



Mortality of very low birth weight preterm infants in Brazil: reality and challenges

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Abstract

Objective: The objective of this article is to review and discuss the medical literature on epidemiological indicators and organizational structure of the Brazilian perinatal health system concerning the care of very low birth weight premature infants (< 1,500 g).

Sources of data: Electronic search of the MEDLINE, Lilacs and SciELO databases from 1990 to 2004, with a selection made of the most relevant articles. Documents and reports from the Ministry of Health (Mortality Information System – SIM and Live Births Information System – SINASC).

Summary of the findings: The decrease in infant mortality rates and the high incidence of maternal deaths, observed since 1990, prompted the Brazilian government to focus its strategies on the organization and delivery of care to pregnant women and their newborn infants. However, a critical analysis of the actions aimed at the care of premature infants reveals that the coverage and utilization of these services are not uniform and that the records on birth and death rates are not reliable. The availability of neonatal beds is very limited and does not meet the demand, especially for those requiring high levels of complexity. Important challenges must be overcome to adequately deal with the incorporation of inappropriate technology, the limited number of qualified health professionals and utilization of evidence-based best practices to improve perinatal care.

Conclusions: A reduction in the rates of morbidity and mortality of premature infants requires more effective planning and intervention in the prenatal care system. To meet the demand, increases in the number of neonatal intensive care beds should be implemented through specialized perinatal centers rather than isolated beds within hospitals of with low resolution rates. These centers should be interconnected and their practices constantly monitored and evaluated.

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Introduction

The elevated rates of neonatal mortality in poor and developing countries continue to be responsible for great concern among researchers in the area. In a recent article entitled "Why are 4 million newborn babies dying each year?" Lawn et al.¹ recognize that the greater part of the impressive reduction in infant mortality observed throughout the twentieth century was the result of reductions in post-neonatal mortality. As a result, neonatal deaths came to account for 36% of deaths of under fives worldwide. The fraction of infant mortality (deaths of babies less than one

year old) that occurs during the neonatal period is, of course, even more significant. Even in developing countries, where risk factors for post-neonatal mortality are still highly significant, neonatal mortality already accounts for more than 50% of the infant mortality coefficient.

Variations in the occurrence of neonatal deaths are widely detected across different global regions. While they follow different paths, with more widespread obstetric and neonatal care coverage or more limited neonatal intensive care, rich countries have achieved neonatal mortality rates well below those of poor countries in Asia and on the African continent, where neonatal mortality is as much as eight times greater.² In Latin America, the identification of a neonatal mortality rate of 25 deaths per 1,000 live births represents a difference of four times with respect of North-American and European countries. The persistence of such a high rate is even more challenging in a context in which the complete absence of perinatal care infrastructure is not the

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case. On the contrary, in the greater part of Latin American countries, the great majority of births take place in hospitals and it is important to highlight the fact that even in some countries in which the proportion of births that take place within health services is above 95%, neonatal mortality still reaches levels of 22 deaths per 1,000 live births.³

In Brazil, the reversal of the distribution of mortality between neonatal and post-neonatal deaths, with an undeniable predominance of the neonatal component over the post-neonatal was observed as a feature of the Brazilian epidemiological transition from 1993 onwards. During the second half of the nineties the neonatal mortality rate, around 20 deaths per 1,000 live births, passed 60% of total infant mortality.⁴ This change in the composition of the infant mortality coefficient was responsible for the increased visibility of neonatal mortality in health indicators and for the increasing production of studies of the subject in the different regions of the country. We find in these studies two phenomena of our country that are most striking: the coefficient's tendency to stabilize or even to increase and the elevated proportion of avoidable deaths.⁵⁻⁷

The increased visibility of deaths among newborn babies and the alarming indices of maternal mortality were responsible for the inclusion of strategies to organize and qualify obstetric and neonatal care on the agenda of health policy priorities that was observed at the end of the nineties.⁸ Although the program directives aimed at the mother and baby population were already consolidated within the public health policy field, until the end of the nineties the aimed at the reduction of post-neonatal mortality and concentrated on interventions within the ambit of basic care. As a result, at the start of the twenty-first century we find a scenario in Brazil that is very different from that envisaged and that is considerably backward compared with other countries in terms of the perinatal care network organization process.

It is important to remember that, as has been identified in other countries^{9,10} and also with respect of other epidemiological aspects of the Brazilian population, one of the characteristics of neonatal mortality in our country is the marked discrepancy between different geographical regions and, in particular, according to the ethnic and social background of patients.^{11,12} A certain proportion of the population have had opportune access to a collection of obstetric and neonatal interventions that are recognized for their efficacy, thus guaranteeing them a reduction in the incidence of certain conditions and increased survival of high risk newborns, with standards that are comparable with the best centers in the world. However, this standard of care is to be found only at some private sector units and at certain more complex public units linked, in general, to teaching and research institutions and whose dimensions were not designed to meet the need for beds in this area. These characteristics speak for themselves with respect of the limited range of this care in terms of coverage for the whole population.

