

# PERINATAL MORTALITY AND REGIONAL DIFFERENCES IN THE STATE OF PARANÁ, BRAZIL\*

Tereza Maria Mageroska Vieira<sup>1</sup>, Rosana Rosseto de Oliveira<sup>2</sup>, Verônica de Azevedo Mazza<sup>3</sup>, Thais Aidar de Freitas Mathias<sup>4</sup>

<sup>1</sup>Nurse. Master of Nursing. Professor, State University of Paraná. Paranavaí. Paraná, Brazil.

<sup>2</sup>Nurse. Doctor of Nursing. State University of Maringá. Maringá, Paraná, Brazil.

<sup>3</sup>Nurse. Doctor of Collective Health. Professor, Undergraduate and Graduate Nursing Program, Federal University of Paraná. Curitiba, Paraná, Brazil.

<sup>4</sup>Nurse. Doctor of Public Health. Professor, Nursing Graduate Program, State University of Maringá. Maringá, Paraná, Brazil.

**ABSTRACT:** The aim of this study was to assess perinatal mortality in the state of Paraná by analyzing the total number of perinatal deaths among Paraná residents occurring between 1999 and 2010, as registered in the Mortality Information System and Stillborn Information System. This study calculated the differences between perinatal, fetal and early neonatal mortality coefficients from 1999 to 2001 and 2008 to 2010, according to data from regional health coordination centers. The results showed a 28.2% reduction in the perinatal mortality coefficient, 32.2% in the early neonatal coefficient and 25.2% in fetal mortality coefficient. Some highlights include a 8.8% increase in the early neonatal mortality rate reported by the 21st regional health coordination center, and the 5.9%, 12.3% and 12.2% increase in the fetal mortality coefficient in the 1st, 8th, and 16th regional centers. Even though the mean state perinatal mortality coefficient fell, high values persist in some regional health centers, pointing to the need for improving actions in prenatal and high-risk neonate care.

**DESCRIPTORS:** Perinatal mortality; Fetal mortality; Early neonatal mortality; Information systems; Nursing.

## MORTALIDADE PERINATAL E DIFERENÇAS REGIONAIS NO ESTADO DO PARANÁ

**RESUMO:** Objetivou-se analisar a mortalidade perinatal no Estado do Paraná. Foram analisados todos os óbitos perinatais de residentes no Paraná, de 1999-2010, constantes no Sistema de Informação sobre Mortalidade e Sistema de Informações sobre Nascidos Vivos. Foram calculadas as diferenças relativas dos coeficientes de mortalidade perinatal, fetal e neonatal precoce, entre 1999-2001 e 2008-2010 segundo Regionais de Saúde. A análise mostrou redução de 28,2% no coeficiente de mortalidade perinatal, 32,2% no neonatal precoce e 25,2% no fetal. Das Regionais de Saúde, destacaram-se a 21ª com aumento de 8,8% no coeficiente de mortalidade neonatal precoce e 1ª, 8ª e 16ª Regionais de Saúde com aumento de 5,9%, 12,3% e 12,2% no coeficiente de mortalidade fetal, respectivamente. Apesar do declínio do coeficiente de mortalidade perinatal para o estado, ainda persistem valores elevados em algumas Regionais de Saúde, o que indica necessidade de aprimorar ações no pré-natal e na atenção ao recém-nascido de risco.

**DESCRIÇÕES:** Mortalidade perinatal; Mortalidade fetal; Mortalidade neonatal precoce; Sistemas de informação; Enfermagem.

## MORTALIDAD PERINATAL Y DIFERENCIAS REGIONALES EN EL ESTADO DE PARANÁ

**RESUMEN:** El objetivo del estudio fue analizar la mortalidad perinatal en el estado de Paraná. Fueron analizados todos los óbitos perinatales de residentes en Paraná, de 1999-2010, constantes en el Sistema de Información sobre Mortalidad y Sistema de Informaciones sobre Nascidos Vivos. Fueron calculadas las diferencias relativas de los coeficientes de mortalidad perinatal, fetal y neonatal precoz, entre 1999-2001 y 2008-2010 según Regionales de Salud. El análisis mostró reducción de 28,2% en el coeficiente de mortalidad perinatal, 32,2% en el neonatal precoz y 25,2% en el fetal. De las Regionales de Salud, se destacaron la 21ª con elevación de 8,8% en el coeficiente de mortalidad neonatal precoz y 1ª, 8ª y 16ª Regionales de Salud con elevación de 5,9%, 12,3% y 12,2% en el coeficiente de mortalidad fetal, respectivamente. A pesar del declinio del coeficiente de mortalidad perinatal para el estado, aún persisten valores elevados en algunas Regionales de Salud, lo que indica necesidad de perfeccionar acciones en el prenatal y en la atención al recién nacido de riesgo.

**DESCRIPTORES:** Mortalidad perinatal; Mortalidad fetal; Mortalidad neonatal precoz; Sistemas de información; Enfermería.

