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Maternal and Child Survival Program

An Assessment of the Status of Kangaroo Mother Care in the Dominican Republic: Findings and Considerations for Sustainability

Final Report

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The Maternal and Child Survival Program (MCSP) is a global, $560 million, 5-year cooperative agreement funded by the United States Agency for International Development (USAID) to introduce and support scale-up of high-impact health interventions among USAID's 25 maternal and child health priority countries,* as well as other countries. The Program is focused on ensuring that all women, newborns and children most in need have equitable access to quality health care services to save lives. MCSP supports programming in maternal, newborn and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment.

* USAID's 25 high-priority countries are Afghanistan, Bangladesh, Burma, Democratic Republic of Congo, Ethiopia, Ghana, Haiti, India, Indonesia, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Pakistan, Rwanda, Senegal, South Sudan, Tanzania, Uganda, Yemen and Zambia.

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Abbreviations

BASICS	Basic Support for Institutionalizing Child Survival
DR	Dominican Republic
EBF	exclusive breastfeeding
HMIS	Health Management Information System
KMC	Kangaroo Mother Care
LAC	Latin America and Caribbean
LBW	low birthweight
MCHIP	Maternal and Child Health Integrated Program
MCSP	Maternal and Child Survival Program
MOH	Ministry of Public Health
NGO	non-governmental organization
NGT	nasogastric tube
NICU	neonatal intensive care unit
SSNB	small and sick newborn

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Introduction

Preterm birth, a common cause of low birthweight (LBW) and newborn illness, is the leading cause of mortality in children under the age of 5 years, and its complications account for 40% of newborn deaths globally (WHO, 2012). Strengthening care for premature infants is critical to reducing infant and child deaths. This vulnerable population requires specialized care to maintain warmth, prevent infection, and ensure early and exclusive feeding of breast milk. Kangaroo mother care (KMC) is a method of care for premature and LBW infants to ensure warmth and bonding between mother and baby and involves the following core components: 1) skin-to-skin care with the mother, 2) exclusive breastfeeding (EBF), and 3) close follow-up and support to the mother-newborn dyad and the family. KMC been shown to reduce mortality by 40% in premature babies when implemented appropriately, reduce the risk of infections, and provide benefits for thermal protection, growth, breastfeeding, and bonding with the mother (Conde-Agudelo A, Díaz-Rossello J, 2014).

Quick Facts: Dominican Republic[1]	
Exclusive breastfeeding	**5%**
Early initiation of breastfeeding	**38%**
Infants with LBW	**14%**
Preterm births	**10.8%**
Neonatal mortality	**21/1000 births**
Infant mortality	**27/1000 births**
Under-5 mortality	**31/1000 births**
Mothers who receive antenatal care	**99%**
Births that take place in a health facility	**96%**

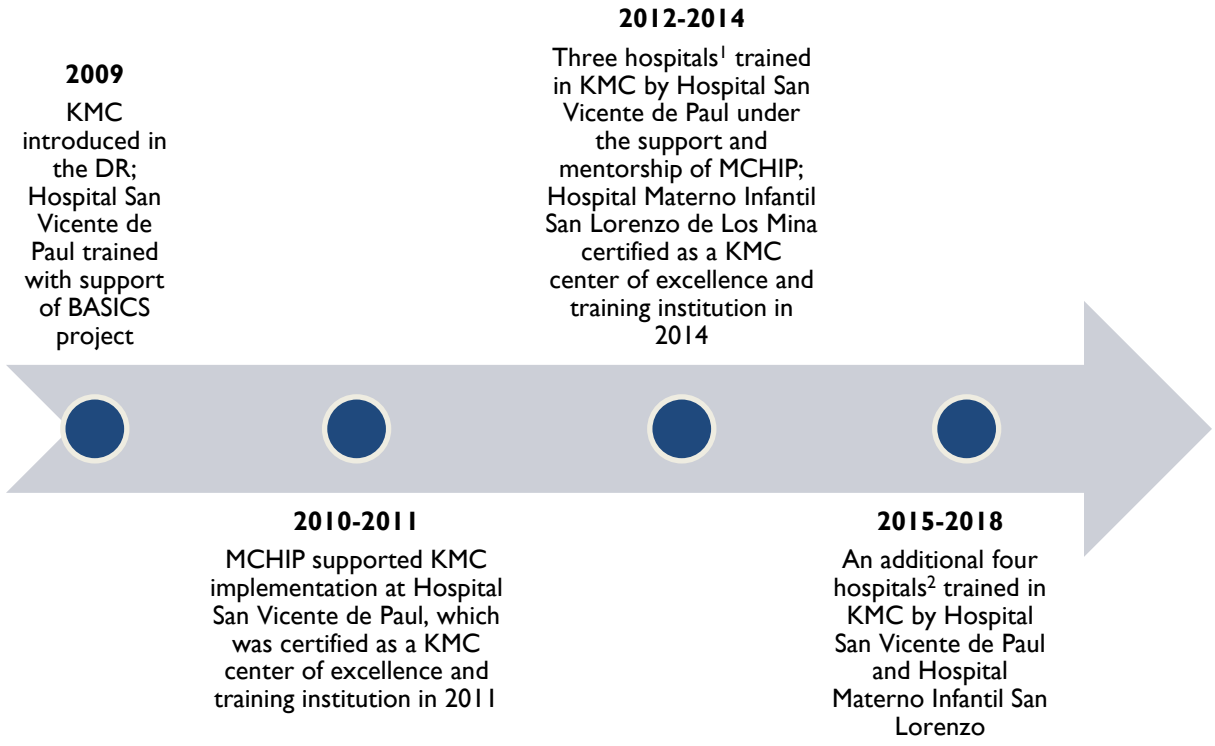
In the Dominican Republic (DR), despite the fact that 96% of births take place in a health facility with skilled birth attendants, the neonatal mortality rate remains high at 21 per 1000 live births (CESDEM, ICF, 2015) (UNICEF, 2016). This signifies significant gaps in newborn health services and the need to strengthen the provision of care among this population. To address this problem and improve care for preterm and LBW infants, in 2009[2] the USAID-funded Basic Support for Institutionalizing Child Survival (BASICS) project provided technical support for high-impact, evidence-based newborn health interventions, including KMC. BASICS supported the introduction and roll-out of KMC in the DR at Hospital San Vicente de Paul, a regional referral hospital (see Figure 1). Support for KMC implementation continued under the USAID-funded Maternal and Child Health Integrated Program (MCHIP) from 2010-2014. Following the training of staff that took place under BASICS, this Hospital San Vicente de Paul was certified under MCHIP's support as a KMC center of excellence and training institution[3]. The introduction and implementation of KMC programs at an additional three hospitals were supported under MCHIP. These three hospitals—Hospital Materno Infantil San Lorenzo de Los Mina, Hospital Regional Dr. Antonio Musa, Hospital Dr. Luis Manuel Morillo King—were trained by Hospital San Vicente de Paul KMC staff. These hospitals were chosen given they are all regional or national referral hospitals with a high number of deliveries (see Table 1). In addition to Hospital San Vicente de Paul sustaining and growing its own KMC program, it was building local capacity by training additional hospitals in the DR to implement KMC programs. MCHIP programmatic data found that newborn mortality at Hospital San Vicente de Paul was reduced from 44 per 1,000 live births in 2009 at the time of KMC roll-out to 25 per 1,000 live births in 2012.