It is against this background that we place the discussion of mortality among extremely premature infants in our

country, opting to widen the scope of the analysis. This decision is the result of the understanding that, in our country, there yet remain enormous and urgent challenges for newborns of greater weight and older gestational age which, while still unmet, override the specific challenges of extremely premature infants. All this being so, this article will present a literature review relating to certain epidemiological indicators and to the organizational structure of perinatal care in the Brazilian health system.

During the course of this paper we will emphasize aspects related to newborns with birth weights < 1,500 g (very low birth weight - VLBW) and discuss these findings with respect of other population groups. Searches were made of the databases of MEDLINE, Lilacs and SciELO to find articles that describe or analyze care models and indicators of neonatal morbidity and mortality in different countries. We have also used documents and reports from the Health Ministry, information from the databases of the Mortality Information System (SIM - *Sistema de Informação sobre Mortalidade*) and the Live Births Information System (SINASC - *Sistema de Informações sobre Nascidos Vivos*) as well as the results of academic theses and dissertations on the subject.

Epidemiological indicators

With particular reference to extreme preterm mortality in our country the first challenge is related to the fragility or even absence of trustworthy and detailed information on deaths among this gestational age subset and also about the defining factors, in particular in the North and Northeast regions or in areas far from large urban centers. The elevated level of sub-registration of neonatal deaths in certain regions of the country (particularly involving extremely premature or extremely low weight infants) and the low level of reliability of death registration data for the whole country are well-known difficulties when studying perinatal mortality in Brazil.⁷

Our presumption of the information problems in this area is reinforced if we consider SINASC, set up in 1993 with the objective of mapping certain basic epidemiological indicators of the birth profile, but which still does not cover the whole country. In this respect we record the obvious contrast with the path followed by other countries that currently have better neonatal results and where we observe, in general, the effective use of the records in health databases or the performance of surveys to obtain demographic and epidemiological information and service profiles that necessary interventions can be based on. The surveys made in France since the start of the seventies¹³ and the information on births from them that has been made available are concrete examples of this strategy that have been taken up by other countries. Nowadays, these records are used as a tool for improving the quality of perinatal care as well as for legal purposes and health planning.¹⁴

Even taking into account the limitations that still exist to the vital statistics on this age group, we thought it necessary to present the available data on live births and neonatal

deaths for the country as a whole. Analysis of the available data on the infant mortality coefficient and its composition in Brazil, from 1990 onwards, confirms the importance of neonatal mortality in the context of child health in our country (Table 1).

Table 1 - Mortality coefficient (MC) according to age and percentage of death distribution in infants younger than 1 year old, Brazil, 1990-2001

Year	< 1 to 6 days		7 to 27 days		28 days to 1 year	
	MC	%	MC	%	MC	%
1990	17.9	37.5	5.5	11.5	24.3	50.8
1991	18.3	40.5	5.3	11.8	21.3	47.3
1992	17.0	39.7	4.7	10.9	21.2	49.3
1993	15.9	38.8	4.5	11.1	20.5	49.9
1994	16.2	41.1	4.4	11.2	18.8	47.6
1995	17.2	44.7	4.5	11.8	16.5	43.2
1996	17.6	46.9	4.5	12.0	15.4	41.1
1997	15.6	48.9	4.2	13.3	12.1	37.8
1998	14.5	47.1	3.9	12.7	12.4	40.2
1999	14.7	50.5	3.8	13.1	10.6	36.4
2000	14.2	50.2	3.9	13.8	10.2	36.0
2001	14.0	51.1	3.8	13.9	9.6	35.0

Source: MS/FUNASA/CENEPI - Sistema de Informação de Mortalidade (SIM), MS/FUNASA/CENEPI - Sistema de Informação sobre Nascidos Vivos (SINASC), IBGE/Estimativas demográficas, available at: <http://datasus.gov.br/cgi/idb2003/co103.htm>.

We can find, in the unfavorable context of access difficulties, inequality and unstable perinatal care, elements that potentially explain the increases in early neonatal mortality observed in the period from 1993 to 1996. However, certain factors that have contributed, over recent years, to a reduction in the under-registration of neonatal deaths should also be considered. Among these factors we give emphasis to urbanization, the increased coverage in death registration and the increase in information on birth care at health centers.⁴

