measurements will be drawn in the following cutoff points:
 - During birth
 - Entry into the Ambulatory Kangaroo Mother Program
 - 40 weeks of gestational age
 - 3 months of corrected age
 - 6 months of corrected age
 - 9 months of corrected age
 - 12 months of corrected age

2. From birth up to 40 weeks of gestational age

2.1. The newborn is located in the weight, height and PC curves at birth in accordance to their gestational age (Fenton or Lubchenco Curves. See reference curves. The Fenton growth curves are currently used in newborn units).

The newborn is diagnosed at birth with or without intrauterine growth retardation (IUGR). If the weight at birth is lower than 10 percent in the weight distribution according to the gestational age in accordance with the Fenton curves, it is considered IUGR.

2.2. Ambulatory Kangaroo Nutrition and Nutrition Strategy

Exclusive breastfeeding must always be initiated and/or continued. If with exclusive breastfeeding (supported by an intensive intervention of kangaroo adaptation by nursing and psychology) the growth goal is not achieved, pathological conditions that may explain the inadequate weight gain are discarded (e.g., anemia, infection, hypothermia, non-adherence to kangaroo position, among others). After the base condition is corrected, growth shall improve. If it is not achieved yet, hindmilk will be employed according to the quality of suction and the maturity of the infant (≤ 34 weeks). To the extent that the infant matures, their suction will mature too, and it will be easier for

them to drink all the breast milk in order to reach hindmilk (see technique described, extraction of hindmilk). If the growth is not improved, the breastfeeding is supplemented with special formula milk for preterm infants, preferably liquid in order to avoid its manipulation during the preparation (risk of transmission of diseases with the hands, risk of contaminated water), administered with a dropper or a spoon in order to prevent interfering with the breastfeeding and divided into 12 to 15 administrations per day. The liquid milk is administered before placing the infant on the breast in order to prevent gastric repletion and the risk of vomiting or bronchoaspiration. Based on the input calculations, the goal is to supplement for up to 30% of the caloric recommendations per day, and after at least 1 week of adequate growth a progressive reduction of the supplementation will always be attempted. The goal is to reach 40 weeks of gestational age exclusively with breast milk. The use of fortifiers of breast milk is not taken into consideration in this document until there is more evidence for its safety and usefulness in the ambulatory setting. According to Certificate 11/09 of November 26, 2009, the National Food and Drugs Surveillance Institute (INVIMA) recommends that in Colombia, breast milk fortifiers must only be administered at a hospital level and with medical recommendation and monitoring.

If despite the previously described strategies no adequate growth is obtained, it will be necessary to hospitalize the infant in order to discard a chronic pathology. It is mandatory to act as soon as possible and those infants cannot be allowed to become malnourished in an ambulatory setting.

2.3. Clinical Goals

The nutrition is based on breast milk from their own mother in order to make the most of the advantages of unmodified human milk, especially its immunological properties, the balanced intake of essential nutrients and its safety profile with respect to the risk of enterocolitis. The growth goal is obtaining a gain of at least the same as the intrauterine development.

Weight:

- 0-37 weeks: 15 g/kg/day
- 37-40 weeks: 8-11 g/kg/day

Height:

- 1.2 cm per week

Head Circumference:

- 0.8 cm per week (0.9 cm to 34 weeks, then 0.6 cm to 40 weeks)

2.4. The longitudinal evaluation or evaluation of growth speeds offers its most usefulness for the anthropometric diagnosis in the follow-up of infants throughout successive controls on its growth curve. The measurements are placed as dots in a reference graph and are united with a line, thus obtaining the growth curve of the infant. If this curve is

parallel to the graph, the growth of the infant is satisfactory.

2.5. The existence or lack of a IUGR diagnosis, the nutritional follow-up of the newborn up to 24 months of corrected age must be based on the same speeds of growth in terms of weight, height and head circumference.

2.6. It is not advisable to use punctual measurements since infants with IUGR always will be below the established limits without belonging to the classification ('classic' classification established for full-term newborns) of acute or chronic malnutrition and the same weight, height and PC of an infant with adequate weight, height and PC cannot be expected, but equal growth speeds in terms of the weight, height and PC can be expected.