The DR has continued to demonstrate achievements in KMC following the close-out of MCHIP in 2014, as staff from an additional four hospitals— Hospital Maternidad Nuestra Señora de la Altagracia, Hospital

[1] *Sources:* (CESDEM, ICF, 2015) (UNICEF, 2016a)
[2] At this time, neonatal and infant mortality were 23 per 1000 births and 32 per 1000 births, respectively.
[3] This certification is provided by the Kangaroo Foundation.

Presidente Estrella Ureña, and Hospital Infantil Robert Reid Cabral—were trained on KMC by staff from San Vicente de Paul and Hospital Materno Infantil San Lorenzo de Los Mina from 2015-2018 (see Figure 2). Despite this progress, significant challenges remain in growing and sustaining KMC in the DR, as it is not included in national maternal, newborn, and child health policies, strategies, and guidelines. Because it is not an initiative implemented through the Dominican Republic's Ministry of Public Health (MOH), KMC implementation has relied heavily on support from donors, implementing partners, and hospital staff's personal funds. With the Dominican Republic having one of the highest neonatal mortality rates in the Latin America & Caribbean (LAC) region, it is crucial that concerted efforts are taken to strengthen the implementation and ensure the sustainability of high-impact interventions, including KMC, in the DR.

Figure 1. Timeline of KMC implementation in the Dominican Republic



[1] Hospital Materno Infantil San Lorenzo de Los Mina, Hospital Regional Dr. Antonio Musa, Hospital Dr. Luis Manuel Morillo King
[2] Hospital Maternidad Nuestra Señora de la Altagracia, Hospital Presidente Estrella Ureña, Hospital Infantil Robert Reid Cabral, Hospital Regional Juan Pablo Pina

To better understand the status of implementation and challenges that remain in scaling up and sustaining KMC in the DR, MCSP conducted an assessment of KMC at the health system and facility levels at the eight hospitals that have received KMC training. The MCSP-led assessment of clinical practices at the hospital level was conducted with the assistance of the Kangaroo Foundation (Colombia). Assessment activities, which took place March-May 2019, were conducted through interviews with key MOH and National Health Service staff as well as at the eight hospitals. This report details the status of implementation of KMC in the DR along with key bottlenecks and challenges in KMC implementation and proposed solutions.

Objectives

The objectives of this assessment were to:

1. Assess the status of implementation and scale-up of KMC in the Dominican Republic
2. Assess for gaps and bottlenecks in implementation of KMC at the health system and facility levels
3. Propose recommendations for sustaining and further expanding the implementation of KMC in the Dominican Republic

Methodology

To assess gaps and bottlenecks at the health system level, the Every Newborn Bottleneck Analysis Tool (Healthy Newborn Network, 2013)—which is used to assess barriers and identify solutions to scale-up newborn care within the health system—was adapted by MCSP to provide an increased focus on KMC. Using the adapted tool, MCSP conducted interviews with key national-level MOH and National Health Service personnel. Additionally, facility-based observations and interviews were conducted with clinical[4] and supervisory staff[5] at each of the eight health facilities that received KMC training. Qualitative data was obtained from these interviews and observations to help assess gaps and bottlenecks at the health system and facility levels and understand the level of implementation of KMC. Health systems policy-related information was also extracted from national policies and guidelines, then collated and analyzed for the presence/absence of significant bottlenecks.

