KANGAROO MOTHER CARE
PRACTICAL RULES
( N. Charpak, Z. Figueroa).

CONTENTS

1. FOREWORD
2. GLOSSARY
3. INTRODUCTION
4. DESCRIPTION OF THE PROBLEM
5. DESCRIPTION OF CURRENT SITUATION
6. EVALUATIONS AND REFERENCES ON KANGAROO MOTHER CARE (KMC°
7. WHO IS THIS DOCUMENT FOR?
8. PURPOSES OF KMC
9. DETAILED DESCRIPTION OF KMC PRACTICAL MANAGEMENT
  RULES ACCORDING TO SETTINGS
  a) The birth of a child weighting ≤ 2000g.
  b) The hospitalized child.
  c) In-hospital kangaroo adaptation and eligibility criteria (R. Martinez and the KMC registered
     nurses team)
     • Place and time of the intra-hospital kangaroo adaptation beginning.
     • Selection criteria for in-hospital adaptation to KMC
     • Mother's requirements for adaptation
     • First session of adaptation (first day)
     • Training in providing Kangaroo position ((including how to hold the
       infant)
     • Training in breastfeeding (manual milk extraction)
     • Different methods for administration of maternal milk
     • Educational session
     • Manifestation of dreads
     • Training in techniques of relaxation in adaptation
     • Testimonials
     • Infant’s stimulation while breast feeding.
     • Closing adaptation: the last session prior to discharge
  d) Entry standards to the ambulatory Kangaroo Mother Care Program (eligibility
     criteria)
  e) Recommendations for a successful discharge
  f) The KMC ambulatory program
  g) Kangaroo Ambulatory Adaptation (KAA)
  h) Management protocols for the ambulatory KMC program

KMC practical rules
Kangaroo Foundation
Bogota, Colombia
These guidelines are based on the following documents: a) a management protocol developed by the Kangaroo Foundation and employed by the "Clinica del Niño" Kangaroo Mother Program in Colombia; b) The report of the II International Workshop on KMC held in Bogotá, Colombia during the first week of December 1998 and a WHO proposal for KMC Guidelines produced by A. Cattaneo and R. Davanzo in Trieste, Italy. These guidelines are intended as a starting point to develop national and/or local policies and guidelines adapted to specific needs, circumstances and available resources.

KMC was created as an alternative way of care for stable Low Birth Weight infants (LBWI) who have overcome major adaptation problems to extra-uterine life. Basically, it is an alternative to minimal care neonatal units. From 1978 to 1989 the KMC program is visited by foreign pediatrician as S.Ludington (USA), Gene Anderson (USA), R.Whiteley (GB), V.Walberg (Sweden), R.de Leew (Netherlands). All of them called for rigorous evaluation and went back to their countries with what is now called "Kangaroo Care", the skin to skin contact which continues to be more widely studied and used in developed countries for promoting breast feeding and early bonding. It is actually considered as a way to humanize high technology. If correctly applied, KMC can be safely used instead of expensive equipment such as incubators, to provide good quality care to stable LBWI at any level of care. KMC represents a step towards humanizing neonatal health care, and it promotes bonding and breastfeeding, two essential elements for the survival of LBWI.

For a better handling all KMC references are at the end of the document.
GLOSSARY

TERM DELIVERY - a delivery occurring between 37 and 42 weeks of gestational age.

PREMATURE INFANT - Infant born before 37 weeks of gestational age. Newborn infants are classified not only according to gestational age but also to their birth weight. A classification proposed by Lubchenco \(^1\) combines both weight and gestational age to produce different risk categories.

LOW BIRTH WEIGHT INFANT (LBWI)- Infant whose birth weight is less than 2500 g regardless of gestational age. Three types of low birth weight infants are distinguished in Lubchenco's classification:

- **Term infant small for gestational age (Term SGA):** born at term (37 - 42 weeks) but with a birth weight lower than the 10\(^{th}\) percentile for his/her gestational age. Intra-uterine growth retardation (IUGR) may have been due to fetal disorders, maternal conditions (e.g. maternal malnutrition) or placental insufficiency.
- **Premature infant with appropriate size for gestational age (Preterm AGA):** normal intra-uterine development but delivery occurred before 37 weeks of gestational age. Birth weight lies between the 10\(^{th}\) and the 90\(^{th}\) percentiles.
- **Preterm infant small for gestational age (Preterm SGA):** born before 37 weeks of gestational age with a birth weight under the 10\(^{th}\) percentile for his/her gestational age.

EVALUATION OF PREMATURITY - The pediatrician evaluates the child's gestational age according to various criteria (Evaluation scales by Amiel, Ballard, Capurro, Dubovich, 280 days rule, etc.)

CHRONOLOGICAL AGE - Age calculated from birth

CORRECTED AGE - Chronological age minus the difference between gestational age at birth and 40 week (term delivery).

Example: an infant six weeks old who was born at 35 weeks of gestational age has a corrected age of 1 week: 6 weeks - (40 weeks - 35 weeks) = 6 weeks - 5 weeks = 1 week.

HINDMILK - The milk remaining in the breast when the initially secreted milk (foremilk) has been removed. This milk has a higher fat content than foremilk, which means higher caloric density.

ELIGIBILITY CRITERIA - Conditions which the infant and the family must satisfy in order to be admitted into the Kangaroo Mother Program. The purposes of those criteria are to optimize benefits and minimize risks for the infant.
INTRODUCTION

Kangaroo Mother Care (KMC) is a care technique for infants under 2000 g at birth created and developed by a team of pediatricians at the Instituto Materno Infantil in Bogotá, Colombia (E. Rey, H. Martínez, L. Navarrete) in 1978.

The original components of the intervention (prolonged skin-to-skin contact –kangaroo position-, breast milk based nutrition and early discharge in kangaroo position) have been scientifically tested in observational and experimental studies and have been shown to be an effective and safe alternative to caring for LBWI in minimal care units after stabilization of infants conditions. It offers additional advantages, regarding mother’s empowerment and family bonding to the LBWI. Modifications of the technique have been employed and tested under different circumstances.

Components of the complete intervention are:

1) Early discharge (instead of minimal care neonatal unit)
2) Skin-to-skin contact 24 hours per day
3) Exclusive breastfeeding whenever possible
4) Strict ambulatory follow-up

It is worth to emphasize that during the provision of ambulatory KMC, quality of health care should meet the standards of a neonatal minimal care unit. It is also important to remark that separation of mother and infant should be avoided whenever possible; skin-to-skin contact should be started as early and as prolonged as possible, even at the Neonatal Intensive care Unit (NICU).

The major goals pursued with these guidelines are to promote protective factors for the LBWI’s health, and to control risk factors associated to the premature infant’s survival, growth and development, while meeting high standards of quality and efficiency, and at the same time, humanizing the care of the LBWI.
DESCRIPTION OF THE PROBLEM

We must remember that Low Birth Weight (LBW) infants are a public health problem in developing countries:

- Worldwide, 5 MILLION CHILDREN die annually
- In half or more of these deaths, PREMATURITY is either the direct or an associated cause for the mortality.

Low birth weight is a world wide problem. Its frequency and distribution closely parallel those of poverty. Low birth weight is associated with high neonatal and infant mortality and morbidity. Care of low birth weight infants (LBWI) represents a burden for the health and social systems everywhere. The reduction of the low birth weight rate and of the associated mortality and morbidity has been possible in affluent societies thanks to better standards of life, resulting in healthier pregnancies, and to expensive neonatal care technology. But expensive technology, mainly based on the use of air-heated incubators, is inappropriate, and often just not affordable, in low-income settings. The number of incubators does not meet the needs; they are often inadequately cleaned; there are frequent breakdowns; the power supply is often irregular; purchase, maintenance, spare parts and repair are expensive; and well trained personnel is often lacking. In addition, incubators give a false sense of confidence and separate babies from their mothers. As a result, LBWI may be subject to poor care: they may be more susceptible to cross infection and milk bronchoaspiration, their thermal control may be inadequate, they may suffer from poor nutrition and growth. Because of the separation from their mothers, LBWI kept in incubators may lack containment, stimulation and love.

KMC is turned to newborn of less than 37 weeks of post-conceptional age and/or of less than 2001 g at birth. Every newborn must have an evaluation of its gestational age at birth (Ballard, Capurro) or computed from the date of the last menstruation when known, as the prognosis and the adequate clinical management depend on it. LBWI should be classified not only according to their weight but also to their gestational age (Lubchenco's classification).
DESCRIPTION OF THE CURRENT SITUATION AND OF THE ORIGINAL KMC TECHNIQUE

In developing countries with limited health resources, overcrowding in neonatal units is common. This leads to high morbidity and mortality among LBW infants, because of associated problems such as nosocomial infections. Additionally, prolonged separation between mother and LBW infants may contribute to newborn infant’s abandonment and/or child abuse.

Traditional care of these LBWI consists in treating any present pathological conditions (hyaline membrane disease, infections, etc) and in supporting their immature physiological functions (thermoregulation, poor sucking-swallowing co-ordination, etc). Infants are maintained in incubators or other heating devices to provide additional environmental heat until they regulate temperature. In many instances, initial nutrition is parenteral, followed by orogastric tubes until infants are be able to suck and swallow correctly. This type of care consumes economic, technical and human resources that are often insufficient in developing countries. This scarcity of resources sometimes forces health professionals to accommodate two or more infants in the same incubator, with all the risks that this practice involves. Furthermore, the prolonged separation of the mother and her infant represents a dangerous situation of affective unbalance for them.

Optimal care for those LBWI (<2500g) requires balancing the benefits of using sophisticated techniques and equipment with the awareness of the risks and disadvantages they involve, in order to achieve the goal of returning a happy and as healthy and intact as possible infant to his or her family.

Kangaroo Mother Care technique is a comprehensive care method for LBWI that allows a better utilization of the technological and human resources available and an early establishment of the mother-child bonding. KMC should be routinely offered to all children weighting ≤ 2.000 g at birth.