---

\*Article extracted from the master's thesis "Perfil da mortalidade perinatal no Estado do Paraná no período de 1999 a 2010" (Perinatal mortality profile in the state of Paraná between 1999 and 2010). State University of Maringá, 2013.

### Corresponding author:

Tereza Maria Mageroska Vieira  
Universidade Estadual do Paraná  
R. Percy Guimarães Cleves, 1466 - 87704-140 - Paranavaí, PR, Brasil  
E-mail: mageroska@yahoo.com.br

Received: 14/08/2015

Finalized: 13/10/2015

## INTRODUCTION

Perinatal mortality is considered an indicator of mother and child health that reflects not only health conditions, but also socioeconomic factors and quality of care provided during pregnancy, birth and to neonates. Perinatal mortality includes deaths that occur after 22 completed weeks of gestation up to the first week of a neonate's life<sup>(1)</sup>, i.e., the sum of fetal and early neonatal deaths.

According to the World Health Organization, stillbirth or fetal death is defined as death that occurs before the complete expulsion or extraction of a fetus from the mother's body. This diagnosis is made when the fetus does not breathe or show any other evidence of life after such separation<sup>(2)</sup>.

It is estimated that three million babies are stillborn in the third trimester of pregnancy each year. Of these deaths, 98% occur in low- to middle-income countries, and over a million of these deaths occur during delivery<sup>(3)</sup>.

Fetal mortality rates have dropped 14.5% worldwide, going from 22.1 stillbirths per 1000 births in 1995 to 18.9 stillbirths per 1000 births in 2009<sup>(4)</sup>. Brazil presents mean rates of 12 stillbirths per 1000 births<sup>(1)</sup>.

However, fetal mortality still presents regional differences. In the North and Northeast regions, there were 13.4 stillbirths per 1000 births in 2006. In turn, the South presented the lowest rate, 9.2 stillbirths per 1000 births, in the same period<sup>(1)</sup>. Even though fetal death tends to be preventable, little importance has been given to the study of its occurrence, a reflection of the low visibility, interest and comprehension around the fact that fetal death could be largely avoided with the help of health actions<sup>(1)</sup>.

Early neonatal mortality, which occurs in the first week of life, expresses a complex set of biological, socioeconomic and health care factors, the latter defined as the care provided to pregnant women and neonates<sup>(5)</sup>.

In Brazil, evidence has indicated a greater concentration of child mortality in the first week of life. Of these, some 50% occurred in the early neonatal period in 2000 and 53% in 2010. In 2005, the early neonatal mortality rate was 10.9 per 1000 live births and despite efforts to reduce this rate, an average of 36,000 early neonatal deaths still occur every year in Brazil<sup>(6)</sup>. The state of Paraná also presents high early neonatal mortality coefficients, with 6.8 deaths per 1000 live births in

2010<sup>(6)</sup>.

In order to monitor perinatal mortality and its components, the Health Information Systems, developed and implemented by the Brazilian Ministry of Health, are important tools for the decentralized management of the health system. They have shown progressive consolidation and qualification, and their use in scientific research and by health professionals has been expanded and solidified<sup>(7)</sup>.

Thus, this context demonstrates the relevance of fetal and early neonatal deaths in child mortality and the importance of identifying situations of inequality that demand specific actions and underpin the planning, management and assessment of health policies and actions for prenatal, intrapartum and neonatal care. In light of this, the aim of the present study was to assess perinatal mortality and its components in the state of Paraná, between 1999 and 2010, according to data from regional and macro-regional health coordination centers. The study is based on the principle that such coefficients have been decreasing due to the expansion of the Family Health Strategy program in the state of Paraná, in addition to the population's improved economic and social conditions as a whole in the last decade<sup>(8)</sup>.

## METHOD

This was a descriptive study of perinatal mortality and its components (fetal and early neonatal death) among the residents of Paraná, between 1999 and 2010. In 2010, Paraná had a population of 10,444,526, consisting of 399 municipalities arranged into 22 regional and 4 macro-regional health coordination centers. The regional and macro-regional centers are territorial demarcations that organize health actions and service networks in order to ensure compliance with the constitutional principles of universal access, equity, and comprehensiveness of health care<sup>(9)</sup>.

The deaths were analyzed based on data from the Mortality Information System (SIM) and Live Birth Information System (Sinasc), together with data available on the Unified Health System Information Department's (Datusus) website. Coefficients were calculated according to the methodology set forth by the Inter-agency Network of Health Information, which combines data directly from state-level SIM/Sinasc with high quality information<sup>(10)</sup>.

Perinatal mortality coefficients were calculated considering the sum of fetal and early neonatal deaths per 1000 live births (LB) and stillbirths (SB). The fetal mortality coefficient was calculated by considering the number of fetal deaths (after the 22nd week of pregnancy) per 1000 births of mothers residing in Paraná (LB and SB). The early neonatal mortality coefficient was calculated by considering the number of neonates from zero to six days old per thousand live births of resident mothers<sup>(10)</sup>.