Similarly we must not ignore the increased visibility of neonatal deaths resulting from the changing perceptions of the limits of viability resulting from the dissemination of information on the "chances" of survival of newborns until recently considered nonviable. The installation of neonatal intensive care units within the Brazilian public health system has also contributed to this, increasing the chances of interrupting pregnancies that would potentially progress to fetal death. It is important to mention that even services that do not have the facilities to care for high risk expectant mothers or newborns have started to refer or transfer them to beds at other institutions. Thus, as has already been discussed in other studies of Brazil,^{6,15} events that were previously counted as stillbirths are now defined as live births, and therefore a death certificate is issued. This phenomenon of a tendency towards registering more births is also to be observed in countries that have already achieved better perinatal indicators.^{16,17} In such countries

the increase over recent years in multiple births resulting from *in vitro* fertilization techniques is another factor to be taken into account when considering the tendencies relating to the birth of extremely or very low birth weight infants.¹⁸

In Brazil, the available data on live births of VLBW infants by maternal residence (Table 2) make possible certain important considerations with respect of the variation in visibility of this subset.

As can be observed in Table 2, for the whole of Brazil, according to the available data, the incidence of live births of VLBW infants is higher for the metropolitan regions, which can potentially be explained by the factors related to information quality already mentioned above.

Another way to approach the epidemiological profile of VLBW infant births in our country is to compare the distribution of the total number of live births with the distribution of VLBW live births by region (Table 3).

It is of interest to observe that, for some regions, we find a discrepancy between the total number of live births during the 2 years shown and the number of VLBW births. It is worth highlighting two regions: the North region is responsible for around 9% of all births and just 6% of VLBW births, which is a reduction of 30%. In contrast, we observe the inverse phenomenon in the Southeast. This region's proportion of all live births in Brazil is around 39%, which rises to around 46% of VLBW births (an 18% increase). It is important to repeat that these data are based on mother's residence and as such should not present any bias resulting from registration based on location of birth which would artificially increase the incidence of VLBW births in metropolitan regions as high risk patients travel from provincial areas. Nevertheless, even taking into account possible bias resulting from inadequate registration of births, we do understand that these differences may be explained by variations in the definitions and registrations of live births and deaths in different regions of Brazil.

The data presented in tables 1 and 3 can be considered as another sign of the epidemiological paradox pointed out by Silva et al.¹⁵ when they analyzed neonatal indicators in São Luís (MA) and Ribeirão Preto (SP) and, contrary to expectations, found a higher incidence of low birth weight in the city in São Paulo state. For these authors, differences in access to and quality of perinatal care is one of the factors that potentially explain this apparent paradox.

Perinatal care in the Brazilian National Health System (SUS - *Sistema Único de Saúde*)

Over the last few decades, interventions aimed at care during pregnancy and the first year of life, have always been at the center of public health policies in our country.¹⁹ We find these mother and baby health care program proposals formalized from the seventies onwards with the implementation of the Mother and Baby Health Program (PSMI - *Programa de Saúde Materno-Infantil*), the activities of which were basically aimed at prenatal monitoring, controlling home births and controlling childcare, and towards child health promotion actions. Until the last few

Table 2 - Incidence of live births of VLBW infants according to metropolitan regions and countryside, Brazil, 2001 and 2002

Region	2001			2002		
	LB	VLBW	% VLBW	LB	VLBW	% VLBW
Metropolitan	1,286,013	16,042	1.25	1,252,722	16,395	1.30
Countryside	1,829,461	15,738	0.86	1,806,680	16,480	0.91
Total	3,115,474	31,780	1.02	3,059,402	32,875	1.07

LB = live births; VLBW = very low birth weight.

Source: MS/SVS/DASIS - Sistema de Informação sobre Nascimentos - SINASC, available at: <http://tabnet.datasus.gov.br/cgi/tabcgi/exe?sinasc/cnv/nvuf.def>.

Table 3 - Comparison of the distribution of the total number of live births with the distribution of VLBW live births by region, Brazil, 2001 and 2002

Region	2001				2002			
	Live births	%	VLBW	%	Live births	%	VLBW	%
North	299,388	9.60	2,041	6.42	301,208	9.85	2,214	6.74
Northeast	942,141	30.25	8,007	25.19	929,717	30.39	8,500	25.86
Southeast	1,230,473	39.50	15,037	47.32	1,195,168	39.06	15,311	46.57
South	415,957	13.35	4,582	14.42	406,116	13.27	4,732	14.39
Central west	227,515	7.30	2,113	6.65	227,193	7.43	2,118	6.44
Total	3,115,474	100.00	31,780	100.00	3,059,402	100.00	32,875	100.00

VLBW = very low birth weight.