Major components of KMC are:

- Kangaroo Position: Skin-to-skin contact between the mother and the child, 24 hours per day, in a strict vertical position, between the breast of the mother and under the clothes. Mothers are employed as incubators and as the main source of nutrition and stimulation. The infant’s temperature stays within normal range, thanks to the heat of the mother's body. A lot of studies have shown that the temperature, the oxygenation, the cardiac frequency and other
physiological parameters are maintained within normal values while in kangaroo position. The child may be fed at any moment. Any other person can share the role of the mother as a kangaroo position provider. While sleeping, the position provider must lay in a semi-seating position. Kangaroo position is maintained until the infant does not tolerate it anymore, meaning that appropriate temperature regulation has been achieved.

• Kangaroo Feeding Policy: exclusive breastfeeding, whenever possible. Initially, a strict schedule for feeding is followed. When the infant's growth is shown to be adequate, the schedule is relaxed to accommodate to infant's demands. The goal is to obtain a weight gain rate that approaches intrauterine growth rate during the third trimester of pregnancy (15 - 20 gr./Kg/per day until 40 weeks of postconceptional age). If with exclusive breastfeeding, and after receiving an intense intervention called ambulatory kangaroo adaptation (see the detailed description below) the infants growth is not satisfactory, breast feeding is complemented with premature formula. A dropper or a spoon is employed to administrate complements, to minimize interference with at breast feeding. The amount of formula should supply 25% of the daily intake recommendation, and after at least one week of adequate weight gain rate, a progressive decrease of supplementation is attempted. The goal is that the infant arrives at 40 weeks of post-conceptional age receiving exclusive breast milk. This is a safe and relatively inexpensive alternative to breast milk fortification.

• Kangaroo discharge and follow-up policies: KMC can be offered to LBWI as soon as they overcome problems related to extra-uterine life's adaptation, are regulating their temperature in a neutral thermal environment (incubator) and are able to suck, swallow and breath co-ordinately. Infants are discharge from hospital independently of their weight or post-conceptional age, after having completed a successful in-hospital adaptation to KMC. This adaptation process might last one to several days. Once at home, the children are maintained in kangaroo position, until they reject it (generally toward 37 weeks of post-conceptional age). After discharge, infants' weights are monitored during daily visits until they recover their birth weight and are gaining 15 to 20 gr./Kg/day. Afterwards, visits are conducted weekly until they reach term (40 weeks of post-conceptional age). These discharge and follow up protocol constitutes a minimal neonatal ambulatory care (MNAC) in opposition to the traditional minimal in-hospital care provided in neonatal units. This MNAC includes prophylactic drugs, vitamins, iron etc, according to the needs of each child.
It is convenient to establish a high risk follow-up clinic to assess kangaroo infants at least up to 1 year of corrected age. These assessment activities should include ophthalmological and hearing evaluations, neurological screening (INFANIB scale) and administration of psychomotor development scales. A strict monitoring of the somatic growth should be performed (using appropriate growth standards and corrected ages, not chronological ages) and vigorous efforts to correct deviations from adequate growth should be established early. Also administration of immunobiologicals according to local EPI schedules should be done (vaccines are administered at usual chronological ages).
EVALUATIONS AND REFERENCES ON KMC

From 1986 to date: Evaluations of some of the components of Kangaroo Mother Care:
• Limited skin-to-skin contact.
• In-hospital kangaroo position for a few hours.
• Breastfeeding
• Early discharge

In 1991, Gene Anderson produced an exhaustive review of published and unpublished evidences mainly about responses and effects of limited skin-to-skin contact in hospitalized patients in developed countries. Reviewed studies included true Randomized Controlled Trials, observational controlled studies and case series. Outcomes varied from survival to specific physiologic parameters. Papers were classified according to their designs and to the overall quality of the evidence.

Regarding infants under skin-to-skin contact, Anderson’s major findings were:
1. Temperature regulation is at least as good as that obtained inside an incubator. Some pieces of evidence suggest that it is even better.
2. Regular breathing patterns, with a decrease of apneic episodes and periodic respiration are more frequent than in non exposed infants.
3. Transcutaneous O₂ levels do not decrease.
4. Improved regulation of infant’s behavioral state: longer alertness periods, less crying, etc.
5. No additional risk for infection.
6. Higher rates and higher duration of breast feeding.

Regarding parents:
1. Mothers reported self-confidence, feeling of fulfillment and less stress.
2. Mothers had more confidence in breast feeding.

When reviewing some of the papers quoted by Anderson, it can be found statements about a reduction of hospital stay associated with limited skin-to-skin contact and a positive change of attitude among health personnel. In 1999 Anderson produces an update to this first KMC review and tries at the same time to define different modalities of application of the Kangaroo Care depending on the starting time of the kangaroo adaptation: very early, early, intermediary and late Kangaroo Care. We found it very interesting but we are thinking that it is easier to analyze the different elements of the KMC (intra-hospital adaptation, kangaroo position and early discharge with proper follow-up) one by one and to observe their possible
developments according to the setting. These developments may change on time at the same place as the positive results achieve to convince the health personnel.

In 1996 we conducted a review of all that was published about KMC between 1991 to 1996 and our conclusion was that very few papers deal with the effectiveness and safety of the KMC in less developed countries, and from a methodological point of view, their value was often limited (case series, cohorts, clinical randomized trials with insufficient follow up). In spite of the KMC’s appeal, more rigorous scientific evaluation was needed to allow its widespread use. In particular, there were three fields that deserve much deeper exploration: provision of kangaroo care on an ambulatory basis, short and long term effects on neuropsychological and emotional development of the infant, and economic consequences of the use of the method (cost-effectiveness and cost utility analysis).

Particularly Bergman and Jürisoo, in another before-and-after study conducted in 1994 in a remote mission hospital in Zimbabwe without incubator care, reported a reduction in hospital mortality from 90% to 50% in LBWI less than 1500 gm and from 30% to 10% in LBWI 1500 to 1999 gm. These differences, however, may be due to some uncontrolled variables.

A paper by Sloan and coll reports an open RCT conducted in an obstetric hospital in Quito, Ecuador involving 300 infants under 2000 gm who survived the adaptation to extraterterine life. Kangaroo mother method was provided to 140 hospitalized infants while 160 control infants were cared for at a minimal care unit (incubators and/or heated cribs). Authors claim that the kangaroo method saves health care costs, does not affect growth indices, and during the first 6 months of life diminishes the risk for serious illnesses, perhaps by changing health care patterns (including more frequent visits to health care providers) among “kangaroo families”.

A paper by Cattaneo ans coll reports on a multicentre trial conducted in five countries that evaluated in-hospital KMC (skin-to-skin contact and breast feeding). Neither early discharge nor ambulatory follows up were performed. Results showed a very good acceptance of KMC by health personal in all 5 participant centers, which represented very different cultures. This paper also shows that KMC may save costs in hospitals from developing countries.

Two studies reported in the literature have evaluated all three major components of KMC: a) Kangaroo position, b) exclusive breast feeding whenever possible and c) early discharge. The first paper of Charpak and coll describes a two cohort study which found that KMC was not associated with greater mortality than the control intervention (minimal neonatal care unit) and that breast feeding was more successful and lasted
longer. Nevertheless, it raised doubts about the quality of early growth in kangaroo infants, and did not show clear savings in length of total hospital stay. The second one of the same team is a randomized controlled trial -RCT- which confirmed the safety regarding mortality and even suggested an almost two-fold reduction in mortality risk in kangaroo infants. Kangaroo infants’ early growth was as good as for control infants, and when they reached one year of corrected age, head circumferences of kangaroo infants were slightly better than those of control infants. In addition, nosocomial infections were much more frequent in control infants. Total hospital stay was shorter for kangaroo infant, and the higher savings occurred in babies under 1500 gm at birth.

Coupled with this RCT an evaluation of the kangaroo mother-child relationship as compared to control families was conducted by Tessier R and the Colombian team. Main findings were: kangaroo mothers had a better feeling of competence for caring for and rising their premature infants; they were also more sensitive to health and developmental needs of those infants at higher risk for developmental impairment and general morbidity. Additionally, a change in the family structure of kangaroo infants was observed, allowing for a greater participation of the father in the care of the infant, and an improvement in the maternal self-esteem. These changes persisted at least during the first year of life. These findings suggest that KMC could play an important role in preventing abandonment and child abuse, which are more prevalent in cases of prematurity and early and prolonged separation of the mother and her newborn infant.

These results can be regarded as sound evidences supporting that KMC involving all its components (including early discharge), is a safe method for the care of clinically stable LBWI.

Every day there are more researches evaluating KMC elements that are published and there is real trend at the developed world to conduct researches of pure physiology observing the thermal stability, apnea, the ideal site for placing electrodes, the digestion hormones while laying in kangaroo position, sleep quality... and so on. We consider important to emphasize that even if we agree with the contribution of such studies, we continue to consider that the KMC is an integral technique when it is totally applied, that goes further than the skin-to-skin contact (Kangaroo care) and which evaluation has demonstrated method efficiency and safety. These new studies are fascinating because they make discover us new aspects of the human physiology and of the human being at his/her beginning but, for the kangaroo mother technique diffusion, it is enough to consider it as a humanization of the high technology and as a rational tool of the use of the available human and technical resources.

During the International Workshop on KMC held in Bogotá in 1998, participants (who were researchers in KMC and/or health care personnel involved in KMC programs)
offered valuable commentaries about problems for implementation of this technique and proposed strategies to overcome those barriers:

1. Lack of knowledge about local necessities and conditions. The strategy proposed involves promotion of local research and proper training of researchers.
2. Difficulties for finding funds to support local research on KMC. It was emphasized that local authorities (particularly from developing countries) should invest on priority research, and appropriate and cost effective health care on LBWI should certainly be a priority in most developing countries.
TO WHOM IS THIS DOCUMENT ADDRESSED?

These guidelines are addressed to all health professionals (Neonatologists, Pediatricians, Nurses, Psychologists, Social Workers, Nutritionists, M.D.) who work in any level of care health facilities involved in care of LBWI. The primary health care level (including health facilities staffed by community health workers) should include KMC as a basic means to promote early survival and safe reference of fragile and sick newborn infants to a more appropriate level of care. Nevertheless, in many instances, reference will not be feasible, and therefore KMC would be the only available opportunity for those infants to survive.