3. From 40 weeks of gestational age to 2 years of corrected age

There are controversies with respect to the initiation of supplementary nutrition in the literature and in the practice of pediatricians who follow preterm and/or low birth weight infants regarding the use of the corrected age or the chronological age. The only thing that is certain is that the health professionals must make the decisions related to the growth in terms of weight, height and PC reported in the curves of the WHO according to the sex and the corrected age.

If the infant grows in an adequate manner in terms of weight, height, PC and in the growth curves

exclusively with mother's milk, it is recommended to wait until 6 months of corrected age to initiate supplementary nutrition. Supplementary nutrition is recommended from 3 to 4 months of corrected age if the infant does not grow in an adequate manner with exclusive breast milk, after discarding base pathologies and under the suspicion of insufficient intake. This also applies if the mother returns to work and cannot dedicate herself exclusively to breastfeeding. Artificial milk is introduced if this situation occurs before 3 months of corrected age to supplement the breast milk.

The introduction of supplementary nutrition must be progressive. Therefore, every new food must be provided for three days minimum without mixing the same with another food in order to test tolerance. It is worth highlighting that the food that contains more allergens are cow milk protein and egg whites. Therefore, their introduction is recommended after the infant reaches 12 months of corrected age. The tolerance to egg can be tested before one year, beginning only with the yolk before offering the same on a daily basis.

After 6 months of corrected age, it is recommended to try to make the infant eat on schedule with the family. The diet must be balanced with respect to carbohydrates, proteins and fats. The follow-up of the anthropometric measurements (weight, height and PC) provides an idea regarding the quality of the supplementary nutrition. The role of the pediatrician is to evaluate the growth of the infant in each consultation and to interview and make

recommendations to the parents or caretakers regarding nutritional practices.

- 3.1. If when evaluating the growth speeds between two visits there is a reduction of the standard deviation, it should constitute an alert that is treated in an ambulatory manner with one nutritional intervention that will depend of the case of each infant. The intervention must be described in the clinical history of the patient. Hospital treatment is taken into consideration if the reduction in the growth speed persists (reduction of two standard deviations).

↓1 SD in weight

The height and head circumference within parameters. Acute pathology (acute diarrheic disease, flu) or lack of nutritional intake with risk of malnutrition if it persists.

It is recommended to interview and provide counseling to parents regarding nutritional guidelines. Strict follow-up in which the evolution of the patient will be evaluated.

↓1 SD in weight and height

Head circumference within parameters. Chronic pathology (e.g. urinary tract infection), lack of sufficient nutritional intake or adequate intake if height is compromised.

We recommend acting, performing an in-depth interview with the parents, detecting the base pathologies or errors in the administration of the

supplementary nutrition. Strict follow-up in which the evolution of the patient will be evaluated.

↓1 SD in weight, height and head circumference

Risk of malnutrition, usually is an infant not under regular follow-up. As applicable, detect chronic pathologies and then talk with the social work and psychology areas, establish a work plan and close follow-up plan. Strict follow-up in which the evolution of the patient will be evaluated.

A reduction of two standard deviations between two control appointments has the same interpretation of the above and requires stronger interventions that should be followed in a strict manner.

Additionally, this information can provide data regarding other pathologies:

↓1 SD in height

Weight and head circumference within the parameters. Metabolic alterations (calcium and phosphorus deficiency, metabolic acidosis), low family height (genetics).

↑1 SD in weight

Height and head circumference within parameters. Review the quality of the nutrition intake (e.g. starch).

If ↑2 SD in weight persist; inadequate diversification with risk of obesity. Intervention required with the family, educating them regarding the most adequate nutritional guidelines for the age

of the infant. Strict follow-up in which the evolution of the patient will be evaluated.