Perinatal mortality coefficients were analyzed by triennials, considering the availability of data in the information systems (SIM/Sinasc) and census years. The objective of triennial analyses is to reduce possible fluctuations in the number of deaths and births during that period. To analyze the distribution of perinatal mortality, we calculated the relative difference between mortality coefficients (MC) corresponding to the first and last triennial periods, 1999-2001 and 2008-2010.

The distribution of perinatal mortality coefficients and its components was analyzed by macro-regional and regional health coordination center in the first and last triennials using the map of the state of Paraná. Coefficients were distributed in quartiles, according to maximum and minimum values, using a gray scale, in which white represents the lowest coefficients and black, the highest coefficients. This study abided by the ethical precepts of research with human subjects, in accordance with resolution no. 5991/2012 by the human research ethics committee of the State University of Maringá.

## RESULTS

The results indicate that, in general, there was an improvement in the health of children residing in the state of Paraná, represented by diminished perinatal MC (from 22.8 in 1999 to 15.3 deaths per 1000 live and still births in 2010), and also in terms of its two components, early neonatal and fetal death. However, despite the decline observed in this period, Figure 1 shows variation in the coefficients beginning in 2007, suggesting a stabilization trend in values close to 8.6 for fetal MC and approximately 6.9 for early neonatal MC.

When analyzing the coefficients by state regions, perinatal mortality coefficients and its components presented a reduction in the state of Paraná as a whole, in all macro-regional centers and most regional centers (RC). Three RCs presented a slight increase in stillbirth rates, with a relative increase of +5.9, +12.3 and +12.2 in Paranaguá, Francisco Beltrão and Apucarana, respectively (Table 1).

The northwest macro-regional center presented a relative reduction in perinatal MC of -32.6% and the east macro-regional, -30.2%, higher than the state mean, which was -28.2% (Table 1).

Comparing the coefficients in each triennial with the state mean, some regions stand out. In the first triennial, two macro-regions, north (19.4 perinatal deaths/1000) and west (19.5 perinatal deaths/1000) obtained lower coefficients than the mean for the state of Paraná, 22.1 perinatal deaths per 1000 live and stillbirths. In the second triennial, three macro-regions (except east macro-

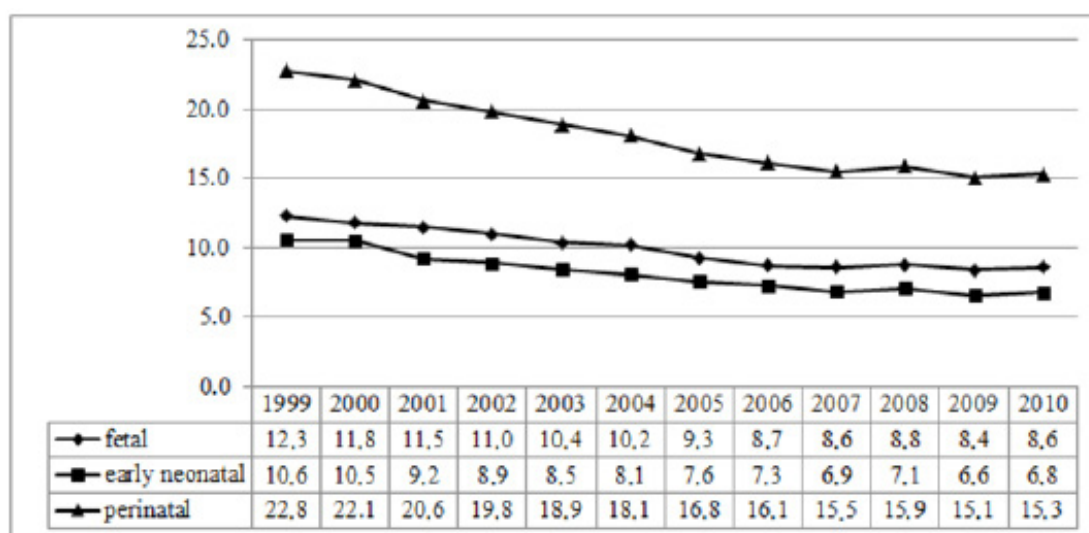


Figure 1 – Perinatal mortality coefficient, by components. Paraná, Brazil, 1999 to 2010

Table 1–Perinatal mortality, early neonatal and fetal coefficients, according to regional and macro-regional health coordination centers, by triennials. Paraná, Brazil, 1999 to 2001 and 2008 to 2010