Currently, we identify three distinct uses of the KMI:

1) In places without appropriate neonatal care facilities, KMI is proposed as the only alternative to the lack of incubators.

2) In places with easy access to all levels of neonatal care, early mother-infant skin-to-skin contact, is employed looking for benefits including an enhancement of the quality of the mother-to-infant bonding and successful breast feeding.

3) In places where technical and human resources are of good standards but insufficient to cope with all the demand, KMI is an alternative for a neonatal minimal care unit, once infants have overcome major extrauterine life adaptation problems.
KMC PURPOSES

- To optimize the use of technological and human resources employed in the care of LBWI
- To decrease the overcrowding usually present at neonatal units in developing countries
- To decrease the rate of nosocomial infections, morbidity and mortality in those facilities
- To establish high risk follow up clinics and programs for premature infants able to monitor health status, growth and development of LBWI and to provide timely and effective care.
- To empower families of these fragile infants by deeply involving them as efficacious health care providers for their infants.
- To promote breast feeding not only for LBWI but for all newborn infants, by means of education of the involved health care personnel.
- To promote a strict growth monitoring and vigorous interventions particularly between birth and 40 weeks of post-conceptional age, as an attempt to close the gap between LBWI and normal full term infants.
- To promote multidisciplinary teamwork, allowing humane and efficacious multidisciplinary care of LBWI.
- To humanize the high technology with the introduction of early kangaroo position in the Neonatal Intensive Care Unit.
- To offer an opportunity for survival and better quality of life to LBWI cared for at any level of care.
DESCRIPTION OF THE KMC MANAGEMENT PROTOCOLS

The management protocols described in a more precisely way in this chapter were conceived for tertiary care health facilities from developing countries with properly trained staff (neonatologists, neonatal nurses, etc.) and equipment (Neonatal Intensive Care Unit, incubators, etc.) in which, due limited resources and high costs, good quality neonatal services can not be delivered to all newborn infants demanding them. They can, nevertheless, be adapted to different levels of complexity of care, as will be shown below. KMC in this scenario is aimed at reducing the amount of time that patients should spend at minimal care units (been in incubators for weeks or even months until they reach some specified weight and/or post-conceptional age), freeing those resources to employ them in patients requiring intermediate of intensive care, and decreasing the overcrowding frequently seen in those Neonatal Units and also having an impact on nosocomial infection rates. These uses of KMC shorten the separation period imposed to mothers and their premature or LBW infants, allowing for an earlier and probably better mother-to-infant bonding.

1) **The birth of an infant weighting ≤2000 gr.**

The purpose of these lines is not to describe standard procedures for the initial care and resuscitation of newborn infants at the delivery room. It is important to mention that in many maternity facilities in developing countries due to high volumes of deliveries and scarcity of staff, not always are physicians or even midwives present during the delivery of a LBWI. Besides offering appropriate resuscitation, personnel caring for newborn infants at the delivery room must be able to measure an Apgar score at 1 and 5 minutes after birth. Additionally, all those LBWI should have an appropriate estimation of their weight and their gestational age at birth. These data are very important for the future management of the infant.

All premature newborn infants (delivered before reaching 37 weeks of gestational age) or with birth weights ≤2000 gr. should receive integral care form birth, and should be closely observed in a hospital for at least 72 hours to monitor transition to extra uterine life, to prevent and correct adaptation problems such as apnea, hypothermia, hypoglicemia, jaundice, etc. And to detect and treat concomitant conditions that may arise.

**In a first care level** (small rural hospitals, peripheral clinics) without special equipment (incubators, radiant warmers) and supplies (oxygen, drugs, preterm formulas) for the care of LBWI, without post-graduate doctors (paediatricians, neonatologists,
gynaecologists), or with no doctors at all, the entire KMC intervention can not be delivered. Premature infants can be transferred in kangaroo position to a higher care level center. The underlying idea is not only to warrant survival, but to offer the best possible quality of life to the LBWI.

If there is no possibility of transfer, immediately after delivery, the premature infant is dried thoroughly and is placed in continuous skin-to-skin contact, dressed only with a diaper and a warm cap. Colostrum can be fed by dropper or by orogastric tubing (when available) to prevent hypoglicemia. After stabilization, both mother and infant should be referred to a higher level care center. When the mother can not be transferred or is not available, any other adult can provide kangaroo position during transportation.

For mild respiratory distress syndrome (RDS), skin-to-skin contact can help to improve hemoglobin oxygen saturation. If there is an oxygen supply available, it should be administered by nasal cannulae (nasal prongs). If the infant is in skin-to-skin contact, under mothers clothing and wearing a hat, the development of hypothermia is a rare event. Whenever it happens, additional conditions should be ruled out.

Care of LBWI also involves continuous monitoring (at least clinically) to identify and treat problems as early as possible. Classifying the infant according to both birth weight and gestational age helps in anticipating specific risks and health problems. Use a scale, ideally a neonatal scale with 10 g intervals, if available. For registration purposes, group all neonates by birth weight and gestational age following the international standards: classification by weights (1800 g or more (large LBWI), between 1200 and 1799 g (small LBWI) and less than 1200 g (very small LBWI)) and by Lubchenco classification: premature infant with appropriate size for gestational age (preterm AGA), preterm infant small for gestational age (preterm SGA) and term infant small for gestational age (term SGA).

These groups represent different levels of risk. The type of care they need differs considerably at different levels of care. As the gestational age at birth increases, the risk for prematurity related RDS decreases. The smaller an infant is for his/her gestational age, the higher is the risk for metabolic disorders such as hypoglicemia. Many conditions depend on weight and gestational age at birth.

Health personnel, from neonatologists to community health workers should be able to estimate gestational age at birth. Simple methods such as time elapsed since last menstruation (the 280 days rule) provide an estimation of gestational age at birth, that combined with weight at birth help to make better decisions when caring for those LBWI. For instance, risks, medical care and prognoses can be very different for a 2000
g. term infant (SGA, intrauterine growth retardation) in whom most physiological processes are much more mature than for a 2000 g. preterm infant (AGA).

It is worth to insist on the need for referral of LBWI (in kangaroo position) to a higher care level center, whenever possible. The underlying idea is not only to warrant survival but to offer them the best possible quality of life.

However in many primary care centers in development countries, there are no alternatives but to care for those infants in situ, without the possibility of referring them.

In those circumstances, the risk of dying for the smallest and the more immature (under 1500 g. and/or under 34 weeks of gestational age) is very high. The impact for the mother of having her infant dying while in skin-to-skin contact has not been properly evaluated. Therefore it is difficult to make a recommendation about offering kangaroo position in those very immature infants who are very likely to die in first care level facilities. Nevertheless, KMC is, in many instances, the only chance for survival these infants will ever have. KMC offers good protection against hypothermia, and in a decreasing degree of efficacy, against primary apnea of prematurity, hypoglicemia (early colostrum and breast feeding) and RDS.

We consider this form of KMC as a temporal alternative.

Second level of care (this category includes a wide range of maternities such as district and provincial hospitals. A common feature is the availability of skilled personnel (specialist nurses and midwives, pediatricians, obstetricians, or at least experienced physicians) and of basic equipment and supplies for neonatal care. But staff and equipment are often insufficient as compared to the needs, and incubators, if available, are subject to frequent breakdowns, power cuts, lack of maintenance and spare parts. The presence of competent physicians may be restricted to a few hours per day. In these facilities, LBWI are often kept in large nurseries and have limited contact with their mothers; exclusive breastfeeding is insufficiently promoted; formula feeding with a bottle or a gastric tube is the usual feeding pattern.

Under the principle of avoiding mother an infant separation, both in-hospital based or ambulatory KMC can be instituted. After satisfying the eligibility criteria, LBWI and their mother should enter a in-hospital KMC program. It can be provided completely as a
preparation for early discharge while in kangaroo position (ambulatory KMC). In any case, these should be health care personnel devoted to the KMC (at least a full time experienced nurse supported by full time or part time physicians). Also, a specific space within the hospital should be adapted for KMC activities: hospital rooms for rooming together mothers and their infants, and an office for the KMC clinic.

Appropriate KMC clinical records with nation wide standardized forms and variables should be kept. An inexpensive desktop computer using a data capture program such as EpiInfo can be employed. Accurate and standardized information is key not only for individual follow up but also for program evaluation. Evaluation and follow-up activities should be undertaken, at least once a year for each new KMC program developed. Important outcome measures should include mortality, morbidity, somatic growth, and compliance with program visits rate at 40 weeks of post-conceptional age and at one year of corrected age.

**Third level** obstetric facilities and neonatal care units in settings with ample resources and infant mortality rates below 15 per thousand: these are health facilities with sufficient human, material and financial resources for highly sophisticated neonatal care.

At this level, KMC can start at the neonatal intensive care unit (NICU), in order to take advantage of the benefits of the precocious skin to skin contact. Once the child has overcome basic adaptation to extrauterine life and major conditions have been properly treated (when is ready for intermediate or minimal care), the infant can receive the KMC intervention in a similar way to what is offered in a second care level facility (see below).

2) **The hospitalized infant.**

Again, these lines do not pretend to replicate what is said in standard neonatology text about caring for LBWI at Neonatal Units. It is worth saying that for KMC to be successful, two words are basic: communication and education. It is necessary to have the co-operation of all health professionals of the Unit. Skin-to-skin contact and breast feeding should be offered to hospitalized infants, as soon as their condition allow it, in addition to other components of care they are receiving. Both early initiated skin-to-skin contact and stimulation of breastfeeding are fundamental steps for the humanization of the practice of neonatology.

**In a first level of care**, electronic apnea monitors are seldom available in this level of limited resources. In these cases, the mother should be trained to observe the respiration of the baby and to inform the staff in case of difficult breathing. Tell the
mother that apnea is a potential cause of death. Familiarize her with the duration of apnea by asking her to hold her breath for a short (less than 10 seconds) and a long (more than 10 seconds) time. Teach the mother how to stimulate the baby, by slightly touching the skin in several different places, in case of apnea lasting more than 10 seconds. Make sure that the mother timely inform the staff in these cases. It is probably unlikely that mothers will be able to monitor the breathing of their babies continuously, but they can certainly help the staff in their task.