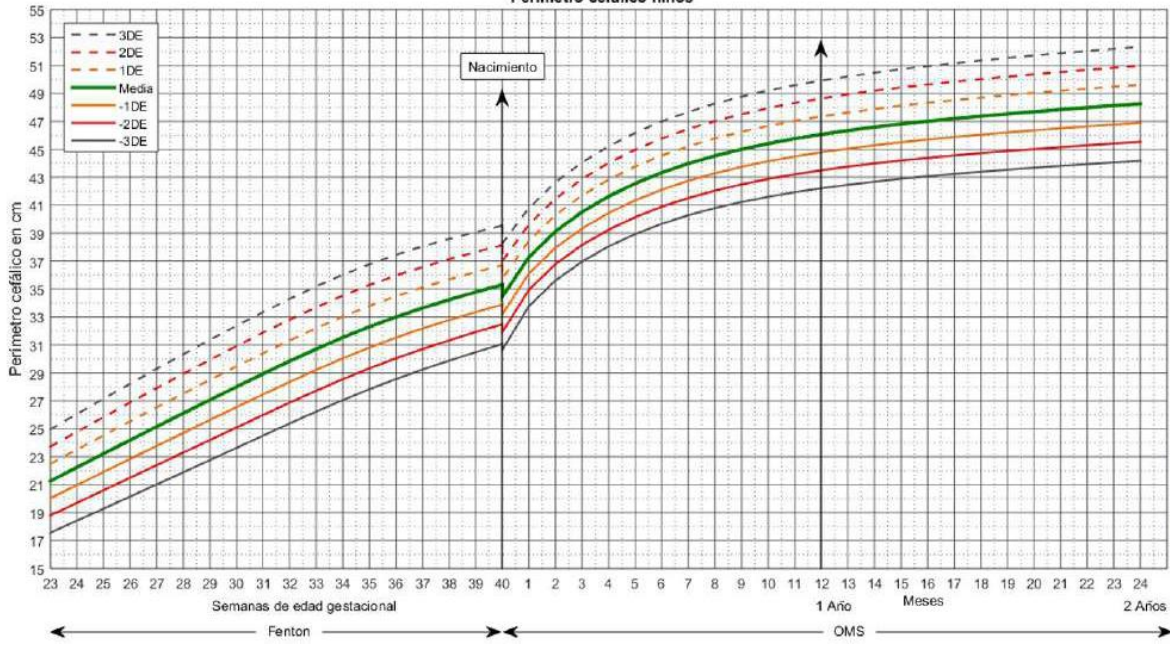
↑2 SD in weight, height and head circumference; genetically large.