Macro-regional/ Regional health coordination center	Triennial						Relative difference (a-b)		
	1999-2001 (a)			2008-2010 (b)			peri	e neo	fetal
	peri	e neo	fetal	peri	e neo	fetal			
<b>East</b>	<b>23.5</b>	<b>10.6</b>	<b>13.0</b>	<b>16.4</b>	<b>7.1</b>	<b>9.4</b>	<b>-30.2</b>	<b>-33</b>	<b>-27.7</b>
1stParanaguá	27.3	15.4	12.1	20.1	7.4	12.8	-26.4	-52	+5.9
2nd Metropolitana	20.8	9.1	11.8	14.4	6.1	8.4	-30.7	-33	-29.1
3rd Ponta Grossa	27.3	13.7	13.8	19	8.3	10.8	-30.3	-38.8	-22.2
4thIrati	29.4	12.6	17	17.7	7.5	10.4	-39.7	-40.9	-39.2
5thGuarapuava	30.8	12.8	18.2	23.3	10.5	12.9	-24.5	-18	-29.4
6thUnião Vitória	19.3	9.3	10.1	12.1	3.5	8.5	-37.1	-62.8	-14.8
21stTelêmaco Borba	27.3	11.3	16.2	22.4	12.3	10.1	-18	+8.8	-36.7
<b>West</b>	<b>19.5</b>	<b>9.1</b>	<b>10.4</b>	<b>15</b>	<b>7</b>	<b>8</b>	<b>-23</b>	<b>-23</b>	<b>-32.7</b>
7thPato Branco	20.5	9.9	10.7	17.8	8	9.7	-13.5	-19.5	-8
8thFrancisco Beltrão	16.7	9.5	7.4	16.5	8.2	8.3	-1.7	-12.6	+12.3
9th Foz do Iguaçu	21.5	9.4	12.2	12.9	6.3	6.6	-40	-33.1	-45.6
10thCascavel	18.5	8.2	10.5	14.5	6.8	7.7	-21.8	-16.4	-26.2
20th Toledo	20.4	9.9	10.6	15.4	6.5	8.9	-24.6	-33.8	-16.2
<b>Northwest</b>	<b>22.1</b>	<b>10.4</b>	<b>11.8</b>	<b>14.9</b>	<b>6.1</b>	<b>8.9</b>	<b>-32.6</b>	<b>-41.3</b>	<b>-24.6</b>
11thCampo Mourão	24.8	11.9	13	15.7	7.2	8.6	-36.6	-39.2	-34.4
12th Umuarama	22.2	10.8	11.5	15	6.4	8.7	-32.3	-41	-24.5
13thCianorte	21.2	9.8	11.5	16.2	7.5	8.8	-23.6	-23.8	-23.7
14thParanavaí	25.8	12.2	13.7	17.9	7	11	-30.5	-43	-19.6
15th Maringá	19.3	8.8	10.6	13.2	4.9	8.3	-31.8	-44.3	-21.6
<b>North</b>	<b>19.4</b>	<b>8.5</b>	<b>11</b>	<b>15.7</b>	<b>6.7</b>	<b>9.1</b>	<b>-19.2</b>	<b>-21.2</b>	<b>-17.3</b>
16th Apucarana	18.1	9.8	8.4	17.1	7.8	9.4	-5.5	-20.5	+12.2
17th Londrina	16.7	7.4	9.3	12.4	5.6	6.9	-25.6	-25.1	-26.2
18thCornélio Procópio	28.6	11.8	17.1	20.2	9.4	11	-29.6	-20.6	-35.9
19thJacarezinho	26.8	11.9	15.1	21.9	7.2	14.9	-18.5	-39.5	-2.2
22ndIvaiporã	16.6	7.9	8.8	13.8	5.9	7.9	-17.3	-24.8	-10.8
<b>Paraná</b>	<b>22.1</b>	<b>10.1</b>	<b>12.1</b>	<b>15.9</b>	<b>6.9</b>	<b>9.1</b>	<b>-28.2</b>	<b>-32.2</b>	<b>-25.2</b>

Source: Datasus/SIM/Sinasc

region) had perinatal mortality coefficients lower than that of the state of Paraná, which was 15.9 perinatal deaths per 1000 live and stillbirths (Table 1).

In the first triennial, the RCs with the lowest perinatal MC were Ivaiporã (16.6), Londrina (16.7) and Francisco Beltrão (16.7). In the second triennial, União da Vitória (12.1) and Londrina (12.4) presented the lowest perinatal MC (Table 1).

Figure 2 illustrates the downward trend in perinatal MC for each macro-region and respective regional centers, demonstrated by the decline in all RCs, with emphasis to Foz do Iguaçu (west macro-region), followed by Irati and

União da Vitória (east macro-region) and Campo Mourão (northwest macro-region).

Figure 3 represents the thematic map of the state of Paraná by regional health coordination centers, showing the spatial distribution of perinatal, fetal and early neonatal MC, in the first and last triennials. The center-south and north regions of the state presented the highest coefficients in the first triennial. In general, in the second triennial, the map presents lighter shades, showing lower coefficients, with emphasis to the 5th (Guarapuava), 21st (Telêmaco Borba) and the 19thRC (Jacarezinho), which presented the highest values, both for fetal and early neonatal MC.