To be eligible for early discharge and ambulatory follow-up in KMC, the LBWI must fulfill a series of conditions called kangaroo eligibility criteria and must have had a successful in-hospital adaptation to kangaroo position and breast feeding.

3) **In-hospital Kangaroo Adaptation**

It is an indispensable step for the success of KMC. As soon as a LBWI is eligible for in-patient minimal care (properly stabilized, thriving in a neutral thermal environment) the patient is eligible for KMC. If the family agrees, someone from the kangaroo care staff (usually a registered nurse) will work daily with the LBW infant and his/her mother. Performance of infants’ adaptation functions such as thermal regulation while in kangaroo position, ability to suck and swallow co-ordinately as well as the ability of the mother to carry and breastfeed her baby are carefully observed.

The mothers are encouraged to remain as longer as possible with their infants. Ideally, mothers under KMC adaptation should 24 hours a day rooming together with their infants. During this 24 hours a day KMC adaptation, weight gains while in kangaroo position and monitoring for conditions of prematurity such as primary apnea are carried out. If rooming together is not possible, KMC adaptation is nevertheless carried out observing the performance of both mother and infant for as long as possible during each day. The “kangaroo” nurse also check daily the delivery room and the maternity ward to identify and recruit those healthy and more mature LBWI who are hospitalized with their mothers and who might be well enough to be discharged within 24-48 hours after delivery. It is very important to offer to these infants the adaptation to KMC and to train their mothers, as they are sometimes very immature (less than 34 weeks of gestational age but with appropriate weight) and susceptible of developing early hypoglycemia, a dangerous condition for intact survival and future neurological development.
Have had a successful kangaroo adaptation for the infant means:

- To thrive in incubator or crib, the ideal being with exclusive breast milk.
- To suck the breast correctly.
- To have a mother or a relative that knows how to feed the infant.
- To have a mother or a relative, if the mother is not able, who feels able to follow the steps and procedures of the program.

Before being discharged from the hospital, a process of adaptation and education of the mother takes place regarding the methodology of the program. Mothers of infants who stay hospitalized should have free and frequent access to the neonatal care unit to feed their infants and to provide kangaroo position while the infant is discharged. During these periods mothers receive information about breast feeding, the optimal way to provide kangaroo position in order to keep the infant warm and to avoid bronchoaspiration.

This KANGAROO IN-HOSPITAL ADAPTATION can be defined as a process of physical, emotional and social adjustment of the mother and the family of the premature child and/or of low birth weight (<2001 g.) to the methodology of the KMC. This is accomplished through a process of clearly targeted education, training and social and emotional support.

The objectives of the Kangaroo In-hospital Adaptation are:

1. To alleviate maternal stress originated in having to care for a fragile LBWI, before discharging the infant from the neonatal care unit (ideally with the aid of a psychologist)
2. To make the mother able to take care for her infant at home, using the KMC methodology
3. To decrease the fear and dread that might show up while providing KMC
4. To promote and enhance the development of and emotional the mother-to-child bonding
5. To evaluate the infants readiness and ability receive KMC
6. To adapt the mother and the infant to breast feeding.

Ideally the training method would have to begin individually within the maternity ward or the neonatal unit. Several studies have demonstrated the benefits for both the mother and the infant of skin-to-skin contact during the hospitalization. Training and adaptation should continue in small groups of mothers in a room reserved for carrying out kangaroo adaptation.

KMC practical rules

Kangaroo Foundation

Bogota, Colombia
• WHEN BEGINS THIS FIRST KMC ADAPTATION?

At a first level the mother is the child’s incubator and the kangaroo adaptation starts immediately after been born (see above). We should even say that at any country and at any delivering room a mother who has a “healthy” LBW child should be able to do the same as described for the first level, and we should not limit to the LBWI but to say that any newborn should be put in kangaroo position against his/her mother breast at birth.

At the intensive care units of high technology, technology has experimented an exponential and explosive development in this century. The role of the physician during the last 100 years has transited from been an almost helpless witness of the struggle for survival of the sick infant and his/her mother, to a gradual and progressive ability to understand and modify with increasing success the immature and altered physiology of the neonate. Somewhere along the way, as health care workers were empowered by science and technology, parents were taken away both physically and emotionally from their sick babies. Newborn infants were in turn placed progressively in a more and more alien environment, and all this was done, of course, with altruistic aims, bearing in mind the infant’s best interest.

The marvels of the twentieth century have not spread out symmetrically. Improvements in quality of life are clearly concentrated in the so-called industrialized countries, while conditions have changed very little for many in developing countries. It has been estimated that about 90% of LBW infants are delivered in less developed countries, while 90% of the investment in the care of high risk neonates occurs in industrialized countries. Fragile newborn infants in economically affluent societies seemed to be condemned to a strange fate: in order to survive they had to be placed in the efficient but inhuman hands of medical technology, away from their parents. Concerns for biomedical aspects obscured common sense even to extremes hard to believe. Painful procedures were routinely done without any regard to the nightmare experienced by the completely defenseless infant. Thermal regulation, infection prevention, monitoring of vital signs and support of physiological functions imposed that the infant had to be immersed into noisy, painfully bright, and aggressive-invasive environments. The fate of premature and/or sick neonates from less developed countries has been even more bizarre. Access to expensive and sophisticated technology was, and continue to be scarce. In many instances, neonatal care units insufficiently staffed and equipped, might turn into deadly traps: malfunctioning incubators and monitors, overcrowding, nosocomial infections, etc. Fragile babies in developing countries are not experiencing
the real and full benefits of technology, because good quality technology is seldom available. But the phantom of de-humanization of medical care which has managed to link itself with technological improvement is also present to a full extent, regardless of the technological insufficiency of this sub-optimal paraphernalia.

It is imperative to rescue the best of both worlds. Neonates, regardless of their place of birth should be entitled to receive the best possible quality of care, both from the biomedical-technological perspective and from the psychological, emotional and "human" perspective. Prolonged and continuous skin-to-skin contact, breast feeding and early discharge constituted the basics for this intervention, which empowered mothers by returning them to their role as primary providers for the physical and emotional needs of their fragile infants. Other interventions and modalities of care such as KMC, are examples of more comprehensive ways for trying to transform the manner in which we care for our newborn infants. These alternatives have been conceived and first implemented in countries where access to all technical resources for proper care were not ready available. But they are not simply the "poor man's" alternative. They do bring physiologically sound and human and emotionally appropriate interventions to the arena where the care for the fragile neonate is provided. These are not simply medical interventions, but the introduction of a set of human values, backed by scientific knowledge, into the highly technical routine care of the youngest of our species. These modalities of care are not against technologically based health care, nor have they been proposed as alternatives to it. They are allies, and their proponents and disseminators are scientifically well structured physicians, who recognize and value greatly the role of highly sophisticated neonatal units in the survival and the quality of life of neonates.

Criteria for initiation skin-to-skin and/or non nutritious suction at the Intensive Care Units depends of each unity and cannot be generalized.

In rooming-in: many times we observed that child’s weight and appearance are more important that the LBWI maturity and we would like to emphasize that a LBWI of 2200g with 34 weeks of gestational age left with his/her mother due to his/her good appearance is the perfectly eligible for an immediate and supervised kangaroo adaptation as he/she is threatened with hypoglycemia and hypothermia as the others but quite often without any supervision.

In minimal care:
- Having overcome any existing pathological condition.
- Having begun and tolerated oral feeding.
- To have a good response to stimuli.
- To have a mother or a suitable person willing to participate in the adaptation's process.

KMC practical rules

Kangaroo Foundation

Bogota, Colombia
- Preferentially not being receiving IV fluids.

When the infant is eligible, mothers should receive opportune information, including the type of clothing needed for her and her infant: a blanket, a vest, diapers, a cap and socks for the infant.

• REQUIREMENTS FOR THE MOTHER ENTERING KMC ADAPTATION

- Willingness to participate to the KMC Program.
- Physical and mental capacity to handle the infant in KMC.
- To bring suitable clothes to allow changing.
- To use a dressing gown and a hospital insulation cap.
- Short and clean fingernails and without nail varnish, for which she has to bring a brush and scissors.

<table>
<thead>
<tr>
<th>ACTIVITIES OF THE INTRAHOSPITALARY KANGAROO ADAPTATION</th>
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<tbody>
<tr>
<td>1. Training on how to hold the infant.</td>
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<tr>
<td>2. Training on breast feeding and feeding of expressed breast milk.</td>
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<tr>
<td>3. Educational meetings about the care, cautions, and alarm signs of the infant at home.</td>
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<tr>
<td>4. Manifestation of the mother specific fears.</td>
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<tr>
<td>5. Physical exercises and relaxation with the infant in kangaroo position.</td>
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<tr>
<td>6. Statement of mothers’ experience that have participated previously to the KMC program</td>
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<tr>
<td>7. Stimulation and massage of the child while in skin-to-skin contact</td>
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</table>
• FIRST SESSION OF KANGAROO ADAPTATION. (First Day)

The first day when the mother begins with the adaptation to the kangaroo method, we may observe maternal fears and difficulties, described in previous studies of maternal reactions to the premature infant.

"In the establishment of a relationship to the premature infant, the mother believes she could be a threat to her infant and she is unable to protect him/her."

This is expressed by mothers as fear of hurting the child, fear of letting him/her fall down, insecurity when mobilizing him/her, fear of suffocating the infant with the breast, lack of ability to breastfeed him/her. As a consequence, many mothers become very tense and in many cases, they can concentrate on the nurse’s instructions to begin to breastfeed the infant, or they resist moving or carrying the child as indicated.

It is important to deal with these initial stressful situations generated by those fears mentioned above. Some ideas about gently approaching mothers during this first day are: to introduce oneself, if it has not been previously made; to always call the mother by her name; to give a short explanation about what the adaptation is and what its goals are. Also, it should be made very clear to the mother that she will receive all the additional support she might need, particularly during this first session. Of the initial climate of this first session depends thereinafter the confidence and calmness on the mother.

It seems more convenient and practical for the nurse to give the instructions being sitting besides the mother as shown above. This position allows the nurse to help the mother without ceasing to observe the child.