ANNEX H

GROWTH CURVES BOYS

Head circumference boys

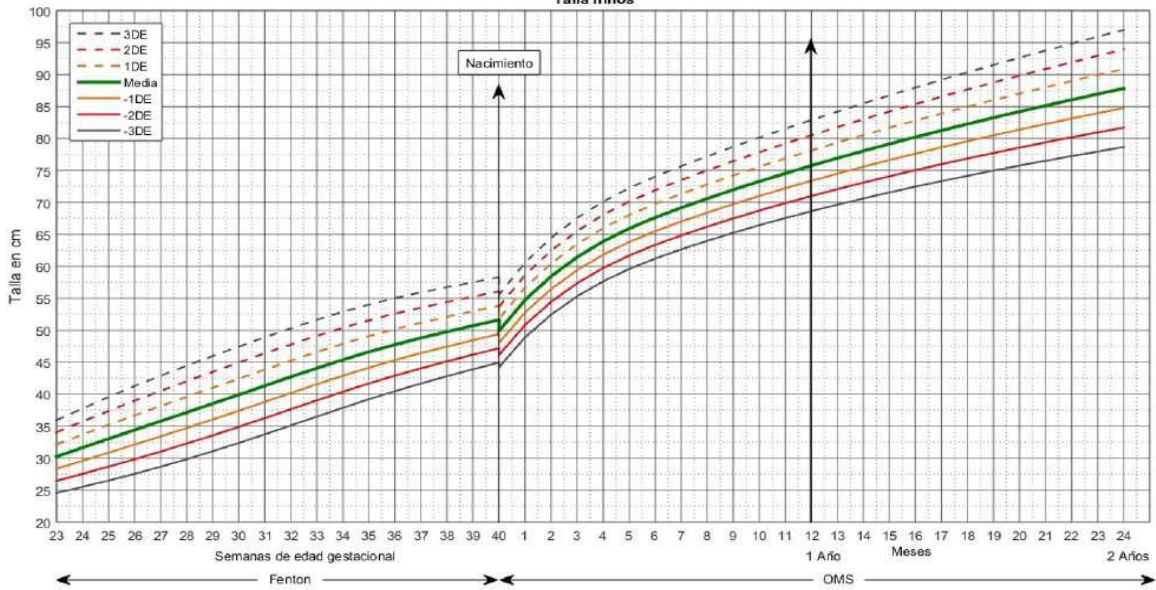
Perímetro cefálico niños



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Height boys

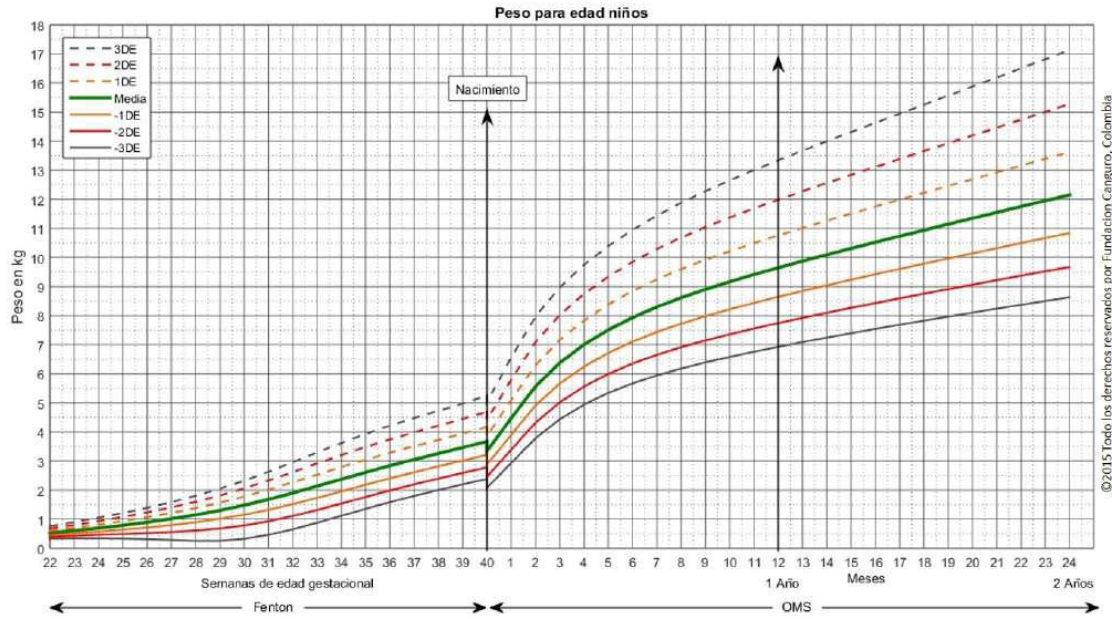
Talla niños



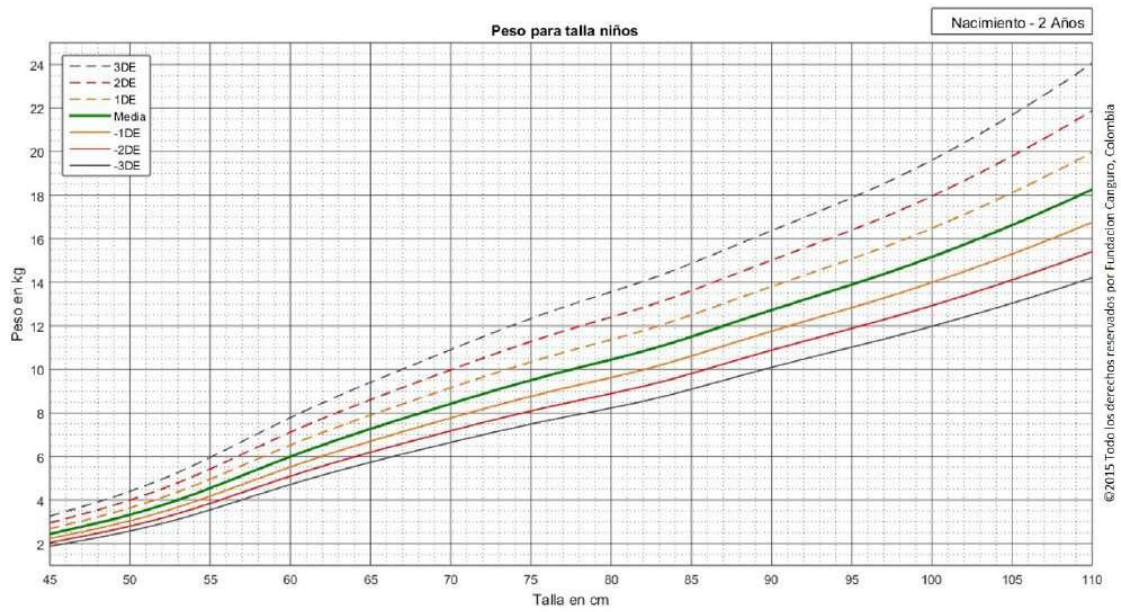
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GROWTH CURVES BOYS