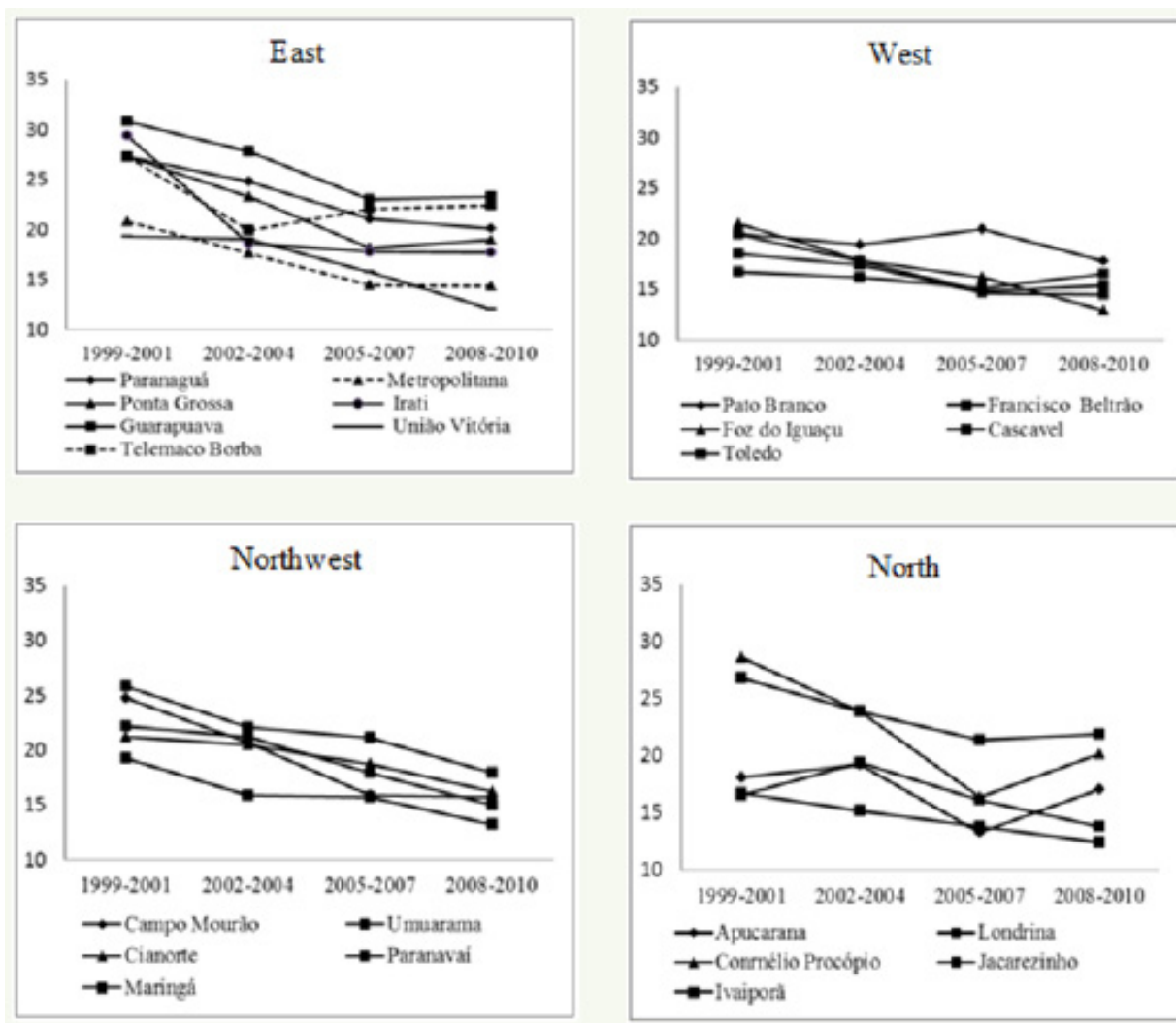


Figure 2 – Perinatal mortality coefficient (by 1000 LB and SB), by regional and macro-regional health coordination center, Paraná, Brazil, 1999 to 2010

## DISCUSSION

The analysis of perinatal (fetal and early neonatal) mortality between 1999 and 2010 showed diminished coefficients for the state of Paraná, dropping from 22.8 deaths per 1000 LB and SB in 1999 to 15.3 in 2010. However, fetal and early neonatal MC were persistently high, corroborating other studies with similar results<sup>(11-12)</sup>.

Data presented by the Brazilian Ministry of Health indicate that even though Brazil still presents high coefficients, these have fallen by 16%, from 25.6 in 2000 to 21.5 deaths per 1000 LB and SB in 2010<sup>(6)</sup>. When compared to the results of other countries, the state of Paraná, with 15.3 deaths per 1000 LB and SB, presents better results in terms of perinatal mortality than African and Asian countries, which have mean MC of 60 deaths per LB and SB. However, the rates displayed by Paraná are higher than those of European

countries, with a mean of 8.0 perinatal deaths per LB and SB in 2004<sup>(13)</sup>.