The mother must wear only a dressing-gown, with the opening toward the front to have an easy access to the breast and to be able to have infant in skin-to-skin contact.
• **TEACHING HOW TO HOLD THE INFANT**

Regarding the initial fears, mother should be taught how to hold the infant, allowing for an easy and safe mobilization. The nurse should first make a demonstration, holding the infant with one hand placed on the posterior part of the neck and back, allowing her fingers to reach the lower segment of the jaw to prevent the head from slipping down and blocking the airway while the infant is in a vertical position. The other hand is placed under the buttocks. The mother will have to receive and hold the child in the form shown in the figure. As the mother gets acquainted with this practice, her fear of hurting the infant while holding him/her is reduced. The nurse should observe to assess the difficulty the mother is experience to overcome her fears.

When this first demonstration does not achieve the expected results, it might be useful to ask other mothers that are more advanced to share their experiences. The nurse can demonstrate the mother how gentle is this was of holding the infant, by placing her fingers around the mother's neck and exerting pressure so that she may experience something similar to what the infant feels while been supported from the back of his/her neck. The smoothness and softness of the fingers avoid any trauma on the infant's neck.

• **TEACHING HOW TO BREAST FEED**

Marmet's technique is employed for breast milk manual extraction. The milk outlet gives self-confidence to the mother in her ability to feed her child. When the milk cannot be extracted easily, it is convenient to talk to the mother about factors that might be inhibiting the ejection reflex: maternal stress, lack of sucking stimulation, and tender or congested breasts. Milk excretion can be promoted by the careful use of some medications such as metoclopramide, sulpiride or some home-made local recipes. It is necessary to introduce at this point the concept of hindmilk, so that the mother understands that when the child empties only one breast, he/she will receive milk with a higher content of fat, and this higher calorie density will promote a better weight gain.

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**TECHNIQUE OF MANUAL EXTRACTION OF MILK**

KMC practical rules Kangaroo Foundation Bogota, Colombia
Initiated from the birth, helps to:
- Have and effective milk supply when the infant is able to receive oral intake.
- To stimulate and promote breast feeding.
- To learn the movements for manual extraction of milk.

Mothers are not asked to extract their milk if their infants have been recently fed.

Training is delivered to groups of mothers, a practice that allows an exchange and an interactive stimulation among mothers. Training should start as early as possible.

It is started with a general massage of the breast in order to avoid the congestion and the drying up of the milk. Immediately after, manual expression is done by pressing the surrounding part of the areola (on average 6 cm of diameter) between the thumb and the index finger. The backwards thrust of both fingers toward backward compresses the breast, then the pressure of both fingers that pinch the areola advancing the hand has as an effect to promote the release of the milk, which is gathered in a plastic container placer under the breast.

Training on these movements is extremely important as it will permit a form of breast gavage of the child when the baby starts to suck.

The collected milk is measured, identified with the baby’s name. Milk can be stored. For 6 to 8 hours at room temperature in Bogota (15°C), for 48 hours when refrigerated at 4°C and up to 3 months when frozen at -18°C. Once mothers are proficient in manual expression and collection of milk, it can be safely and hygienically done at home.

Milk should be collected in a plastic sterile bottle, to prevent antibodies and other important molecules to be adsorbed to the container walls, as would happen in a glass container.

When the baby gets tired of sucking, breast milk should be collected in a plastic container. It can be latter fed to the infant with a dropper. Milk from different mothers should not be pool or fed to different infants, unless proper pasteurization can be performed in order to avoid infectious risks (HIV, hepatitis B and C).
Before beginning the breastfeeding the mother must awake the child, using progressively stronger stimuli. It can start by caressing the infants face several times with one hand; applying a soft but firm tickle in the plant soles or holding him/her face down resting on the holder’s arm and swinging him/her gently from top to down, as is shown in the figure. Gentle stimulation continues until the baby opens his/her eyes. Using the index finger the surroundings of the infants mouth are gently tipped to evoke the seeking reflex.

It should be explained to the mother that the infant has natural reflexes and mechanisms that are going to help her feed him/her: seeking, suction and swallowing reflexes that appear very early in the intrauterine life (28 - 32 weeks of gestational age). The seeking reflex will have a slow or imperfect response if the child is less than 30 weeks of postconceptional age. At 32 weeks the response is more complete and rapid. Up to 34 weeks the response should be complete, quick and lasting. If there is no response, the infant should be stimulated again as to get him/her to be fully awake, as explained before.

To feed her infant at her breast, the mother is invited to sit comfortable and straight, in an armless chair without, wearing a gown opened in the front. The infant is placed on the side, in skin-to-skin contact, under the mother’s armpit, besides the breast she is going to feed him/her from. The mother will try to support the hip and the shoulder of the child with the internal face of her forearm. The hand from that same arm that is holding the baby supports the head, placing her fingers in a C shaped manner (fingers around the posterior part of the child’s neck), trying to reach with the middle finger and the thumb the lower part of the fence. In this way the infant’s head position allows him/her to approach the areola. The other hand supports and retracts the breast toward the mother’s thorax.

With the infant slightly upwards and in front of the mother’s chest, the seeking reflex is stimulated by approaching the child’s face to the breast and grubbing the lateral brims of the mouth with the nipple until achieving a maximum mouth opening; at this time the mother must take the infant toward the breast in a firm and rapid movement, in
such a way that most of the areola remains within the child's mouth. This exercise should be repeated until placing the infant correctly to the breast.

The fear to suffocate the infant can be manifested in the mother's resistance to approach him/her to the breast, it will be then necessary for the nurse to explain that the child can breathe freely through his/her nose while she is breastfeeding him/her.

The nurse should hold the infant child from the back of the neck, approaches him/her to the mother’s breast and demonstrate the feeding technique for some seconds. When the infant begins to suck, the mother expresses gently her breast to assure the release of enough milk with each suction effort. The breast must stay withdrawn and slightly slimmered during all the feeding.

The mother can place the pointer finger of the hand that supports the breast, below the child's chin to reduce the downwards excursions of the jaw, favoring an effective suction, particularly in infants less than 34 weeks of post-conceptional age, in whom the co-ordination between suction, swallowing and respiration can be poor. If the child seems to be tired or presents cyanosis, feeding should be stopped.

A way in which mothers can participate in evaluating infants' suction is by counting the sucking movements done between pauses. This allows mothers to appreciate their infants' progress as time goes by. The normal sequence of suction, swallowing and breathing should be of 1:1:1

**In a first level of care**

Health care personnel should be well acquainted with the guidelines for infant’s breast feeding adaptation. Training the mother-child dyad on breast-feeding of premature infants is a question of survival, particularly when there is no other feeding alternative.

The table describes recommended amounts of breast milk according to weight and post natal age (source unknown). We don't have references about the evidences supporting these recommendations. It is also appropriate to remark that feeding recommendations according to weight should be refined taking into account gestational age. For instance, a 36 weeks infant weighting 2000 g. will probably tolerate very well eating every 3 hours, while a 34 weeks, 2000 g. infant may not tolerate well this rhythm. An alternative for determining frequency of feedings is: infants entering KMC weighting between 1500 and 2000 g. should be fed every hour and a half during daytime, and every two hours, during night time. For those under 1500 g. frequency is every hour during daytime, and every hour and half during the night. The mother has to wake up her child for feedings. Daily monitoring of weight gain related with post conceptional age, can help to tailor these recommendations to individual infants.

KMC practical rules

Kangaroo Foundation

Bogota, Colombia
Approximate amount of breast milk needed per feed by birth weight and age.

<table>
<thead>
<tr>
<th>Birth weight</th>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>ml/kg/day</td>
<td>1000 g</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>100</td>
<td>180</td>
</tr>
<tr>
<td>ml per feed</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>feeds per day</td>
<td>6</td>
<td>7-8</td>
<td>8-9</td>
<td>10</td>
<td>12-13</td>
<td>22-23</td>
<td></td>
</tr>
<tr>
<td>ml per feed</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
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<td>12</td>
</tr>
<tr>
<td>feeds per day</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>ml per feed</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
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<td>8</td>
</tr>
<tr>
<td>feeds per day</td>
<td>8</td>
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<td>8</td>
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</tbody>
</table>

Mothers can check if infants had received enough milk by stimulating the seeking reflex once again, before placing them back into kangaroo position.

The mother should maintain her shoulder straight and relax her neck, shoulders and arms to make the position more relaxed and comfortable for her. The nurse can facilitate the mother’s relaxation by touching and squeezing firmly her shoulders and arms to reduce their tension. Large mirrors in the adaptation room can be very useful, because they allow mothers to check and correct their position while nursing their babies.

The mother should know that the degree of development of the sucking-swallowing-respiration coordination of the child, depends on both the maturity reached before birth. Early training, especially not nutritive suction may reduce fatigue in premature of short gestational age (29-32 weeks) and promotes the development of the suction abilities in the premature.

**METHODS FOR MILK ADMINISTRATION**

KMC practical rules Kangaroo Foundation Bogota, Colombia
It is important to describe the different ways to feed both, mother’s milk and formula to the baby. When the infant is immature, instillation by a tube is the preferred method for enteral feeding. Gavage feeding through a nasogastric tube is usually employed in LBWI who are unable to suck and swallow efficiently, i.e. under 32 weeks of gestational age. Gavage feeding can be used in KMC babies. A respiratory rate over 80 breaths per minute contraindicates gavage or any other kind of enteral feeding, because of the increased risk of aspiration.

Use a Nº 5 or Nº 8 French gauge nasogastric tube, depending on the size of the infant. Mark the distance from the mouth to the tip of the sternum on the tube with a felt pen. Then pass the tube through the nose into the stomach until the felt pen mark reaches the mouth. Check the position of the tube by aspiration of gastric content and by injecting one ml of air; a gurgling noise heard with a stethoscope placed over the stomach confirms that the tube is correctly placed. Secure the tube to the infant’s face with a piece of tape. Pour a measured amount of warm (about 37°C) breastmilk into a syringe attached to the tube and allow it to drip in by gravity in 15-30 minutes; never inject under pressure. The volume of the syringe (5, 10 or 20 ml) depends on the volume of milk to be administered. Let the baby suck the breast or the mother’s finger during gavage feeding, to stimulate the sucking ability and the coordination with swallowing. Flush the tube and the syringe with few ml or warm sterile (or boiled) water after each feeding. Remove the tube every 24 hours and change it, but keep it closed or pinched during removal to avoid dripping fluid into the baby’s throat.