Source: MS/SVS/DASIS - Sistema de Informação sobre Nascimentos - SINASC, available at: <http://tabnet.datasus.gov.br/cgi/tabcgi/exe?sinasc/cnv/nvuf.def>.

years of the eighties, therefore, the PSMI, later dismembered into the Integrated Women's Healthcare Program (PAISM - *Programa de Atenção Integral à Saúde da Mulher*) and the Children's Healthcare Program (PAISC - *Programa de Atenção à Saúde da Criança*), was characterized by its limited range in directing its efforts primarily at better prenatal care, neglecting measures such as continuing care up to delivery and guaranteeing qualified hospital care.²⁰ Even so, studies of the coverage and adequacy of prenatal care point to significant problems in this area in many Brazilian regions.²¹⁻²³

In 1991, by means of the creation and promotion, by the Health Ministry, of the Perinatal Healthcare Program (PROASP - *Programa de Assistência à Saúde Perinatal*),²⁴ perinatal care as responsible for care of the mother-fetus unit and of newborns was for the first time defined as a program area of the governmental directives on healthcare in Brazil.

A review of this program reveals that it is fully consonant with the guiding principles of SUS and the directives of countries that achieve the best neonatal results: a) the organization of perinatal care in a hierarchal and regionalized manner, b) the creation and updating of technical standards for perinatal care and the guarantee of their availability and

adequacy to local epidemiological reality; c) valorization and capacitation of human resources with an interdisciplinary focus; d) the improvement of the quality of care for both institutional and home births; e) the reduction of the incidence of complications inherent to delivery and making delivery teams and the general population conscious of the advantages of normal delivery; f) improvement of the care given to newborns, promoting rooming-in and reserving nursery wards for high-risk newborns; g) encouragement of maternal breastfeeding; h) family planning guidance and evaluation and supervision of care by means of a perinatal information system.

However, more than a decade later, the existence of a perinatal care system that is effectively regionalized and hierarchal has not yet been achieved for the whole country. Although certain, localized, advances have taken place, contributing to reduce maternal and neonatal mortality in specific geographical areas,^{6,25,26} when we analyzed the dynamics of perinatal care management and operations in our country we found common characteristics that potentially contribute to the distance that remains between the program standards and the true state of the Brazilian health system.

As is the case in other healthcare areas in our country, the lack of cooperation and communication between the areas planning and executing health activities has been a factor complicating the implementation of directives and technical standards. In addition to this we cannot ignore the urgent challenges in financing the health sector in our country, nor the gaps that still remain before the many service providers are effectively and systematically integrated and functioning together (federal, state, city, university, philanthropic and private), which are basic requirements to the consolidation of SUS.

Despite the 1991 directives, it was not until the end of the nineties that we saw the implementation of strategies that were effectively transformed into an integrated approach to the different links that comprise perinatal care (prenatal, delivery, neonatal and childcare at all their different levels of complexity). As a result of this we have observed the discussion, formulation and execution of disjointed strategies and, consequently, less impact on perinatal result improvement.

Challenges in high risk neonatal care

When attention turns to neonatal care of greater complexity in our country we find an additional challenge: the greatest concentration of the technical areas responsible for planning, implementing and monitoring healthcare services in the states and cities has traditionally been linked to basic health care since that is the area in which the strategies for dealing with the primary causes of infant mortality were located until the nineties (respiratory infections, diarrheal diseases, immunopreventable diseases, nutritional risks). This profile was not sufficient for the implementation of intervention and monitoring strategies that could guarantee qualified perinatal care in the hospital environment, which in turn is evidence of a lack of synchronization between service directives and practices and the new realities of public health.⁵

Whilst there has been no systematic planning, over recent years in Brazil we have observed a considerable amplification in the numbers of neonatal intermediate and intensive care beds in the public sector, primarily in metropolitan areas of the South and Southeast regions. By October 2004, 2,985 beds in neonatal intensive care unit and 2,945 beds in intermediate neonatal units were registered in SUS, making a total of 7,972 beds, which is around 30% of all intensive or intermediate beds in the Brazilian public sector.²⁷ The lack of systematic planning and the fragility of the management systems at the state and city levels have contributed to limiting the possible positive impact of this increase in installed capacity. In common with what has been reported in other developing countries, we have come face to face with striking examples of inadequate or insufficient incorporation of technology and serious difficulties in selecting and retaining human resources in the public sector.^{25,28} With respect of this aspect in particular and because of the frequency with which it takes place, we cannot ignore the negative impact that the inadequate ratio of health professionals to

bed has on the quality of neonatal care (taking into account the workload resulting from the profile of the babies treated).²⁹

Compounding this is the concentration of tertiary services in state capitals with an absolute lack of this type of service in the remaining cities and which cannot be the result of planning based the perspective of regionalization and optimization of available resources. As the situation is, the beds in the state capitals are not sufficient to meet the demands of each state and frequently face periods of "overcrowding" which obviously prejudice the safety and quality of the care provided.