While early neonatal MC in the South region of Brazil in 2010 was 5.9 deaths per 1000 LB, the state of Paraná presented 6.8 deaths per 1000 LB. More favorable results were found in the state of Rio Grande do Sul, with a coefficient of 5.5 deaths per 1000 LB, and higher values were found in the states of Bahia and Maranhão, with 12.8 and 12.7 deaths per LB, respectively<sup>(6)</sup>. The early neonatal MC in Brazil as a whole fell from 13.4 to 8.7 deaths per 1000 LB from 2000 to 2010<sup>(6)</sup>. This reduction may be attributed to the availability of advanced technologies that provide care to premature neonates or those in severe conditions, which can help reestablish the health of these babies or prolong their survival time<sup>(11)</sup>. The fetal mortality component in this study presented a downward trend in the state of Paraná, with a 30% reduction between 1999 and 2010, which can also be attributed to the improvement of the quality of

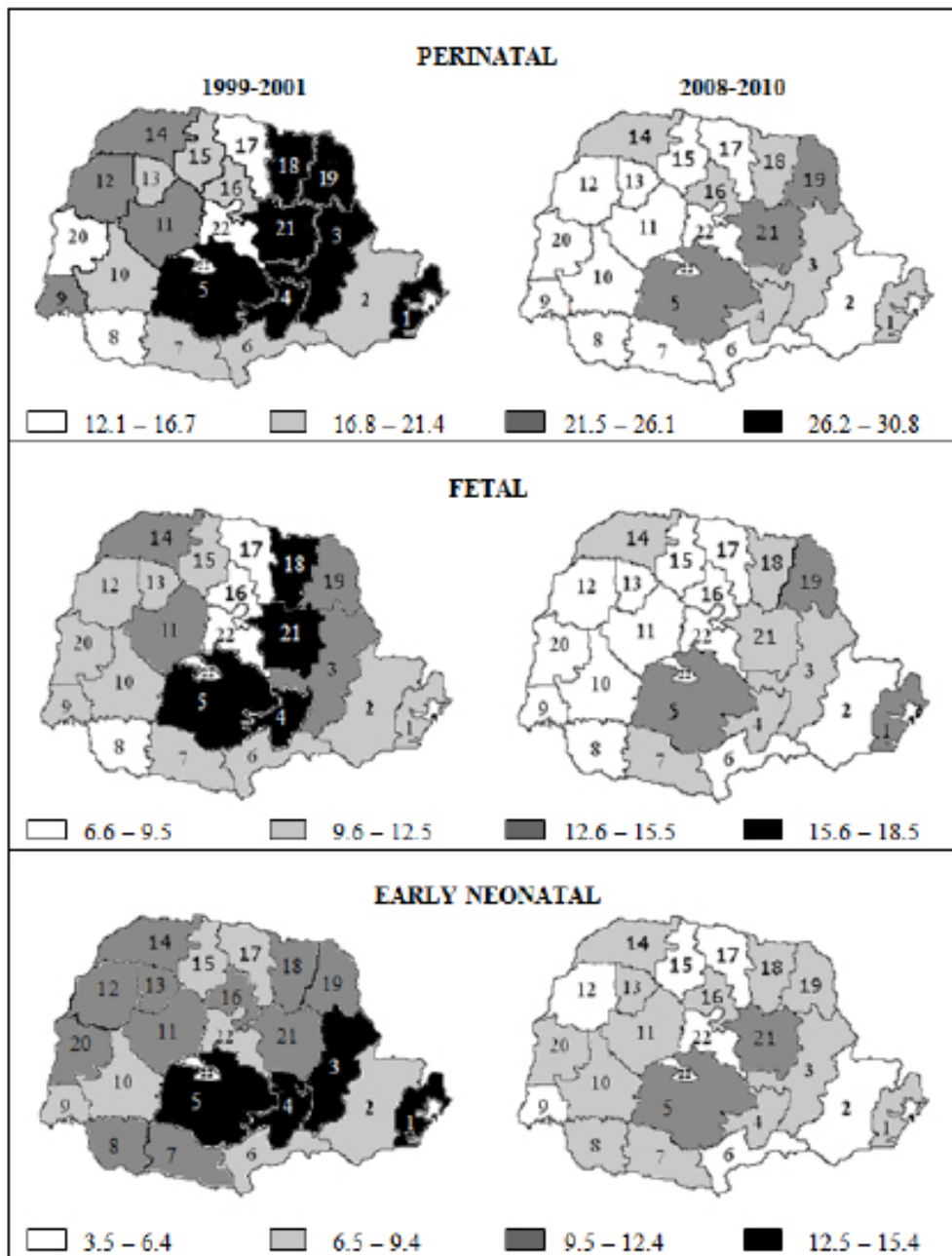


Figure 3 – Perinatal mortality coefficient by components and regional health coordination centers. Paraná, Brazil, 1999-2001 and 2008-2010

information on this indicator, although there were gaps in the information available on each variable in the data records, interfering in the final result. The period between 2006 and 2010 is also a cause for concern, as fetal deaths remained relatively stable, with coefficients ranging from 8.7 to 8.6 deaths per 1000 LB and SB.

Despite the reduction in fetal MC that was observed, we must emphasize that for the most part, causes of fetal death could be further prevented<sup>(14)</sup>. In 2007, of the total fetal deaths notified in Brazil, 29.4% occurred in fetuses weighing over 2.500 g, due to congenital syphilis or intrapartum asphyxia<sup>(7)</sup>. An estimated three

million third-trimester stillbirths occur every year, and of these, 98% happen in low- and middle-income countries, and over a million occur in the intrapartum period<sup>(3)</sup>.