Daily during kangaroo adaptation, the nurse will evaluate and stimulate the direct breastfeeding. When the mother is not present, milk can be administrated by cup by trained personnel.
To cup feed a LBWI:
• hold the baby sitting half-upright
• keep the cup in such a way that it just reaches the baby’s lower lip
• let the edge of the cup touch the outer part of the baby’s upper lip
• wait until the baby becomes alert and opens his/her mouth and eyes
• let the baby take the milk himself by lapping it into his mouth with his tongue (do not pour milk)
• let the baby keep small amounts of milk in his mouth for some time before swallowing
• observe the baby: when he has enough milk, he will close his mouth and will not take any more
• feed the baby more often if he does not take the calculated amount
• calculate the intake over 24 hours, be flexible on each feed.

Do this yourself, or better teach the mother of a KMC baby to do it.

Cup feeding should only be employed if the personnel are properly trained and have the time to do it. In overcrowded facilities when staff do not have enough time to devote to each infant, this method may lead to underfeeding the infants. This situation can arise in developing countries. Prolonged cup feeding without proper sucking stimulation delays the maturation of the sucking activity. It is preferable to initiate the kangaroo adaptation as soon as possible, going directly from tube feeding to breastfeeding whenever feasible.

When administering hindmilk, it could be preferable the use of a dropper rather that cup feeding. Is easier for the mother to master it, less milk is wasted and avoids nipple confusion.

• EDUCATIONAL SESSION

When the training session is over, mothers are invited to participate in a short educational session on KMC benefits for the premature baby. Topics discussed include caring for kangaroo babies at home (skin to skin contact, breastfeeding each 90 min during the day and each 120 min during the night, kangaroo clothing, etc.), warnings (never lay him/her down horizontally, never bath him/her until leaving the kangaroo
position), alarm signs (cyanosis, apnea, blood in stool, seizures), nutrition of the breastfeeding mother, usual annoyances of the premature (hiccup, sneezes), activities that the mother can and cannot perform while the baby is in kangaroo position and appropriate position when sleeping with the baby in kangaroo position (see illustration). In kangaroo position the baby is placed vertically on the chest of the mother with the legs and arms on each side of the body. An elastic piece of cloth (lycra) wrapped around the mother's torso can help to hold the baby in position. It is important to insist in the position of the head: completely vertical and the cheek resting against the mother's chest. Both, forward flexion and hyperextension of the head must be avoided to decrease the risk of obstructive apnea.

- MANIFESTATION OF FEARS

After the educational session is over, it is important to encourage mothers to share their concerns and fears, some of which might have emerged during the training process. The idea is to discuss them and solve them jointly. The concerns about awaking and displacing the child are commonly encountered in these meetings, as well as the fear of not providing enough milk (both quantity and quality). Sometimes, particularly with very anxious mothers, the initial fears (suffocation, improper holding so the infant can fall down, etc.) may persist.

- TECHNIQUES OF RELAXATION IN ADAPTATION

To perform this activity the mother is asked to bring a scarf or a traditional shawl that permits her to fasten and carry her child after feeding him/her. The exercises proposed for this activity are stretching, contraction, flexion and circular movements of neck muscles, the arms and shoulders. Afterwards, a relaxation exercise starts. In a calm environment, with low lights and soft music the nurse conducts the relaxation session, asking mothers in a soft tone of voice to keep their eyes closed and to alternatively contract and stretch different body parts, and then relax them while exhaling.

When mothers are very relaxed, it is the moment to deliver positive messages in relationship with their ability to care and nurture their children. Mothers are brought back to an alert state, and are invited to share their experiences.
They are also invited to do this activity at home whenever they feel tired and apprehensive.

- **TESTIMONIES**

An efficient way to show mothers what will be like to deliver kangaroo care at home is to invite an experienced kangaroo mother to comment about her experience and ask her to answer to additional worries of mothers during the kangaroo adaptation.

- **MASSAGE AND STIMULATION OF THE CHILD AT THE BREAST**

This activity is thought to help mothers develop confidence and skills for handling their children. Mothers are asked to bring sunflower oil. While breast feeding the infant, a circular massage starts with circular movements beginning at the nose and moving the fingertips around the eyes. Movements are repeated three times. Massage continues from the nose to the labial commissures (three times) and finally a soft circular massage is applied to the temples of the child. Then the child is undressed and put in skin-to-skin contact with the mother, leaving only the diaper between the mother and the genital area of the child.

The mother pours some oil in her hands and warm it to body temperature. The mother uses her lubricated hand to apply a massage beginning at the infant’s upper part of the back and making circular movements from top to bottom and at both sides of the spine. Then, circular movements and soft pressure about the arms and forearms are applied, ending in the infant’s hand, holding each of the child’s finger and exercising a gentle pressure. The same kind of massage is applied to the lower limbs. Then the infant is placed with the back facing the mother, to allow the delivery of a circular massage on the child’s chest and abdomen. Finally, the baby is turned around, allowing his/her chest to be in contact with the mother’s chest, and giving him/her a gentle hug allowing a close contact between the baby’s and the mother’s bodies. If the mother is very anxious, the nurse can help her hold the child in the appropriate position, allowing the mother to carry out the massage. The duration of the massage should be short, and the environment should be warm, to prevent excessive heat lost.

- **FINAL KANGAROO ADAPTATION SESSION (prior to discharge)**

When the baby is going to be discharged from the neonatal unit, it is necessary to observe the mother’s ability to take appropriate care of her child by herself. At this time the mother’s fears usually emerge again: some mothers will, consciously or unconsciously, try to avoid taking the baby with them. Whenever this happen, the nurse
should help the mother to realize the characteristics of and the reasons for that behavior. The mother’s answer to the question: Do you wish to take your child home? may reflect to a large extent the degree of self-confidence she has in her ability to provide adequate care to her child. It can be helpful to remark to the mother her progress during the adaptation process, and her improving ability to take proper care of the infant. Allowing the mother to externalize and share her fears at this point in time, will help greatly to the success of the ambulatory phase. Real threads and possible solutions can be identified, and candidates for additional support during the out-patient phase of the program can be identified.

5-. Entry standards to the ambulatory Kangaroo Mother Program (eligibility criteria)

- Weight at eligibility < 2001 gm or gestational age <37 weeks
- Having overcome any concomitant pathological condition
- Able to be fed by suction
- Having an appropriate sucking-swallowing coordination (especially for infants less than 34 weeks of post-conceptional age)
- Thriving while in incubator or crib (15-20 gm per day if age > 8 days)
- To have parents (either father or mother) able to adhere to the Kangaroo care protocol and to attend on time to scheduled appointments.
- To have had a successful in-hospital kangaroo adaptation.
- It is necessary to have a complete clinical record including diagnoses and if possible a cerebral sonography before discharging from hospital, as well as a complete physiotherapy evaluation and an ophthalmologic examination.
- Obtain a written informed consent from parents.

It is preferable to make decisions about discharge in the afternoons. In this way, the infants and his/her parents can leave hospital early the following day and can attend to the ambulatory kangaroo care clinic for an additional period of observation before being sent home.

However, in many hospitals discharge occurs at any time (depending on the need for hospital beds) sometimes at moments when personnel from the KMC program are not present. In those cases, the treating physician should follow the following recommendations:

6-. Recommendations for a successful discharge

1. To have a cerebral sonography
2. Don’t forget to give theophylline if the infant if less than 34 weeks of post conceptional age at eligibility or if he/she was receiving it during the hospitalization. (a dose of 4 mg/kg/day is suggested).
3. Offer metoclopramide or cisapride on a routine basis.
4. Give vitamins (A,D,E and K) to satisfy the recommended allowances for premature infants.
5. Ophthalmologic evaluation if the hospitalisation lasted more than one month.
6. Blood type measurement if discharge occurs within 12 hours of delivery.

The infant must be properly referred to the KMC clinic. Ideally both parents and the infant should attend to a visit the day before discharge.

First level of care: When there is any guarantee or possibility that mother come again the next day (they live in rural areas without transport facility or lack of any resources) it is better not to establish an early discharge and to keep the mother in the hospital but not in a medicalized environment. The best place is a small house or a spacious and community room at the hospital where mothers may carry out the activities they have learnt during the intra-hospital adaptation, but without the health professional supervision. As in the ambulatory follow-up, the pediatrician and the nurse come once a day for weighting and examine the kangaroo infant. When the child has a proper weight for a weekly follow-up, he/she is discharged for the ambulatory kangaroo mother program. This technique allows not loosing the advantages given by the KMC of a deep ability feeling for bringing up the children with more responsibility towards a delicate child. Ideally, the mother could cook and wash up in this space and to be visited by relatives, including brothers and sisters. Mothers of KMC babies can do whatever they like: they can walk, stand, sit or lie down. They can rest during the day and sleep during the night. The hospital should organize for them recreational (e.g. reading, radio, television), educational (e.g. classes for literacy, general or specific health education, nutrition of their infant, oral rehydratation, vaccinations, hygiene......), or income-generating activities (a good way of using the long time in hospital is to learn something that will be useful at home), mothers can attend as much as they like.

7.- The Kangaroo Outpatients Visit.

The arrival of the preterm infant to the post-conceptional age of 40 weeks (arrival to term) is an important event. That is the date when he/she should have been born if delivery had been at term. Follow-up is organized differently depending on the post-conceptional age of the preterm infant, and frequency of visits and activities are not the same for infant before and after reaching term.
An objective of all the general care of preterm infants, and particularly of KMC is to allow the premature infant to reach the 40 weeks of post-conceptional age in the best possible psychological and physical status, as similar as feasible to those of a full term newborn infant. Once the infant reaches term, the follow up schedule is the same that is usually employed with any high-risk newborn infant. Follow up is conducted to at least the corrected age of one year.