In this context we observe high risk expectant mothers migrating to the capitals, the majority of whom have not been referred under the responsibility of the health center that saw them first, but under their own initiative in a risky "peregrination" to several different maternity units, potentializing the initial risk.^{21,25}

The "overcrowding" observed at many different maternity units in the country affects the pre-delivery and rooming-in sectors (expectant mothers and mothers with their newborns on trolleys in the corridors) and even affects the neonatal intensive care units. It is worth pointing out that the "overcrowding" of these units is very specific to the neonatal intensive care sector and is not reported with the same intensity, despite the notorious lack of beds of this complexity, in other units designated as "closed sectors" for pediatric patients or adults (intensive care units, coronary units, etc.).

Another factor that, in our view, merits attention is the instability that exists both in the supply and the quality of perinatal care. One habitual result of this "fluctuation" in the availability of care is a knock-on effect causing worse performance in other services. Due to the emergency nature of delivery, services that are working, even if they are already working over capacity, necessarily break off work to attend to the greater need.

While they remain rare in our country, those studies that have made a more specific evaluation of care practices and their results have found evidence of situations that vary from the non-availability and inadequacy to unnecessary and inappropriate use of technology. The low level of antenatal corticoid therapy use found by some studies^{30,31} and the variations and inadequacies observed in the management of nutrition, ventilation, venous access and neonatal jaundice^{25,31,32} are clear examples of a situation that it is imperative to face and overcome.

The effective bedside availability of the set of elements that comprise neonatal intensive care is also something that has not yet been achieved at all neonatal centers in the public sector in our country, in particular in the case of high risk maternity units not located within general hospitals. This being so, to guarantee access to specialized tests and procedures is a task that still challenges the day-to-day working of neonatal care in our country. Of particular importance here are access to transfontanelar ultrasound and the ophthalmological procedures for diagnosing and treating retinopathy of prematurity.

Starting from the principle that good neonatal care is not limited to guaranteeing the survival of extremely premature infants until their hospital discharge, follow-up of and adequate support for babies and children discharged from neonatal units are still enormous challenges in our country. Neither interventions aimed at the specific clinical features of this group, including their increased risk of post-discharge rehospitalization,³³ nor those aimed at opportune multidisciplinary care for development disorders yet have the necessary coverage.³⁴ Knowledge of the progress of these children is also very limited in our country.³⁵

Summing up, in the place of guaranteed access we have innumerable problems, where we should have equality we find inequality, we have disorganization and fragmentation instead of regionalization and hierarchization and worrying and frequent techno-scientific inadequacies, all of which are challenges that are very much alive and which face the public management of perinatal care in our country.

Table 4 compares the progress of countries with the best perinatal indicators with progress made in Brazil up to the end of the nineties, highlighting the differences that have, without doubt, contributed strongly to the distance between the results.

Prospects

From the end of the nineties onwards we find a series of Health Ministry initiatives in the field of perinatal care. Two of these initiatives merit citation for offering as specific objectives contributions towards organizing the perinatal system and overcoming the challenges discussed above: the Program of Support for the Installation of State Systems of Hospitals of Excellence for the Care of High Risk Pregnancies

(*Programa de Apoio à Implantação dos Sistemas Estaduais de Referência Hospitalar para Atendimento à Gestante de Alto Risco*) and the Birth and Prenatal Care Humanization Program (PHPN - *Programa de Humanização do Pré-Natal e Nascimento*).⁸ Specific resources for the organization of the State Systems for the Care of High Risk Pregnancies were reserved for the creation of centers for bed allocation, acquisition of equipment and training professionals that affected 226 maternity units in different parts of the country. The PHPN, implemented from 2000 onwards, aimed to achieve, by means of financial incentives for cities, improvements in the quality of prenatal care and of the relationship between prenatal and delivery care. We understand that measurement of the impact of these and other initiatives at the regional and local levels should be prioritized, not just in studies and research,¹⁹ but, more than anything, as part of the monitoring and evaluation of health system management.

In the specific case of neonatal care, strategies that can guarantee access to adequate care practices based on the best available evidence are an urgent priority. In many countries, collaborative neonatal networks have consolidated with the objective of improving the effectiveness and efficiency of neonatal care by means of coordinated programs of research, education and quality improvement projects.³⁶⁻⁴⁰ In Brazil, the great expectation is that the Brazilian Neonatal Research Network (RBPN - *Rede Brasileira de Pesquisas Neonatais*) can actively collaborate in the implantation of adequate care practices and the improvement of the quality of neonatal care all over the country.⁴¹ Similarly it is necessary that the databases on perinatal care be refined and effectively used to evaluate care practices and to identify opportunities for improving care.

Table 4 - Characteristics of perinatal care in Brazil and in countries with better perinatal results

Countries with better perinatal results	Brazil
Integral approach of the different "links" of the perinatal chain (prenatal visits, delivery and neonatal period).	Fragmentation of both the approach of the "links" of the perinatal chain and the absence of the integrated services network.
Diagnosis and monitoring of epidemiological data about births and deaths and availability of trustful information systems on the use of services.	Lack of standardization of the coverage and trustfulness of the records on births, deaths and use of services.
Structure of the integrated network, considering region, hierarchy and planning according to the necessity.	Difficulties of access and lack of equality due to the shortage of offers of services, especially the most complex services.
Use of mechanisms of assessment and quality control of the perinatal care. Increasing importance of the use of routines and practices based on the best evidence available.	Inappropriate use of technology, lack of quantity and quality of human resources and insufficient use of practices based on the best evidence available.