To assess the clinical components of KMC implementation at the hospitals, the Kangaroo Foundation's KMC Facility Assessment Tool (Kangaroo Foundation, 2014)—which assesses the clinical aspects of a facility's inpatient and ambulatory KMC program and determines if they meet criteria for certification as a recognized KMC program—was used. Collection of data on the clinical components of KMC was conducted through hospital-based observations and interviews with hospital staff. Additionally, clinical service and mortality indicator data was collected as available. Of note, given it was determined prior to the hospital visits that two of the hospitals have undergone KMC training but have not yet started a KMC program, the clinical assessments were conducted at only six of the eight hospitals.

We assessed bottlenecks in the following six World Health Organization (WHO) health system building blocks:

1. Policy, Leadership, and Guidance
2. Health Workforce
3. Health Service Delivery
4. Health Financing
5. Health Information Systems
6. Supplies and Technology

No identifying information was collected from key informants or on patients from clinical records. Given the nature of this assessment and that the anonymity of key informants was maintained and no patient

[4] Nurses, neonatologists, pediatricians, obstetricians
[5] Hospital administrators, clinical supervisory staff

information was collected, the ethical research committee in the United States determined this to be non-human subjects research. Through discussions with the Dominican Republic's MOH, it was determined that, due to the nature of this assessment, did not warrant needing to go through review by the Dominican Republic's ethical research committee. Because of this, approval from an institutional review board was not warranted.

Results

Of the eight hospitals that have undergone training in KMC, six have built a KMC program (see Table 1). The two facilities that have not yet built a KMC program noted it was due to lack of financial resources, structural capacity, and/or buy-in from hospital administration, but staff from these hospitals expressed their intent and commitment to continue working on developing a KMC program. All eight hospitals visited are tertiary hospitals, acting as referral hospitals at either the regional or national level. Each hospital has a neonatal intensive care unit (NICU) to provide specialized care for small and sick newborns (SSNBs); however, one of the hospitals—Hospital Infantil Robert Reid Cabral—provides pediatric care only and does not provide maternity services. Because of this, all infants initiated on KMC at this hospital are referred from a facility with a maternity ward.

Table 1. Hospitals in the Dominican Republic that have undergone KMC training

Hospital	Province	Level of Care/Type	Provides Maternity Care (Y/N)	Date of KMC training	Implementing a KMC program? (Y/N)	# of KMC admissions in 2018	# of deliveries in 2018
Hospital San Vicente de Paul	San Pedro de Macoris	Tertiary/ Regional	Y	2009	Y	148	1756
Hospital Materno Infantil San Lorenzo de Los Mina	Santo Domingo	Tertiary/ National	Y	2012	Y	806	3700
Hospital Regional Dr. Antonio Musa	San Pedro de Macorís	Tertiary/ Regional	Y	2013	Y	*	3102
Hospital Dr. Luis Manuel Morillo King	La Vega	Tertiary/ Regional	Y	2013	Y	146	2864
Hospital Maternidad Nuestra Señora de la Altagracia	Santo Domingo	Tertiary/ National	Y	2016	Y	300	9509
Hospital Presidente Estrella Ureña	Santiago	Tertiary/ Regional	Y	2015	N	N/A	*
Hospital Infantil Robert Reid Cabral	Santo Domingo	Tertiary/ National	N	2015, 2018	Y	134	N/A

Hospital	Province	Level of Care/Type	Provides Maternity Care (Y/N)	Date of KMC training	Implementing a KMC program? (Y/N)	# of KMC admissions in 2018	# of deliveries in 2018
Hospital Regional Juan Pablo Pina	San Cristóbal	Tertiary/ Regional	Y	2018	N	N/A	*

*Unable to obtain this data from the hospital

A summary of key bottlenecks found to significantly impede the provision of KMC are outlined in Table 2 as well as recommendations for addressing the challenges. Within the context of the six WHO health system building blocks, these bottlenecks as well as facilitating factors are discussed in further depth below.

Table 2. Identified bottlenecks and proposed solutions, per WHO health systems building block

Building block	Bottleneck	Recommendations
1. Policy, Leadership, & Guidance	KMC not included in national newborn health and nutrition strategies or protocols	Advocate for national level support for KMC and inclusion into national strategies and protocols
	No KMC guidelines instituted in the Dominican Republic	Continue to develop/finalize KMC guidelines alongside the eight hospitals, MOH, and National Health Service
	National newborn health and nutrition strategies do not prioritize early and exclusive breastfeeding	Advocate for an increased focus in improving breastfeeding practices, including by prioritizing early and exclusive breastfeeding in national strategies
2. Health Workforce	Lack of job aids and patient education materials in KMC	Budgeting for the development/printing of job aids and education materials on KMC in annual hospital budgets
	Registered nursing shortages nationwide	Continued focus in building the nursing field in the DR, including via incentives
	Lack of skilled staff trained to provide adequate KMC	Include KMC in pre-service training curricula; Regular in-service trainings and on-site mentoring on KMC
	Lack of supportive supervision mechanisms from the national or hospital levels to health providers	Development of mechanisms to institute routine supportive supervision around KMC
3. Health Service Delivery	Inadequate space/seating for parents to provide KMC on demand	Improved organization and/or structural capacity of NICUs/nurseries to include seating for parents to bond with, provide skin-to-skin care, and breastfeed infants
	Inadequate geographic coverage of KMC nationwide	Advocacy for increased coverage of KMC services, including in the North/Cibao and South macro-regions as well as in lower levels of care
	Inadequate space in the ambulatory KMC units	Advocacy for increased structural capacity of the ambulatory KMC units
	Lack of psychomotor development or neurological evaluations in KMC	Psychological services to include psychomotor development evaluations and addition of neurological services in KMC
	Suboptimal feeding practices	Integrate dietitians into KMC programming to strengthen feeding practices of SSNBs
	KMC not routinely provided in the delivery, NICU, or nursery wards	Increase the capacity of all staff in the delivery, NICU, and nursery wards in KMC
	No domestic investments in KMC	Advocacy for governmental investments in KMC