Weight vs. age boys



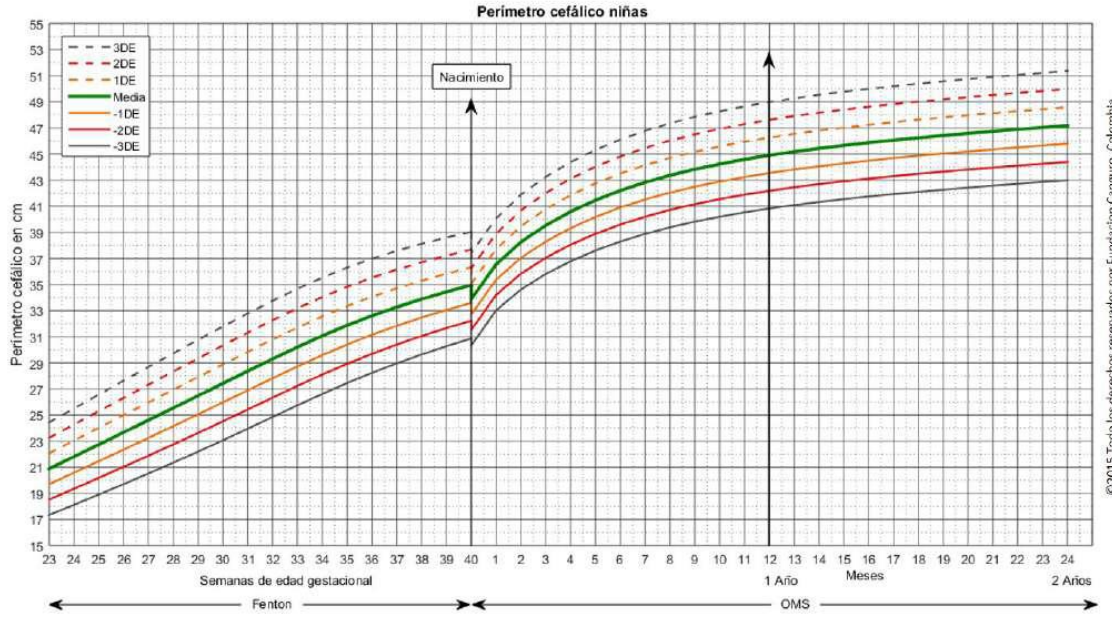
Weight vs. height boys



ANNEX I

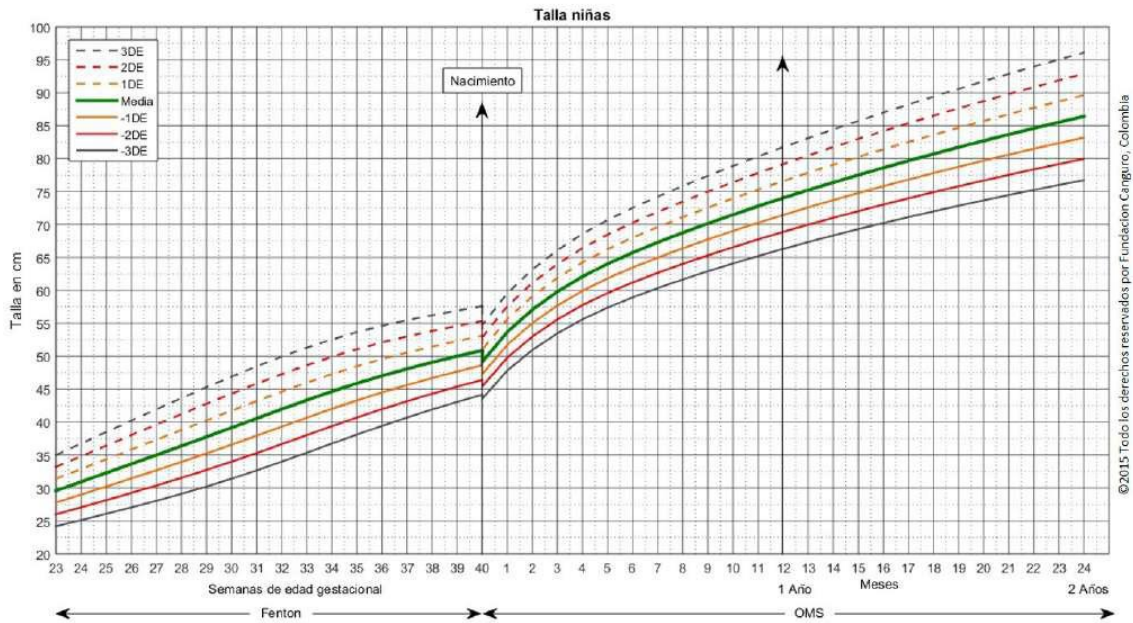