In this context, concerns with the quality of life and the ethical aspects of the survival of extremely premature infants, a highly significant challenge in developed countries,^{42,43} should also be the subject of systematic and wide-ranging reflection in our country.

In this review we could not fail to mention a fundamental feature of any contemporary discussion of perinatal care quality: the need to review care practices surrounding delivery and birth, in a movement including several strategies aimed at humanization. Central elements in this humanization movement are guaranteeing good obstetric and neonatal care practices and recovering delivery and birth as special moments of great social value to women, their babies and their families. It is important to consider that neonatal practices in caring for high-risk newborn babies, in addition to being influenced by this context are also going through a period of intense reevaluation in common with other areas of intensive care. Many studies recognize the central role of the mother and her family⁴⁴⁻⁴⁶ and the need to minimize the negative impact of interventions that are inherent to the neonatal intensive care environment, indispensable to the survival of premature infants, but often invasive and aggressive.^{47,48}

In this area we also have good prospects. It is already possible to speak of the Brazilian experience with a public policy of high-risk neonatal care humanization. Coordinated by the Health Ministry, the Humanized Low Birth Weight Infant Care - Kangaroo Method (*Atenção Humanizada ao Recém-Nascido de Baixo Peso – Método Canguru*) program, implemented from 1999 onwards by means or standards and protocols and a wide-ranging process of capacitation is based on four basic principles: accommodation of the baby and family, respect for differences, promotion of skin-to-skin contact as early as possible and involvement of the mother in the care of her baby.^{49,50} It is important to point out that in analyzing this directive we do not find any attempt to substitute the technology inherent to good neonatal practice. In the Humanized Care proposal, skin-to-skin contact and the kangaroo position are inserted within a group of interventions that are inextricably linked with the overall care of newborns and their families during the hospital stay and their quality of life after discharge.

Finally, we would identify as measures with a direct impact on the quality of neonatal care in our country, the definitive elimination of "overcrowding" and the implementation of a system for monitoring and evaluating care practices developed at neonatal units. We reiterate that reducing neonatal mortality and improving the remaining indicators of the results of caring for extremely premature infants must come through the effective functioning of all "links" of the chain of events surrounding the expectant mother and her newborn, including the commitment to multidisciplinary care after discharge. We repeat that the amplification of intensive care neonatal bed provision should be defined based on parameters that take into account regional needs and characteristics, aiming at creating complete perinatal centers and avoiding at all costs atomizing resources across non-resolutive units. Based on this

understanding we emphasize the importance of the integration and joined-up action of the services of the different providers in SUS, which task is undeniably that of the state and city health management bodies. This integration, above and beyond simple rhetoric, is a fundamental prerequisite for the construction of a perinatal system in our country.