Building block	Bottleneck	Recommendations
4. Health Financing	Inadequate governmental investments in the health sector	Advocacy for an increased proportion of the national budget to go to the health sector
5. Health Information Systems	HMIS does not track EBF at discharge from the facility and % of LBW/ preterm newborns initiated on KMC	Incorporation of these indicators into the HMIS and internal monitoring plans; prioritization of early breastfeeding initiation within national nutrition policies
	Hospitals do not routinely track breastfeeding data or have routine monitoring systems in place to track progress in KMC programming	Routine monitoring of early and exclusive breastfeeding; Institute protocols to routinely monitor KMC outcomes to inform KMC and newborn health programming
6. Supplies and technology	Inadequate or lack of breast pumps, breast milk storage cups, refrigerators, electronic metric system scales, wraps for skin-to-skin care	Inclusion of these supplies into the national ordering system for facility-based newborn health

I. Policy, leadership, and guidance

A significant bottleneck in policy, leadership, and guidance is the lack of guidelines for KMC in the Dominican Republic at the national level or hospital level. In addition to KMC not having standalone national guidelines, it is not mentioned in any national maternal, newborn, and child health and nutrition policies, strategies or protocols. Although the MOH and the National Health Service verbally pledged its support during assessment activities for scaling up and sustaining KMC in the DR, national support and oversight are currently not administered for KMC, creating substantial challenges in achieving this goal. Of note, the MOH, National Health Service, and the eight hospitals trained in KMC are currently collaborating with the Kangaroo Foundation and Project Hope to draft KMC guidelines for the DR. The timeline for finalizing these guidelines and the mechanism for providing coordination, oversight, and support for KMC programming is still being discussed within the MOH and National Health Service.

The National Strategic Plan for the Reduction of Maternal and Child Mortality, 2012-2016 (Dominican Republic MOH, 2012) prioritizes reducing neonatal mortality as well as key actions to achieve this goal, including the following:

- Creation of additional NICUs throughout the country
- Establishing a human milk banking network
- Newborn infection prevention and control
- Capacity building of health staff in basic newborn care
- Promotion of breastfeeding and the Baby-friendly Hospital Initiative (BFHI)
- Prevention of adolescent pregnancy
- Strengthening of the national health management information system (HMIS) to better track and monitor newborn health and nutrition indicators

Despite these strengths, a key gap in this national strategic plan to facilitate KMC programming and improve care for SSNBs is the lack of clear pathways or specific interventions for implementing these actions. For

example, although it outlines the need to strengthen the HMIS for improved monitoring of newborn health and nutrition statistics, it does not state how it intends to do so. Additionally, it does not prioritize improving care and mortality for LBW, preterm, or sick newborns, the target populations for KMC. Although the plan recognizes the importance of breastfeeding, it does not specifically prioritize early and exclusive breastfeeding or improving nutrition and/or feeding of SSNBs. Given the extremely low EBF rate of 5% in the DR and that breastfeeding is one of the three core components of KMC, this was found to be a major bottleneck (UNICEF, 2014). This plan was noted to be outdated, and the National Health Service and MOH stated they are currently in the process of developing a new strategic plan.

The National Strategic Plan for Nutrition, 2013-2016 (the most recent nutrition strategic plan) similarly recognizes the importance of breastfeeding, however, does not explicitly prioritize early and exclusive breastfeeding or the need to improve nutrition and feeding practices of SSNBs or key actions for doing so (Dominican Republic MOH, 2013). It does prioritize building the capacity of nutritionists/dietitians for improving inpatient nutrition.

Both the National Strategic Plan for Nutrition, 2013-2016 and the National Strategic Plan for the Reduction of Maternal and Child Mortality, 2012-2016 lack proper guidance on monitoring and supportive supervision at the hospital, subnational, and national levels to ensure enforcement and the provision of quality care for SSNBs. Without national KMC guidelines, the hospitals do not have KMC clinical protocols, which was reported to significantly affect the care given by health providers. Although national neonatal care protocols for preterm newborns are available, they inadequately cover skin-to-skin or feeding concerns of the SSNB.

2. Health workforce

A major bottleneck affecting the health workforce is the inadequate number of health staff trained in KMC at each of the hospitals assessed. All facilities were found to have a lack of or inadequate number of one or more of the following cadres with the capacity to properly implement KMC at their facility: registered nurses, neonatologists, obstetricians, pediatricians, psychologists, administrative coordinators, social workers. In particular, the hospitals and KMC programs were found to have a significantly inadequate number of registered nurses in general, regardless of whether they were trained in KMC. The MOH and National Health Service noted this registered nursing shortage is a nationwide challenge that they are working to address. Most of the hospitals reported that a small proportion (<15%) of their physicians and nurses in the delivery, nursery, and NICU wards are adequately trained in KMC, and that there was a general lack of adequate staffing of registered nurses. Some of the hospitals lacked an administrative coordinator in their ambulatory KMC units, making it difficult for the health providers to efficiently provide care and administratively process patients during their visit.