Fetal MC presented higher values in some regional centers, such as the 1st RC of Paranaguá, which registered a 5.9% increase in this period, the 8th RC of Francisco Beltrão with a 12.3% increase and the 1st RC of Apacurana, with a 12.2% increase. It is worth mentioning that this positive change can be a reflection of improvements in the quality of records kept by the information systems. However, the quality of care provided to pregnant women and newborns must be

further improved, given that early neonatal morbimortality and fetal mortality share similar circumstances and etiologies and, for the most part, could be avoided, even though they tend to be considered less important.

The highest perinatal, fetal and early neonatal MC in Paraná were concentrated in regions with the lowest socioeconomic indicators and levels of development, such as RC Guarapuava, which presented the highest perinatal mortality rates in the first and last triennials (30.8 and 23.3 perinatal deaths per 1000 births, respectively), and also the highest coefficient of fetal deaths (18.2 and 12.9 per 1000 births). Another study that analyzed maternal and child health indicators in the state of Paraná found similar results to that of the RC Guarapuava. The findings showed municipality agglomerates in which over 50% of mothers lacked adequate prenatal healthcare coverage, a determining factor for increasing the probability of perinatal mortality<sup>(15)</sup>.

Perinatal mortality is an important health indicator that serves as the basis for assessing health care provided to women and children. This indicator is also influenced by the population's economic and social level of development and the location of study. One of the possible explanations for perinatal MC and its components in the RCs of Paraná can be found in the characteristics of this region, where there is a prevalence of municipalities with low and medium levels of socioeconomic development<sup>(15)</sup>. Similarly, these coefficients can be an indirect indicator of flaws in access to health services and the effectiveness of actions offered to pregnant women during the prenatal and intrapartum period.

The 21st RC stands out for the increase in early neonatal mortality during the period investigated in this study. As in the case of Guarapuava, more attention must be given to this RC in order to define factors that are influencing these health indicators, considering that mortality in the first days of life express a complex set of biological, socioeconomic and health care factors, with the latter being defined as care provided to pregnant women and neonates<sup>(16)</sup>.

With improved social and economic conditions, access to basic sanitation, and health services, child mortality in the late and post-neonatal period decreases and deaths in the first week, predominantly in the first hours of life, become more frequent. Therefore, health care provided to pregnant women during the prepartum and intrapartum period and to children

immediately after birth and in the nursery must be further improved, given its close relationship with perinatal mortality<sup>(17)</sup>.

One strategy for monitoring child and fetal mortality was the implementation of child and fetal mortality prevention committees by the Brazilian Ministry of Health. The purpose of these committees is to elucidate the circumstances surrounding child and fetal deaths, identifying risk factors, determining the avoidability of each case and proposing measures to improve the quality of care<sup>(1)</sup>. Paraná has a state child and fetal prevention committee, 22 regional and municipal committees, and hospital committees. The work of these committees consists of assessing health care, contributing to improving knowledge about child and fetal death in order to underpin public policies and intervention actions<sup>(18)</sup>.

Despite the downward trend of perinatal MC and its components, and notwithstanding the efforts of the state government and the State Health Secretariat, the findings of this study demonstrate that further deaths could be avoided, especially in some regions of the state of Paraná. The implementation of women and children's health clinics, the Nascir no Paraná program ("Birth in Paraná") and, most recently, the implementation of the Rede Mãe Paranaense ("Network of Paraná's Mothers"), in 2012<sup>(18)</sup>, are some strategies that qualify health care provided to pregnant women and establish care networks in order to reduce maternal and child deaths.

## FINAL CONSIDERATIONS

This study analyzed perinatal mortality and its components according to data from regional and macro-regional health coordination centers in the state of Paraná, Brazil, between 1999 and 2010. The most significant reduction was observed in the early neonatal component in comparison with the fetal component; however, after 2007, these coefficients remained relatively stable. Among the components of perinatal mortality, there was an increase in fetal MC in the RCs of Paranaguá, Francisco Beltrão and Apucarana; the RC of Toledo presented increased early neonatal MC and that of Guarapuava presented the highest coefficients, both for perinatal and fetal deaths, in the first and final triennials.

The results showed a variation of MCs among regional and macro-regional centers, indicating the need for more accurate analyses directed at each health region in isolation, seeking for

associations between perinatal mortality and socioeconomic, demographic, healthcare and healthcare services organization factors. Given the heterogeneity of the population among regions, future studies must investigate how these risk factors are distributed among the different regions of the state of Paraná, if the variations in perinatal mortality coefficients observed in this study can be attributed to these local characteristics, and which ones are more relevant. Therefore, it is important that healthcare workers in the regional centers of Paraná encourage and contribute to the discussion in each municipality about target coefficients and also about the need to improve access and quality of high-risk newborn and prenatal care.

This study presents some limitations that must be taken into account when interpreting its results. Perinatal mortality coefficients may have been influenced by the different quality of birth and death records kept by hospitals and other health services, in addition to municipal epidemiological sectors in which the mothers reside. These factors influence the quality of the SIM and Sinasc in each location, to different extents.