References

1. Lawn JE, Cousens S, Bhutta ZA, Darmstadt GL, Martines J, Paul V, et al. Why are 4 million newborns babies dying each year? *Lancet*. 2004;364:399-401.
2. Saugstad OD. Perinatal Health in Europe: Neonatal Aspects. In: Carrera JM, Cabero L, Baraibar R, editors. *The Perinatal Medicine of the New Millennium*. Bologna, Italy: Monduzzi Editore; 2001. p. 1-4.
3. Bélizan JM, Martinez G, Capurro H. Perinatal Health in Latin América. In: Carrera JM, Cabero L, Baraibar R, editors. *The Perinatal Medicine of the New Millennium*. Bologna, Italy: Monduzzi Editore; 2001. p. 19-24.
4. Maranhão AGK, Joaquim MMC, Siu C. Mortalidade Perinatal e Neonatal no Brasil. *Tema-Radis*. 1999;17:6-17.
5. Leal MC, Szwarcwald CL. Evolução da Mortalidade neonatal no Estado do Rio de Janeiro, Brasil, de 1979 a 1993. Análise por grupo etário segundo região de residência. *Rev Saúde Pública*. 1996;30:403-12.
6. Ribeiro VS, Silva AAM. Tendências da mortalidade neonatal em São Luís, Maranhão, Brasil, de 1979 a 1996. *Cad Saúde Pública*. 2000;16:429-38.
7. Lansky S, França E, Leal MC. Mortes perinatais evitáveis em Belo Horizonte, Minas Gerais, Brasil, 1999. *Cad Saúde Pública*. 2002;18:1389-1400.
8. Brasil. Ministério da Saúde. Secretaria de Políticas de Saúde: O desafio de construir e implementar políticas de saúde - Relatório de Gestão 2000 – 2002. Brasília: Ministério da Saúde; 2002. p. 173-8.
9. Kramer MS, Séguin L, Lydons J, Goulet L. Socio-economic disparities in pregnancy outcome: why do the poor fare so poorly? *Paediatr and Perinat Epidemiol*. 2000;14:194-210.
10. Matijasevich A, Barros FC, Forteza CA, Díaz-Rossello JL. Atención de la salud em niños de muy bajo peso al nacer en Montevideo, Uruguay: comparación entre los sectores publico y privado. *J Pediatr (Rio J)*. 2001;77:313-20.
11. Victora CG, Barros FC, Vaughan JP. *Epidemiologia da Desigualdade*. São Paulo: Hucitec; 1988.
12. Almeida LEA, Barbieri MA, Gomes UA, Resi PM, Chiaratti T, Vasconcelos V, et al. *Peso ao Nascer, Classe Social e Mortalidade Infantil em Ribeirão Preto, São Paulo*. *Cad Saúde Pública*. 1992;8:190-8.
13. Rumeau-Rouquette C, Mazaubrun C, Rabarizón Y. *Naître en France – 10 ans d'évolution, 1972-1981*. France: Doin Éditeurs; 1985.
14. Gould, JB. Vital records for quality improvement. *Pediatrics*. 1999;103:278-90.
15. Silva AA, Bettiol H, Barbieri MA, Ribeiro VS, Aragão VM, Brito LG, et al. Infant mortality and low birth weight in cities of Northeastern and Southeastern Brazil. *Rev Saúde Pública*. 2003;37:693-8.
16. Joseph KS, Kramer MS, Allen AC, Cyr M, Fair M, Ohlsson A, et al. Gestational age and birthweight - specific declines in infant mortality in Canada, 1984-1995. *Paediatr Perinat Epidemiol*. 1999;14:332-9.
17. Foix-L'HL, Blondel B. Changes in risk factors of preterm delivery in France between 1981 and 1995. *Paediatr Perinat Epidemiol*. 2000;14:314-23.
18. Pinborg A, Loft A, Rasmussen S, Schmidt L, Langhoff-R, Gorm G, et al. Neonatal outcome in a Danish national cohort of 3438 IVF/ICSI and 10362 non-IVF/ICSI twins Born between 1995 and 2000. *Hum Reprod*. 2004;19:435-41.
19. Serruya, SJ, Cecatti JG, Lago TG. O Programa de Humanização no pré-natal e nascimento do Ministério da Saúde no Brasil: resultados iniciais. *Cad Saúde Pública*. 2004;20:1281-9.
20. Lansky S, França E, Leal MC. Mortalidade perinatal e evitabilidade: revisão da literatura. *Rev Saúde Pública*. 2002;36:759-72.