Mothers of SSNBs often require psychosocial support given the associated increased psychological demands of delivering and/or caring for a SSNB. Additionally, SSNBs require psychological services for psychomotor development evaluations. Because of this, psychologists are an essential resource within a successful KMC program. Additionally, psychologists can provide psychomotor development for infants in the KMC program to ensure these vulnerable infants are developing properly. However, as shown in Table 2, only two of the hospitals assessed have a psychologist working in the KMC program at least part-time. Of note, these two hospitals provide psychological services to the mother only; none of the hospitals assessed are providing routine psychomotor development evaluations for babies in the KMC programs.

Pre- and in-service training and staff rotation

Counseling and promotion of breast milk feeding—including with expressed milk via alternate methods, such as cup or nasogastric tube (NGT)—was reported to be included in pre-service training curricula for nurses

and physicians in the DR. While a core component of KMC is breastfeeding/provision of breast milk, KMC as a whole was reported to not be included in pre-service training curricula for clinical staff.

Although the hospitals reported receiving in-service trainings related to care and feeding of SSNBs, most of the hospitals reported they do not receive regular, ongoing in-service training on KMC. Personnel at Hospital Materno Infantil San Lorenzo de Los Mina stated that all of their pediatric and neonatology residents undergo a two-month, mandatory KMC rotation on site. Staff interviewed at Hospital Maternidad Nuestra Señora de la Altagracia stated that they have routine staff training and education sessions on breastfeeding promotion, including on alternate feeding methods (i.e. cup, NGT), and that their neonatology residents are sent to Hospital Materno Infantil San Lorenzo de Los Mina to receive in-service KMC training.

Hospital personnel interviewed lamented that they experience frequent staff rotations, often of staff well-skilled in KMC. This turnover often leads to a decreased proportion of staff at a given facility who have received in-service training, as new staff are frequently coming from facilities without a KMC program.

Supportive supervision

The lack of supportive supervision around KMC from the national/sub-national level to hospitals was found to be a major bottleneck affecting the health workforce. Additionally, each of the hospitals reported that they have no formal supportive supervision mechanisms in place to monitor care and ensure that global KMC guidelines are followed. Some facilities reported that supportive supervision does take place from clinical supervisors to health providers, however, they noted that there is no formal system set up for this to ensure it occurs on a regular basis for all providers. All facilities reported that no mechanisms are in place for reviewing the competencies of cadres who provide KMC.

3. Health service delivery

KMC services and programming

The presence of key actions and resources pertinent to health service delivery within a KMC program (MINSALUD, 2017) are illustrated in Table 3 by each of the eight hospitals. Personnel interviewed at Hospital Regional Juan Pablo Pina reported that they are currently not implementing inpatient KMC and that they do not have space for an ambulatory KMC unit. Although the hospital is undergoing renovations to make structural improvements and strengthen maternal and newborn care, it was unclear from the staff interviews whether KMC was being prioritized within these renovations. Staff at Hospital Presidente Estrella Ureña lamented that, although some of their staff were trained on KMC several years ago and have made attempts to build a KMC program, there has been a lack of commitment from the hospital administration and management. For these reasons, these two hospitals currently do not have a KMC program, but they have participated in the ongoing development of the national KMC guidelines in collaboration with the other six hospitals, the Kangaroo Foundation, MOH, and National Health Service. Additionally, they have pledged their continued intent to create a KMC program at their facility.

Although each of the hospitals were found to be motivated and have strengths in their KMC programming, none of the hospitals assessed were found to be implementing their program in accordance with global guidance to receive certification by the Kangaroo Foundation.

The criteria for entry into the KMC program at each of the six hospitals was LBW <2500 grams or being born premature (<37 weeks gestational age). Admission to the NICU was also found to be a criterion for admission to the KMC program at some hospitals. At the time of discharge from the hospital, staff from each

KMC program reported that they refer eligible patients to their ambulatory KMC program within 24-48 hours. Children in these KMC programs are monitored within the program until age five years.

One of the key gaps in health service delivery was the lack of neurological or psychomotor development evaluations, which are vital services within a successful KMC program. None of the hospitals were found to conduct psychomotor development or neurological evaluations, though all conduct opthalmological screenings within their KMC programs.

While all six hospitals with a KMC program have an ambulatory KMC unit, only three hospitals have inpatient KMC programming, and just one hospital provides KMC services in the NICU. While KMC should start at the time of delivery for SSNBs, only three of the hospitals routinely provide skin-to-skin care and breastfeeding support in the delivery room 24 hours/day, 7 days/week. Staff at Hospital Materno Infantil San Lorenzo de Los Mina and Hospital Regional Dr. Antonio Musa stated that KMC is not routinely practiced in the delivery room because delivery room staff are not trained in KMC. None of the hospitals assessed were found to provide KMC care, counseling, and support 24 hours/day, 7 days/week in the NICUs and nursery wards. This is becuse they do not having physicians and/or registered nurses trained in KMC on staff at all times.

Table 3. Presence of key actions or resources for KMC, by hospital

Hospital	Key Action or Resource											
	KMC program	KMC in the NICU	Ambulatory KMC	Routine KMC in delivery room	24/7 inpatient KMC care	Opthalmology screening	Psychologist	Neorological screening	Timely/routine growth charting	Routinely monitor KMC data	Written KMC protocols	NICU open to p
Hospital Presidente Estrella Ureña												
Hospital Regional Juan Pablo Pina												
Hospital San Vicente de Paul	●		●	●		●	●		●			
Hospital Materno Infantil San Lorenzo de Los Mina	●	●	●			●			●			
Hospital Regional Dr. Antonio Musa	●		●			●	●		●			
Hospital Dr. Luis Manuel Morillo King	●		●	●		●			●			
Hospital Maternidad Nuestra Señora de la Altagracia	●		●	●		●			●			
Hospital Infantil Robert Reid Cabral	●		●	N/A*		●			●			