Frequency of visits:

First Principle: in any case where there is doubt about the mother's ability to take care of the child, the mother-infant couple should be seen at the clinic every day, until the suspected problems are solved.

- When an infant is included in the KMC Program, he/she must be seen daily until is gaining at least 10-15 g. per kilo per day.
- Once he/she is thriving properly (at least 10-15g. per kilo per day), he/she is seen at least once a week until he/she reaches the normal term (40 weeks of post-conceptional age).

- After he/she reaches this term, the child would be seen according to the usual follow-up schedule for a high-risk infant:
  - Monthly: up to 3 months of corrected age
  - Every 6 weeks until at least 6 months of corrected age
  - Every third month until 1 year of corrected age.

Out-patient Clinic visits' objectives

- Monitoring of child’s acute weight, length and head circumference progresses according to standard norms for each country
- Complete clinical examination. Infants of very low birth weight are examined while sitting on an anti-reflux seat or lying on an inclined examination table with the head higher than the rest of the body. Clinical exam should take as little time as possible, to minimize heat loss.
- Early detection of any problem which would require specialist's consultation, particularly problems needing physiotherapy
- Check whether the child attended to the ophthalmologist’s consultation and to the appointments for intensive physiotherapy.
- Check on completeness of immunizations.

Neurologic and psychomotor development:
• An evaluation of neurological development should be done at term, 3, 6, 9, and 12 months of corrected age. For neurologic status screening, the INFANIB screening test can be employed. Any infant showing a transitory or abnormal neurological screening test result on the INFANIB scale, should be referred to both physical and occupational therapy for a full evaluation and treatment plan.

• An evaluation of the psychomotor development at 3, 6, 9, and 12 months of corrected age should be performed. For psychomotor development assessment, a properly validated scale should be used. Additionally, the mother-infant relationship should be assessed, using appropriate and locally validated instruments.

8-. The Kangaroo Ambulatory Adaptation (KAA)

**IDEAL GOAL: TO OBTAIN AN INCREASE OF WEIGHT OF 15-20G/Kg/DAY UNTIL THE REACHES TERM (40 WEEKS OF POST-CONCEPTIONAL AGE). AFTER TERM, WEIGHT GAIN SHOULD BE of 7-11gm/day. LENGTH AND PC SHOULD INCREASE BY 0.7 cm PER WEEK.**

Although a successful in-hospital KMC adaptation is required to enter the ambulatory phase of KMC, it does not guarantee that the same success will be achieved once the patient is at home. Therefore, an ambulatory kangaroo adaptation is also needed. The in-hospital adaptation can be done with the infant and the mother rooming together, or with the mother attending to the hospital for several hours a day, and after the mother leaves, the baby returns to the neonatal unit. In any case, the infant status can be monitored as frequent as necessary, and emergency interventions initiated promptly.

In contrast, during ambulatory KMC, parents are the main caregivers and they should be properly trained to play their role, and should have easy access to emergency care. Risks such as hypoglycemia can not be ruled out completely, and for this reason, during the ambulatory adaptation period the infant must be seen daily at the KMC clinic and the parents should be provide with a telephone number in case of emergency.

The KAA begins the first day of entry to the KMC outpatient clinic, when the child’s weight and length are measured and a complete clinical exam is made. The previous medical history is carefully checked, paying particular attention to verify gestational age at birth, apgar score at birth (when available) all important conditions and problems occurring prior to eligibility to KMC and treatments administered, current therapies.

A small weight loss during the first two days of ambulatory KMC can be tolerated.
Infants that have had an extended hospitalization usually enter the program presenting particular problems: low weigh, malnutrition, partial breast feeding or not breast feeding at all. In those cases it is many times necessary to supplement breast feeding with preterm formula (for administration guidelines see bellow) in order to achieve an appropriate weight gain rate.

Attempting a relactation is very important in these children. Relactation means making breastmilk flow again. For a good start of relactation, as soon as the baby starts sucking, it is necessary to ensure that mother and baby relax together in skin-to-skin contact. The mother should be asked to avoid the bottle; cups, spoons and droppers must also be used carefully. After proper stimulation, allow the baby to take the nipple and areola; check that attachment to the nipple and position are correct. Use a specifically designed relactation device (such as the SNS Starter™ made by Medela, or other similar device), or a locally made device with a small caliber catheter inserted into a small and clean plastic bottle. This small plastic bottle containing the desired amount of expressed breastmilk (or preterm formula if breastmilk is not available), hangs from above. The connected small size tube is taped to the breast in such a way that its opening reaches the nipple. The relactation device works in the way of a drinking straw.

Allow the baby to suck the nipple, including the tube. Instruct the mother to stop the flow of breastmilk or milk from the device after about 5 minutes, to avoid “tube confusion”: newborn infants are very smart and quickly learn that it is the tube, not the nipple, that produces milk. In this way the nipple gets stimulated and breastmilk is extracted, a mechanism that increases milk production progressively. Tell mothers that this is a slow process: it will take several days or weeks before breastfeeding is established. Do not cheat them by ensuring that the baby will be fully breastfed in a couple of days! Relactation is easier if the baby stopped breastfeeding recently; the longer this interval the lower the rate of success. Some research in India showed that relactation is possible in more than 90% of mothers, with motivation, support and repeated suckling, and without using galactogogues.

The technique for administration of hindmilk should be used, for infants who, regardless of their weight of gestational age, fail to empty the mothers breast. In very immature infants (particularly those under 34 weeks of post-conceptional age) or in any infant who gets tired while sucking, hindmilk should be feed using a dropper every two meals.

Preterm formulas used only as a supplement to breast milk, basically to optimize the infant’s proteins, calcium and phosphorus intake. It is used instead of breast milk fortification, an expensive technique that is seldom available in developing countries.
9.- **Management protocols for Kangaroo outpatient visits**

**The Kangaroo position**

- The infant is placed in an upright position, facing the mother, 24 hours a day, his/her cheek against the mother’s chest, and between her breasts. The infant can be also placed on the chest of another healthy person willing to assume the mother’s role if the mother is unable to do it. Besides the mother, fathers, aunts and uncles, grandparents, sisters and brothers or any other relative are appropriate kangaroo position providers \(^{34,35}\)

- Auxiliary technique: A lycra-band is used around the mother’s chest, giving support to the child, and helping the mother to move freely while providing Kangaroo position. These special band do not need to be expensive: a local or hospital tailor can make them. The mother can cover herself and the baby with her usual clothing. Special garments are not needed and the mother can wear whatever she thinks is appropriate for the climate (temperature and humidity) and the culture, provided the clothing contains the baby, i.e. keeps him/her firmly and comfortably in contact with her skin. Should the room temperature drop below 18°C, when it starts to become uncomfortable also for mothers and staff, clothing becomes insufficient to provide warmth and the room must be warmed by other means so the mother is not cold.

- The infant is dressed in a sleeveless t-shirt, made of a soft, natural fabric like cotton, a little warm hat, bootees and a cotton diaper. The infant’s chest skin should be exposed, to allow skin-to-skin contact with the mother. All the child’s clothing should be washed with mild soap, hypo-allergic as well as rinsed in plenty of water adding vinegar or lemon whenever possible.

**Objective of the Kangaroo Position**

- To allow skin-to-skin contact will all the demonstrated benefits the position implies: appropriate temperature maintenance, apnea prevention, etc.
- To prevent aspiration of gastric contents, which is one of the major causes for sudden death and hospital admission.

- The length of time in Kangaroo Position is determined by the infant. In other words, the infant “decides” when to be discharged: he/she shows to be uncomfortable, gets limbs out, cries and fusses every time the mother tries to put him/her back again in
the kangaroo position. This usually happens when the baby reaches 37-38 weeks of gestational age with an average weight of 2000 - 2200 gr.

What is forbidden?
To lay the infant horizontally
To bath him or her while in Kangaroo Position
To band him or her
Excessive handling
To bottle-feed the baby if a successful lactation is desired
Any contact with sick people

Kangaroo feeding

- **Breastfeeding**
  It is imperative to emphasize the importance of breastfeeding. Breastfeeding should begin at birth. If the infant is at the hospital and he/she cannot be breastfed, the mother will squeeze her milk manually inside a plastic bottle with the purpose of conserving the antibodies (otherwise antibodies will be attached to the glass). The infant should be placed, as soon as possible, at the mother’s breast. For this reason the mother should be permitted to stay in the hospital close to her baby. Through scheduled conversations, mothers are always reminded, once or twice a week, about the importance and benefits of breastfeeding the baby. The infant with weak sucking will be fed with hindmilk until he is capable of emptying at least one breast during the feeding. It will be explained to the mother how to express the foremilk and collect it inside a sterilized plastic bottle. This foremilk can be administered after the hindmilk if he/she continues to be hungry. The milk is given by means of a dropper or a spoon. If the infant gets easily tired while sucking and/or the weight gain is less than 15 gm per kilo per day, it will be explained to the mother the manual expression technique to alternate breast feeding with administration of expressed milk by dropper. There should be no limit time for breastfeeding. On the contrary, the longer the mother is able to do it, the more benefits will come from it. When the mother returns back to work and wishes to keep breastfeeding her baby, she will receive appropriate advice and instructions.

- The goal regarding nutrition is, on top of any other consideration, to obtain an adequate nutrition of the kangaroo infant.
- Nutrition should be started with exclusive breast feeding independently of the weight, gestational age and length of stay in hospital. Breast feeding is offered, on average, every 90 minutes in the day and every 120 minutes during the night.
- If the baby is older than 10 days, is not thriving, gets easily tired while sucking the breast, the mother is instructed to feed him her expressed breast milk by dropper every two meals.
- If it doesn’t work, hindmilk is administered every two meals.
- If definitively the kangaroo baby is not thriving (15gm/kg/day) a preterm formula supplement accounting for 25% of the daily requirements can be administered (see below).
- If despite all these, the infant does not thrive properly, an underlying condition should be ruled out. It is usually necessary to admit the infant to hospital to conduct a proper workout and treat vigorously any heavily suspected or demonstrated condition.