21. Alves MTS, Silva AAM. Avaliação de Qualidade de Maternidades – Assistência à Mulher e ao seu Recém-Nascido no Sistema Único de Saúde – São Luís, Maranhão. UFMA/UNICEF; 2000.
22. Monteiro CA, França JI, Conde WL. Evolução da assistência materno-infantil na cidade de São Paulo (1984 – 1996). *Rev Saúde Pública*. 2000;34(Supl):19-25.
23. Silveira DS, Santos IS, Costa JSD. Atenção pré-natal na rede básica: uma avaliação da estrutura e do processo. *Cad Saúde Pública*. 2001;17:131-9.
24. Brasil. Ministério da Saúde. Programa de Assistência à Saúde Perinatal. Bases Programáticas. Brasília: Ministério da Saúde; 1991.
25. Gomes MASM. Assistência Neonatal na Secretaria Municipal de Saúde do Rio de Janeiro: uma análise do período 1995-2000 [tese]. Rio de Janeiro: Instituto Fernandes Figueira/Fundação Oswaldo Cruz; 2002.
26. Victora CG, Barros FC. Infant mortality due to perinatal causes in Brazil: trends, regional patterns and possible interventions. *Rev Paulista Med*. 2001;119:33-42.
27. Cadastro Nacional de Estabelecimentos de Saúde (site na internet). Disponível em: <http://cnes.datasus.gov.br>. Acessado: 15 de outubro de 2004.
28. Ho NK. Relevance of neonatal care in developing countries. *Singapore Med J*. 1999;40:47-51.
29. Lamy FF. Carga de trabalho e falhas inespecíficas de processo nos cuidados intensivos neonatais [tese]. Rio de Janeiro: Instituto Fernandes Figueira/Fundação Oswaldo Cruz; 2001.
30. Krauss SL, Pinheiro CT, Reis AF, Iamada NO, Azevedo AP, Albuquerque CP. Avaliação da qualidade da assistência hospitalar obstétrica: uso de corticosteróides no trabalho de parto prematuro. *Cad Saúde Pública*. 1999;15:817-29.
31. Gianini NOM. Práticas nutricionais nos recém-nascidos com menos de 1500 g [dissertação]. Rio de Janeiro: Instituto Fernandes Figueira/Fundação Oswaldo Cruz; 2001.
32. Lima CLMA, De Carvalho M. O uso da fototerapia nas maternidades públicas da Cidade o do Rio de Janeiro [dissertação]. Rio de Janeiro: Instituto Fernandes Figueira/Fundação Oswaldo Cruz; 2001.
33. Escobar GJ, Steven J, Gardner MN, Armstrong MA, Folck BF, Carpenter DM. Rehospitalization in the first two weeks after discharge from the neonatal intensive care unit. *Pediatrics* 1999;104. Disponível em: www.pediatrics.org/cgi/content/full/104/1/e2.
34. Bellotti MC. Avaliação do crescimento de recém-nascidos de risco egressos de UTIs neonatais: um estudo prospectivo e multicêntrico [dissertação]. Rio de Janeiro: Instituto Fernandes Figueira/Fundação Oswaldo Cruz; 2002.
35. Méio MDBB, Lopes CS, Morsch DS. Fatores prognósticos para o desenvolvimento cognitivo de prematuros de muito baixo peso. *Rev Saúde Pública*. 2003;37:311-8.
36. Hack M, Horbar JD, Malloy MH, Tyson JE, Wright EW, Wright L. Very low birth weight outcomes of national institute of child health and human development neonatal network. *Pediatrics*. 1991;87:587-97.
37. Lee KM, McMillan DD, Ohlsson A, Pendray M, Synnes A, Whyte R, et al. Variations in practice and outcomes in the Canadian NICU network: 1996-1997. *Pediatrics*. 2000;106:1070-9.
38. Horbar JD, Rogowski J, Plsek PE, Delmore P, Edwards WH, Hocker J, et al. Collaborative quality improvement for neonatal intensive care. *Pediatrics*. 2001;107:14-22.
39. Lemons JA, Bauer CR, Oh W, Sheldon BK, Papile L-A, Stoll BJ, et al. Very low birth weight outcomes of the National Institute of Child Health and Human Development Neonatal Research Network, January 1995 through December 1996. *Pediatrics*. 1996;107. Disponível em: www.pediatrics.org/cgi/content/full/107/1/e1.
40. Tapia JL. Very-low-birthweight infant outcomes in 11 South American NICUs. *J Perinatol*. 2002;22:2-7.
41. Barros FC, Diaz-Rossello JL. Redes multicêntricas e qualidade da atenção neonatal. *J Pediatr (Rio J)*. 2004;80:254-6.
42. De Leeuw R, Cuttini M, Nadai M, Berbik I, Hansen G, Kucinkas A, et al. Treatment choices for extremely preterm infants: an international perspective. *J Pediatr*. 2000;137:608-16.
43. Streiner DL, Saigal S, Burrowa E, Stoskopf B, Rosenbaum P. Attitudes of parents and health care professionals toward active treatment of extremely premature infants. *Pediatrics*. 2001;108:152-7.
44. Conner JM, Nelson EC. Neonatal Intensive Care: satisfaction measured from a parent's perspective. *Pediatrics*. 1999;103(Suppl):332-49.
45. Moreira MEL, Braga NA, Morsch DS. Quando a vida começa diferente: o bebê e sua família na UTI neonatal. Coleção Criança, Mulher e Saúde. Rio de Janeiro: Editora FIOCRUZ; 2003.
46. Cisneros KA, Coker K, DuBuisson AB, Swett B, Edwards WH. Implementing potentially better practices for improving family-centered care in neonatal intensive care units: successes and challenges. *Pediatrics*. 2003;111. Disponível em: <http://www.pediatrics.org/cgi/content/full/111/4/e450>.
47. Walsh-S M, Reintebach A, Hudson-B D, DePompe P. Reducing lights and sound in the neonatal intensive care unit: an evaluation of patient safety, staff satisfaction and costs. *J Perinatol*. 2001;21:230-5.
48. Roques V, Miranda J, Garrigues JV, Garcia A. Strategies to improve the neonatal environment. In: Carrera JM, Cabero L, Baraibar R, editors. *The Perinatal Medicine of the New Millennium*. Bologna, Italy: Monduzzi Editore; 2001. p. 1017-22.
49. Brasil, Ministério da Saúde. Portaria 693 GM/MS, de 5 de julho de 2000. Implantação do método canguru. Brasília: Ministério da Saúde; 2000.
50. Brasil, Ministério da Saúde. Atenção Humanizada ao Recém-Nascido de Baixo Peso – Método Canguru. Brasília: Ministério da Saúde; 2002.

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