*Not applicable given this hospital does not have a maternity/delivery ward

Staff from five of the six KMC programs stated that they have developed educational materials on KMC, including information on skin-to-skin care and breastfeeding. However, staff reported that they often run out of these materials and go for long periods of time without being able to print them, noting this as a significant challenge. Staff from Hospital Infantil Robert Reid Cabral noted that they do not have any educational materials on KMC for mothers and families. The four hospitals that were supported by MCHIP from 2010-2014 have KMC cards that were developed and distributed under the project. These are still available and used at these hospitals similar to a child health card to track patient clinical data, including KMC visits and

services as well as to track weight and length along international growth curves. They are given to each infant's mother to be brought at every KMC ambulatory visit. The other two hospitals that implemented their KMC programs following MCHIP (Hospital Dr. Luis Manuel Morillo King and Hospital Maternidad Nuestra Señora de la Altagracia) do not have these KMC cards. Staff at these two hospitals reported they are recording and tracking this data on patient clinical forms.

Family-centered care, coverage of KMC services, and facility to community linkages

Family-centered care—an approach that recognizes the family as a partner in health care treatment and decision-making and promotes collaboration in care between health professionals and families—has been shown to lead to improved maternal and newborn health outcomes (Kuo et al., 2012). A significant challenge to providing adequate family-centered care in the facility's assessed is limited space or seating areas throughout the NICUs, nursery wards, and ambulatory KMC units. In the inpatient units providing KMC, most of the hospitals do not have adequate space and/or chairs to provide skin-to-skin care and/or breastfeed. Only one hospital--Hospital Materno Infantil San Lorenzo de Los Mina—has a NICU ward with designated space for mothers to provide skin-to-skin care and breastfeed and allows mothers to stay in the NICU 24 hours/day, 7 days/week to visit, bond with, and provide KMC to their baby. In the ambulatory setting, each of the hospitals reported lack of space as a key barrier and noted that mothers and families often have to stand while waiting for an extended period of time for their child to be evaluated.

Geographic coverage of KMC services was found to be a significant gap. Of the three macro-regions in the DR, the South macro-region has no KMC programs and the North/Cibao macro-region has just one (Hospital Dr. Luis Manuel Morillo King in La Vega); the remaining four KMC programs are in the East/Southeast macro-region. To address this issue, the MOH verbally pledged its commitment to KMC and reported its goal of having 17 KMC programs in the country by the end of 2020. MOH staff interviewed noted that financial resources have been proposed for each existing and expected KMC program, though the budgeting for this has not yet been approved and it is unclear if there is an operational plan for achieving this goal.

Given each hospital is a tertiary referral hospital at either the regional or national level, long travel distances were found to be a prevailing barrier to the provision of optimal KMC services. Mothers and family members often have to travel for hours to get to the hospital to visit their infant in the inpatient unit or to bring them to the ambulatory unit. Staff at hospitals reported that mothers with infants in the inpatient unit often are not able to come to the hospital until the afternoon due to this challenge. Because of this, skin-to-skin care, breastfeeding, and mother-baby bonding does not occur for long periods of time each day for many mother-baby pairs. Due to lack of accommodations for mothers and other family members, extended stays in the inpatient KMC program can be difficult on the family and affect parental engagement in care. Staff reported that mothers and grandparents typically visit frequently, but for infants with an extended hospital stay, fathers often need to return to work and cannot regularly travel long distances to spend time and bond with their baby. Staff reported that sometimes, due to the long travel distance and transportation costs, mothers either visit infrequently or discharge their babies earlier than medically indicated. Personnel at each of the hospitals reported that, despite the lack of or inadequate accommodations for mothers and families, food is provided for them while they are at the hospital.

In addition to the challenges associated with the inadequate coverage of KMC services and long distances to travel to a KMC program, hospital staff interviewed from each hospital reported that lack of KMC-related services (i.e. skin-to-skin counseling and support, breastfeeding support for mothers of SSNBs) in the

community was a significant bottleneck and prevented optimal hospital to community linkages and continuity of care.

Sociocultural concerns

Hospital staff interviewed reported that as many as 40% of mothers who deliver in their facility are Haitian or of Haitian descent and are not seen at their facility until the time of delivery. These mothers and their babies were reported to have more high-risk pregnancies and, thus, a greater likelihood of negative outcomes and complications, including very LBW and infection, requiring specialized care. It was noted that, due to a lack of staff fluent in Haitian Creole, patient educational materials in Haitian Creole or those appropriate for patients with low literacy, and staff equipped with counseling and cultural skills for working with this population, these mothers often lack the understanding of the need for specialized therapies and early and exclusive breastfeeding and, at times, are resistant to these therapies.

4. Health financing

Without support for KMC at the national level, there are currently no government financial investments in KMC, which was found to be a very major bottleneck in sustaining and growing KMC in the Dominican Republic. To date, financial investments have come from external partners and donors (i.e. USAID, Project Hope) as well as funding from health providers' own financial resources.

Key informants interviewed reported that national budgeting for the health system overall was a significant challenge, as only 2.9% of the Dominican Republic's gross domestic product (GDP) is allocated to the health sector, the second lowest proportion in all of Latin America (PAHO, 2017).

5. Health information systems

At the national level, routine monitoring of the following key newborn health indicators within the HMIS were reported: percentage of infants born with LBW, percentage of infants born premature. Of note, EBF at discharge from the facility following childbirth, number of or percentage of newborns initiated on KMC, early initiation of breastfeeding <1 hour of birth, and early skin-to-skin care <1 hour of birth are not routinely tracked in the HMIS.