GROWTH CURVES GIRLS

Head circumference girls



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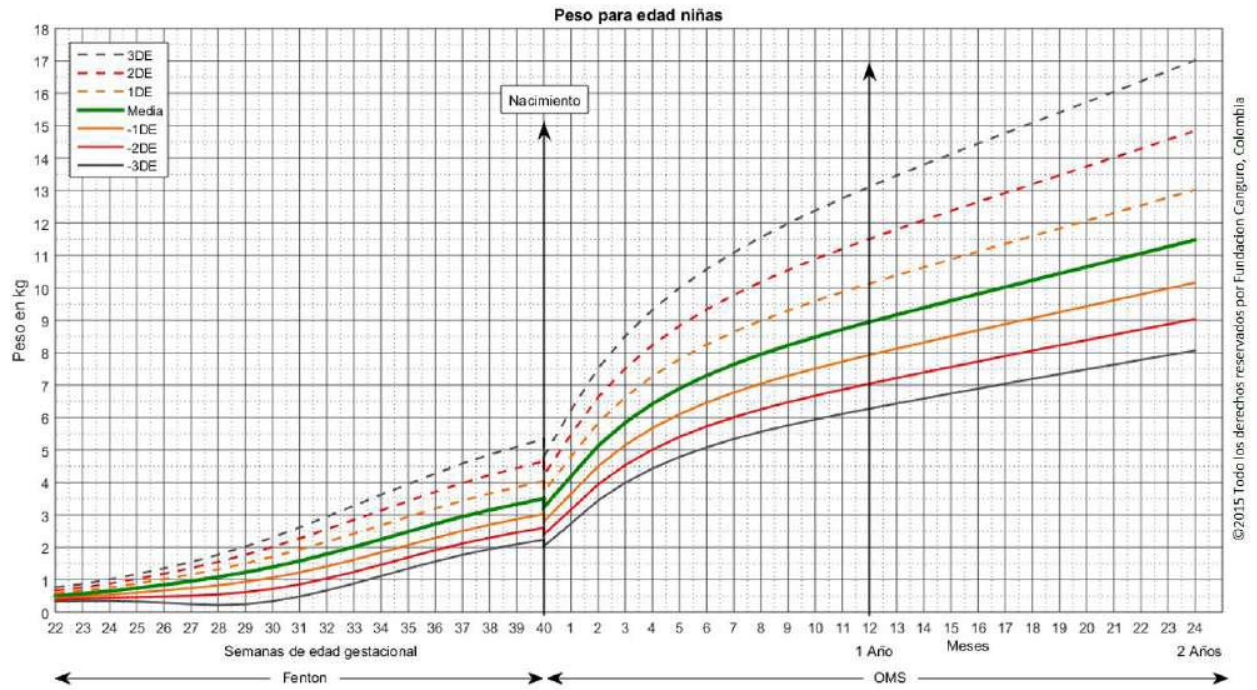
Height girls