Formula feeding

Babies in the Kangaroo Program, who do not thrived with breastmilk or final milk, and for whom no pathological cause can be shown may receive a supplement of preterm formula. The supplement should provide initially 25% of the daily allowance on the basis of 180-200 cc/kg/day. (the total daily allowance should not be greater than 200cc/kg/day in order to prevent a ductus arteriosus reopening). This supplement is distributed during the day and is given by spoon or dropper, so that, there is no interference with breastfeeding. This supplement can be given, if necessary, until the normal term is reached. Then at 40-41 weeks of gestational age the complement should be stopped to give exclusively breastmilk. Training sessions on the preparation of formula milk will be given to relieve the family from feeling guilty, when there is no possibility of breastfeeding (Mother’s death or mother’s reject) or when the supplement is given, trying to reduce infectious risks and episodes of acute diarrhea.
Administration of profilactic medications

Theophylline

**Indication:** History of apnea during hospitalization; post-conceptional age ≤ 34 weeks at entry to KMC; apnea evidenced during examination without bradycardia or cyanosis; if the mother describes episodes of periodic respiration during the interview and discharge from hospital with theophylline

**Dosage:** 4-8 mg/kg/day in 3-4 doses

**Duration:** Variable according to pediatrician's opinion, usually up to 40 weeks of post-conceptional age

Metoclopramide

**Indication:** All babies

**Dosage:** 1-2 mg/kg/day in 3-4 doses.

**Duration:** Systematically until 6 months. Afterwards in case of symptoms of gastro-oesophageal reflux

Multivitamines

**Indication:** Systematically

**Dosage:** The appropriate dose/day that requires a low birthweight baby in vitamin A (2000IU), Vitamin D (800 UI) and E (25IU) and Vitamin K 1mg per week IM if exclusive breastfeeding.

**Duration:** Until the child reaches the term and afterwards according to the pediatrician's opinion.

Iron

**Indication:** Systematically after 1-2 months of extrauterine life

**Dosage:** 1 - 2 mg/kg/day

**Duration:** Until the child reaches one year of chronological age

Folic Acid

**Indication:** Systematically from 2 months after birth

**Dosage:** 5 mg/day

**Duration:** Until solid food is started
REQUIREMENTS

KMC is feasible everywhere, because it is not based on equipment, and it presents advantages for the organization of health services provided the following requirements are met:

- The health facility (the hospital or the neonatal ward) should have an open doors policy for parents at all times. A room near to or at the neonatal unit, furnished with comfortable seats for the mothers, is needed for conducting the kangaroo adaptation and for teaching and training mothers. The presence of a nurse available full time, trained in the kangaroo technique, is indispensable. The nurse works in close relation with physicians and staff from the neonatal unit, conducts the mother and infant adaptation sessions at least twice a day at the KMC room. This nurse is responsible for evaluating the quality infants sucking effort, the suction-swallowing-breathing coordination, the parental capacity for delivering kangaroo care, etc. The nurse also should take the socio-professional history of the mother and should collaborate with the physician in charge on the elaboration of the clinical record summary at discharge from the neonatal unit. There should be at least one nurse per every 10 infants in the program.

- Breastfeeding must be the official feeding policy of the hospital for all newborn infants. The difficult task of breastfeeding preterm and LBWI becomes almost impossible if the whole hospital environment is not appropriate and the staff is not already used to promote breastfeeding (i.e. knows the basic techniques) with normal newborn infants. There should be facilities to express, store and administer breast milk. Human milk fortifiers, if available, as well as vitamins and micronutrients, are useful in LBWI, in particular the small and very small ones. The hospital staff should be able to use alternatives to the bottle (cup, spoon, syringe) for expressed breast milk or formula feeding. Staff should also be familiar with oro and nasogastric feeding. All the materials and supplies needed for feeding must be always available.

- All the staff should receive adequate training on KMC, including the special breastfeeding and feeding needs of LBWI. Extra training is usually needed on stimulation of breastfeeding, expression and conservation of breastmilk, mode of administration of expressed breastmilk, and daily monitoring of growth. Simple breastfeeding on demand is inadequate for LBWI, and the staff should know how to implement a breastfeeding program that takes into consideration the nutritional needs of each baby. The staff should also have the knowledge and the skills to decide when and how to supplement breastfeeding with preterm formula or another suitable
supplement, if necessary (failure to thrive with exclusive breastfeeding). The staff should also be fully trained on monitoring and taking appropriate action. In addition, they should have good knowledge of infant development and the type of care appropriate to degree of maturity, and on how to provide encouragement and support to mothers and families. Continuous education is needed in addition to initial training. As soon as possible, nursing and medical schools should include KMC in their curricula. The number and type of staff available does not affect the possibility of implementing KMC, provided there is mutual agreement among all the personnel involved and between them and the mothers, and provided an adequate training and education program is in place.

- Whenever good quality follow-up (including initial daily follow up visits) can not be warranted, early discharge in kangaroo position should be not attempted. On the contrary, KMC should be provided as an in-hospital activity, allowing mothers and infants to room together for as long as needed.

- For both early discharge (ambulatory KMC) and LBWI follow-up clinic, health care visits can be conducted simultaneously for several patients. This type of collective visit facilitates the exchange of experiences. A room large enough to accommodate comfortably seated a sizable number of mothers (15 to 20) is needed. Physical exams, educational activities and ambulatory KMC adaptation activities take place in this area as the kangaroo ambulatory adaptation also takes place there. Patients are seen by a multidisciplinary team, which can include a pediatrician, a pediatric nurse, a physical therapist, a psychologist, a social worker and any other health personnel that might be needed. The follow-up clinic should give priority to booked visits for LBWI. Support groups in the community should be involved, if possible, for support at home (social, psychological and domestic work support).

Besides human and physical resources, implementing a KMC program needs institutional, social and health care workers support. During the II International Workshop about KMC, problems faced while implementing KMC programs were discussed and possible solutions were suggested. The basic strategy for facilitating the implementation and success of KMC programs can be summarized in three words: communication, sensitiviness and education.

To obtain these goals, it is necessary:
- To have clear care protocols adapted to local needs and circumstances
- that enough time is devoted to disseminating the idea, sensitizing in a progressive way not only the staff of the health care facility centre, but also families of LBWI and the community.
- To have access to good quality evidences supporting KMC and to share that information with all the professionals at the health care facility.

A serious and common problem is the lack of adequate physical space sufficient and properly trained human resources. Initiating a KMC program in very precarious conditions might prove counter-productive. It is necessary to make an initial effort to provide the program with the minimum facilities for a safe operation.

STRATEGIES FOR IMPLEMENTING A KMC PROGRAM

For the implementation of a KMC program, the coordinate action of health authorities at the national and provincial level is needed, to assess local and regional needs, health facilities at different care levels that would be involved and to initiate the training of health care personnel.

In places where neonatal mortality is very high, one of the first obstacles to implementing KMC is the fatalism of mothers. When the baby is stabilized and KMC starts, tell the mothers that the most critical period has passed, and that chances for survival are increasing, and that the result will can be good if they take appropriate care of their babies. Explain that KMC is very demanding for a mother. Whatever her social and cultural level, the mother must be fully aware of the program she will go through.

When the initial difficulties are over, with the continuous support of the staff, mothers usually apply KMC with enthusiasm. By sharing the same experience during the in-hospital adaptation and during the ambulatory care, KMC mothers and fathers develop a sense of mutual solidarity and exchange information, opinions and emotions. They also support each other. They are empowered as main caretakers of their LBWI, after a period of impotence and frustration during stabilization and hospitalization. They regain their maternal and paternal role from physicians and nurses. The great majority of mothers consider KMC convenient, comfortable and easy. Some will complain about the work at home, even if partners and families provide support. The acceptability of in-hospital KMC for mothers has been described in several studies. A common issue raised by most participants at the II International Workshop about KMC in Bogotá was the lack of international and local clinical management guidelines. General policy and guidelines should be adapted to each country conditions and needs. It is very important the creation of centers of documentation in KMC, regularly updated and easy accessible from both developed and developing countries.
First Kangaroo Adaptation according to the setting

At birth:
in the delivery room, or in the community (in case of delivery by birth attendants)
Kangaroo position
Breast feeding

In Intensive Care Unit
Skin to skin contact a few hours a day
No nutritive sucking,
Massage

In rooming-in
Kangaroo Position
Kangaroo Nutrition (Breast feeding)

Home

Transitional or Minimal Care Unit
Kangaroo Position
Kangaroo Nutrition (Breast feeding)
No nutritive sucking
**Kangaroo Position according to the setting**

**NICU**
- Baby naked with diaper.
- Hot environment.

**Transitional or Minimal Care**
- Collective and individual kangaroo adaptation in a room inside the unit.
- Diaper, Cotton sleeveless shirt, hat and socks are needed to take the baby out of the incubator.

A support can be used to carry the baby.

*In Colombia we use a lycra band*

**In rooming-in or at home**
- Diaper, Cotton sleeveless shirt, hat and socks.
- In hot and wet climate: cotton scarf between the baby’s face and the mother’s skin to avoid the sweat.
- Sleeping in semi-seated position.
- At home the father or other member of the family can and must carry the baby.

**Transfer in Kangaroo Position from community to local hospital**
**In delivery room or in community**

Exclusive breastfeeding if possible as soon as possible by sucking.
If no sucking in community, breast milk by dropper and transfer.

**In UCI**

According to the rules of the setting
Breast Milk by tube whenever possible and as soon as possible.

**In rooming-in, minimal or transitional unit**

Breastmilk by sucking or tube.
Monitoring of daily weight gain.
If necessary (inadequate weight gain) complement by dropper or cup (Milk power or liquid milk for premature or fortifier according to the setting).

**At home**

Same than rooming-in except the tube (single experience in Vietnam).
Fortifiers are difficult to use at home.
Time of administration of milk according to weight and maturity of the baby.
If the mother and the family agree to come back the next day, the discharge will be independent from the actual weight or gestational age. The baby must only fit with the eligibility criteria to enter in the out-patient kangaroo program. If it is not possible due to lack of transportation or extreme poverty, it would be better to keep the baby in a community room where the mother will take care of him until the baby gains 15g/Kg/day. Then they can be discharged with a weekly follow-up up to term.