Staff at all hospitals reported that their KMC programs do not routinely monitor KMC program data to inform program improvement activities. While hospitals noted that they occasionally review their data, no hospital had routine monitoring policies and procedures in place or reported that they reviewed data routinely to inform KMC programming. Each hospital stated that they collect data on each child's birth weight, current weight, corrected age, chronological age, date of birth, and the number of deaths in the KMC program. All hospitals except Hospital Infantil Robert Reid Cabral track annual KMC admissions.

The lack of systematic monitoring of early initiation of breastfeeding <1 hour of birth, EBF at time of discharge from the facility, or EBF <6 months is a significant gap in health information. Given early and exclusive breastfeeding rates in the DR are so critically low and breastfeeding is a crucial component of KMC, it is essential that these indicators are routinely tracked at the hospital and national levels in order to monitor progress. Additionally, while all hospitals implementing KMC reported improvements in their mortality and morbidity outcomes following the implementation of their KMC programs, a limitation of this assessment is that we were unable to obtain this data from the hospitals. It is unclear if this data is systematically tracked at the hospitals and, if so, how it is disaggregated and/or used to inform newborn health and KMC initiatives.

None of the hospitals reported that they are tracking percentage of patients who discharged themselves early or abandoned the KMC program, percentage of patients referred to another KMC facility, or rehospitalization rates. These indicators can all help to provide crucial information for KMC programming at the hospital and national levels.

6. Supplies and technology

Staff from all six hospitals with a KMC program noted they have adequate supplies of cups, syringes, and NGTs for feeding expressed breast milk, as well as incubators. Personnel from all hospitals reported either a complete lack of or insufficient amount of breast pumps for extracting milk for infants who are unable to suckle and/or babies whose mother is unable to remain at the hospital at all times to feed on demand. Just half of the hospitals reported they have containers for extracted milk and refrigerators for breast milk storage. Only one of the assessed hospitals has a human milk bank, which takes donations and pasteurizes milk to ensure equitable access to human milk. While most hospitals stated they have adequate supply of wraps for holding the baby in skin-to-skin position, either those left over from MCHIP project or through donations, staff from two of the hospitals noted they often do not have wraps to give to the mothers. Additionally, none of the hospitals were found to have functioning electronic scales and length/height boards based on the metric system in use. Most hospitals were noted to either record weights in pounds or lack consistency in the weight units they use (i.e. some staff use pounds while others use kilograms). Given all international growth charts utilize the metric system this requires staff to manually convert weights and lengths/heights to the metric system to chart anthropometric data, allowing for errors to be made when recording this data.

Recommendations for Addressing Identified Bottlenecks and Sustaining KMC

Proposed solutions for addressing the identified gaps outlined in this report came from discussions with key MOH, National Health Service, and hospital personnel and are described below by solution theme.

Advocating for Support for KMC within the MOH and National Health Service

The lack of support for and buy-in of KMC at the national level of the MOH and National Health Service was noted to be the most significant challenge in the adequate provision and coverage of KMC services. Although the government has informally voiced its support for KMC, formal buy-in through the integration of KMC into newborn health and nutrition programming, strategies, and protocols as well as finalization of the development of KMC guidelines for the Dominican Republic, with ownership by the MOH/National Health Service, is essential for sustaining and growing KMC programs which meet global KMC standards. Additionally, it is essential that the MOH and National Health Service provide coordination and oversight support to facility-based KMC programming. Furthermore, ensuring early and exclusive breastfeeding—a core component of KMC—is prioritized in national newborn health and nutrition strategies is important for strengthening national support for KMC.

Domestic investments in KMC by the government are crucial to delivering, growing, and sustaining quality KMC services in the DR. In addition to allocating funds for KMC within the national health system budget, given the government allocates just 2.9% of the country's GDP for the health sector, it is recommended that advocating for increased funding for the health system in general may be warranted.

It is recommended that stakeholders—including the Dominican Republic Neonatal Alliance and other partners—advocate for KMC to be included in national newborn health strategies, guidelines, and budgeting and assist with ensuring these recommendations as well as others outlined in this report are implemented.

Expanding the coverage of KMC services and the structural capacity of hospitals with KMC programs

Limited space and seating in the NICU and nursery wards and the ambulatory KMC units for mothers and families to bond with their babies, breastfeed, and provide skin-to-skin care was found to be a significant barrier to providing family-centered care. Stakeholders should advocate for a structural re-organization of these units and/or for increased funding to improve the structural capacity of these units to allow for mothers and fathers to stay with their babies for as long as they desire.

Additionally, given the limited coverage of KMC services in the DR—particularly in the North/Cibao and South macro-regions—creating KMC programs throughout the regions of the country can help to increase access to KMC services. It can also help to address the challenge of long travel distances to a KMC program, which often leads to limited parental visitation and/or discharge from the hospital or KMC program before medically indicated. To improve continuity of care from the facility to the community, it is important to build the capacity of providers at the community level in select components of KMC. These actions will require increased advocacy, commitment, and resources at the community, facility, and national levels.

Ensuring availability of supplies, medical equipment, and technologies

Non-availability or inadequate numbers of breast pumps, wraps for mothers to provide skin-to-skin care, storage containers for expressed breast milk, electronic metric scales, and metric length/height boards was noted to prevent the provision of adequate KMC services. Ensuring adequate numbers of these equipment are in the national ordering system for essential medical products and technologies can help to ensure their availability. Additionally, budgeting for the development and printing of job aids and patient education materials around KMC is needed.