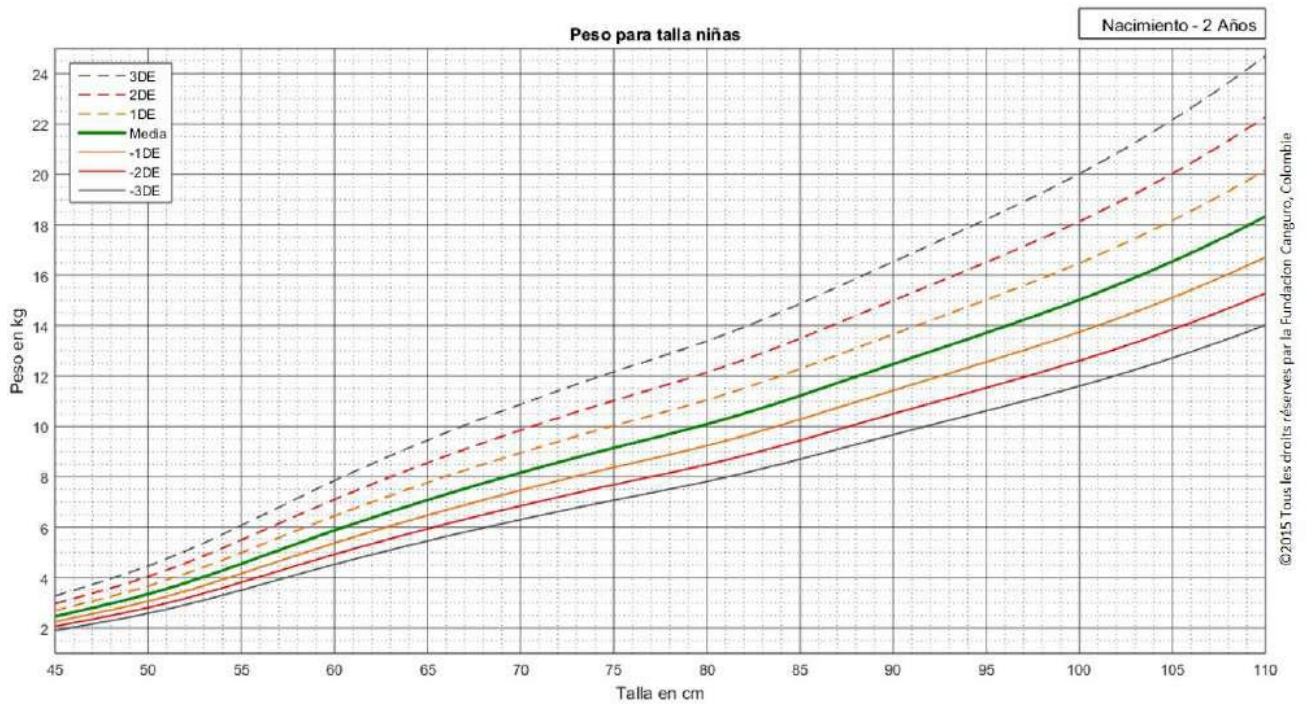
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GROWTH CURVES GIRLS

Weight vs. age girls



Weight vs. height girls





Ministry of Health and Social Protection

Department of Promotion and Prevention

Subdirectorates for Nutritional Health, Food and Beverages

Quality Office

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