In this context, the localized study of perinatal mortality by healthcare services is of utmost importance, as multiprofessional teams are responsible for developing actions to promote the health of women and children, both in terms of caring for the population and also organizing healthcare services and establishing care networks for pregnant women and newborns. These actions include prenatal, intrapartum and neonatal care, health education, and specific actions to prevent perinatal mortality, such as the early detection of high-risk pregnant women and newborns in regions within the scope of the Family Health Strategy program.

New studies on the profile of perinatal morbimortality are needed, and especially analyses to differentiate risks to child health among health regions. It is also necessary to understand the reasons behind the stabilization of perinatal mortality coefficients between 2007 and 2010 and determine actions that can be applied to reduce these coefficients.

## REFERENCES

1. Ministério da Saúde (BR). Secretaria de Atenção à Saúde. Secretaria de Vigilância em Saúde. Manual de vigilância do óbito infantil e fetal e do comitê de prevenção do óbito infantil e fetal. Brasília, DF; 2009.
2. Organização Mundial da Saúde (OMS). Classificação estatística internacional de doenças e problemas relacionados à saúde. 1. ed. rev. São Paulo: Centro Colaborador da OMS para classificação de Doenças em Português; 2007.
3. Goldenberg RL. Stillbirth: the vision for 2020. *Lancet*. 2011; 337(9779):1798-805.
4. Cousens S, Blencowe H, Stanton C, Chou D, Ahmed S, Steinhardt L, et al. National, regional, and worldwide estimates of stillbirth rates in 2009 with trends since 1995: a systematic analysis. *Lancet*. 2011; 377(9779):1319-30.
5. Drumond EF, Machado CJ, França E. Óbitos neonatais precoces: análise de causas múltiplas de morte pelo método Grade of Member ship. *Cad. Saúde Pública*. 2007; 23(1):157-66.
6. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Mortalidade Infantil no Brasil: Tendência, componentes e causa de morte no período de 2000 a 2010. Saúde Brasil 2011: uma análise da situação de saúde e a vigilância da saúde da mulher. Brasília; 2012.
7. Paris GF, Mathias TAF. Fatores associados à ausência de dados no sistema de informações sobre nascidos vivos em condições desfavoráveis no nascimento. *Cien. Cuid. Saúde*. 2012; 11(4):673-80.
8. Victora CG, Aquino EML, Leal MC, Monteiro CA, Barros FC, Szwarcwaldet CL. Saúde de mães e crianças no Brasil: progressos e desafios. *Lancet*. 2011; 377(1):32-46.
9. Secretaria de Estado da Saúde do Paraná (PR). Rede mãe paranaense. [Internet]. 2012 [acesso em 12 out 2013]. 29 p. Disponível em: [http://www.saude.pr.gov.br/arquivos/File/APSUS\\_-\\_Ed.\\_Permanente/Oficina\\_02/Rede\\_Mae\\_Paranaense.pdf](http://www.saude.pr.gov.br/arquivos/File/APSUS_-_Ed._Permanente/Oficina_02/Rede_Mae_Paranaense.pdf)
10. Rede Interagencial de Informações para Saúde. Indicadores básicos para saúde no Brasil: conceitos e aplicações. Brasília: Organização Pan-Americana da Saúde (OPAS); 2008.
11. Martins EF, Lana FC, Maria E. Tendência da mortalidade perinatal em Belo Horizonte, 1984 a 2005. *Rev. Bras. Enferm*. 2010; 63(3):446-51.
12. Barreto JOM, Nery IS, Mendes YMMB. Mortalidade perinatal: uma análise com enfoque na evitabilidade. *Cogitare enferm*. 2011; 16(1):88-95.
13. Ahman E, Zupan J. Neonatal and perinatal mortality: country, regional and global estimates 2004. Geneva: World Health Organization; 2007.
14. Martins EF, Rezende EM, Lana FCF, Souza KV. Óbitos perinatais investigados e falhas na assistência Hospitalar ao parto. *Esc Anna Nery*. 2013; 17(1):38-45.



15. Melo EC, Mathias TAF. Distribuição e autocorrelação espacial de indicadores da saúde da mulher e da criança, no Estado do Paraná, Brasil. *Rev. Latino-am. Enfermagem*. 2010; 18(6):1177-86.
16. Soares ES, Menezes GMS. Fatores associados à mortalidade neonatal precoce: análise de situação no nível local. *Epidemiol. Serv. Saúde*, 2010; 19(1):51-60.
17. Silva ZP, Almeida MF, Ortiz LP, Alencar GP, Alencar AP, Schoeps D, et al. Morte neonatal precoce segundo complexidade hospitalar e rede SUS e não SUS na Região Metropolitana de São Paulo, Brasil. *Cad. Saúde Pública*, 2010; 26(1):123-4.
18. Secretaria de Estado da Saúde do Paraná (PR). Seminário Integrado do Paraná: 20 anos do Comitê de Prevenção de Mortalidade Materna – 10 anos de Mortalidade Infantil. Curitiba, 2009.