Capacity-building and addressing workforce shortages and gaps in specialty services

Having a limited proportion of registered nurses, obstetricians, neonatologists, and pediatricians trained in KMC was found to be a significant bottleneck. In order to ensure that health care professionals graduating from nursing and medical teaching institutions are equipped with skills in KMC, it is recommended that KMC training and skills-building is integrated into training curricula. Collaboration between the MOH, medical and nursing associations, and other partners to improve professional standards could help to ensure this content is adequately integrated into pre-service curricula. To strengthen in-service training, collaboration between hospitals, the MOH, National Health Service, and relevant partners can help to ensure training curricula adequately covers KMC. Furthermore, mentoring and coaching of health providers on key skills around KMC should be systematically included in routine MOH supportive supervision visits and supportive supervision from hospital-based clinical supervisors to providers.

While the National Strategic Plan for Nutrition, 2013-2016 prioritizes capacity-building of nutritionists/dietitians to improve inpatient nutrition, no nutritionists or dietitians were seen to be involved in the NICU, nursery, or ambulatory KMC units. Integrating nutritionists/dietitians into the multidisciplinary care team in these units can help to strengthen feeding practices of SSNBs.

Shortages of registered nurses were reported by key informants from the MOH, National Health Service, and the hospitals to be a major gap nationwide, and the MOH and National Health Service communicated they are working to address this challenge. A continued focus on building the nursing field in the Dominican Republic, including via incentives and in collaboration with nursing institutions, will be critical to improving quality of care in all health areas. Addressing nursing shortages and building the capacity of health providers working in the delivery, NICU, and nursery wards can also work to enable KMC services to be routinely provided inpatient 24 hours/day, 7 days/week.

Gaps in specialty services within KMC—including psychomotor development evaluations, auditory screening, and neurological evaluations—were found to be significant bottlenecks in delivering quality KMC services. Ensuring that each KMC program has staff trained to provide these services within their KMC programming is necessary.

Strengthening routine monitoring

Improving monitoring of KMC-related indicators in the HMIS will be essential to improving care. To better understand any gaps or improvements in infant feeding and KMC, it is recommended to integrate the following indicators into the HMIS:

- EBF upon discharge from the facility
- Percentage of LBW and preterm infants initiated on KMC

At the facility level, instituting mechanisms for routine monitoring to regularly track and review KMC-related data is essential to monitor progress and inform KMC programming. It is important to foster a culture that values the use of data for decision-making. In addition to routinely reviewing morbidity and mortality data, integrating the following indicators into the list of indicators that hospitals are tracking can help to inform KMC programming at the hospital and national levels :

- EBF upon discharge from the facility
- EBF <6 months
- Early initiation of breastfeeding <1 hour of birth
- Percentage of KMC patients who abandoned KMC services
- Percentage of patients referred to another KMC facility
- Rate of re-hospitalization of patients in the KMC program

Improving breastfeeding practices

Evidence shows that breastfeeding saves lives and is one of the most cost-effective health interventions, providing a return on investment of up to $35 for every $1 spent (Rollins et al., 2016) (Shekar et al., 2017). The Dominican Republic has critically low early and exclusive breastfeeding rates. A major challenge in the provision of quality KMC services noted from this assessment is the number of gaps at both the national and hospital levels in strengthening feeding of breast milk, including:

- Lack of prioritization of early and exclusive breastfeeding in national strategies
- Hospitals are not tracking breastfeeding practices
- Lack of inpatient structural space and seating for mothers to feed their baby breast milk on demand, including from the breast and via alternative feeding methods for babies who are unable to suckle
- Lack of hospital-based initiatives to address the low early and exclusive breastfeeding rates

In addition to the solutions already provided in this section for these gaps, it is essential that newborn health, KMC, nutrition, and breastfeeding stakeholders are advocating for increased attention to the problem of low breastfeeding rates. Greater information around the contributing factors to this problem, specific to the Dominican Republic, is warranted. While some of the key informants interviewed suggested that the rising

popularity of breast-milk substitutes (BMS) is a major contributor, it is unclear if the exact causes of the low breastfeeding rates in the Dominican Republic have been studied. Regarding BMS in the Dominican Republic, the DR has legislation in place to regulate the marketing of BMS; however, some areas needing strengthening within this legislation include: prohibiting pictures and text that idealize BMS, prohibiting the promotion and free provision of BMS to health providers, and integrating into this legislation the ability to investigate violators of these regulations (WHO, UNICEF, & IBFAN, 2016). Addressing the issue of low breastfeeding rates will require concerted efforts and a multi-pronged approach, including increasing public awareness of the benefits of breastfeeding and harms of BMS, strengthening the counseling skills of providers, enhancing legislation around the marketing of BMS, and ensuring breastfeeding promotion, support, and counseling are included along the reproductive, maternal, newborn, and child health and nutrition continuum of care.

Conclusion

Improving care of the SSNB is essential to reducing neonatal, infant, and child mortality. The Dominican Republic has made impressive steps to address neonatal mortality through KMC. This report highlights key bottlenecks impeding adequate provision of KMC in the DR as well as recommended next steps. Through sustainably addressing these issues and growing KMC services, the Dominican Republic can demonstrate its commitment to saving newborn lives and investing in the future of its people. This will require commitment and advocacy from the MOH, National Health Service, the Dominican Republic Neonatal Alliance, policy makers, nursing and medical institutions, and partners to ensure this change.

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