

# Brazilian National Policy of Comprehensive Women's Health Care and Mortality during Climacteric Period: Has Anything Changed?

Isabel Cristina Esposito Sorpreso (✉ [icesorpreso@usp.br](mailto:icesorpreso@usp.br))

Disciplina de Ginecologia, Faculdade de Medicina, Universidade de Sao Paulo <https://orcid.org/0000-0002-5475-5957>

Francisco Winter dos Santos Figueiredo

Faculdade de Medicina do ABC

José Lucas Souza Ramos

Universidade de Sao Paulo Faculdade de Medicina

Lea Tami Suzuki Zuchelo

Universidade de Sao Paulo Faculdade de Medicina

Fernando Adami

Faculdade de Medicina do ABC

Edmund Chada Baracat

Universidade de Sao Paulo Faculdade de Medicina

José Maria Soares Júnior

Universidade de Sao Paulo Faculdade de Medicina

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## Research article

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# Abstract

**Background:** The National Policy for Integral Attention to Women's Health Care (PNAISM) was implemented more than two decades ago, with the monitoring of potential benefits being explored. One of the life cycles of women contemplated in this health policy was the importance of health care during the climacteric. Prevention and health promotion actions carried out by the Brazil National Health System - Unified Health System and enshrined in health Brazilian policies for women. Thus, our purpose was to identify climacteric women's main causes of death as well as the mortality trends of such causes, especially after PNAISM implementation.

**Methods:** An ecological study was conducted from 2018–2019. Data were retrieved from the Brazilian Health Department by accessing the mortality information system of the National Health Information, divided into periods 1996–2004 and 2005–2016 to correspond with the implementation of the National Policy. The death records of Brazilian women aged 35 to 64 years who had a diagnosis were retrieved. Trends and differences between periods were evaluated using linear regression. The significance level was set at 5%.

**Results:** The main causes of death in women from 1996 to 2016 were circulatory system diseases (29.39%, 736,972 deaths), neoplasms (26.17%, 656,385 deaths), respiratory system diseases (7.29%, 182,812 deaths), endocrine, nutritional and metabolic diseases (6.81%, 170,881 deaths), and external causes of morbidity and mortality (5.49%, 137,674 deaths). Mortality from circulatory system diseases was reduced following implementation of the PNAISM ( $\beta=-0.58$ ; 95% CI -0.68 to -0.48;  $r^2=0.93$ ;  $p<0.001$ ), but no significant changes were observed in mortality from neoplasms ( $\beta=0.07$ ; 95% CI -0.01 to 0.15;  $r^2=0.22$ ;  $p=0.070$ ).

**Conclusions:** The leading causes of death during climacteric are circulatory system diseases, neoplasms, respiratory system diseases, nutritional, metabolic, and endocrine diseases, and external causes of morbidity and mortality, with no changes in neoplasms and respiratory system diseases. Thus, the analysis of women's health indicators, such as mortality rates, is fundamental in order to enable the monitoring of benefits and results related to PNAISM as well as directing the design and implementation of other new health policies to be developed for women.

## Background

The National Policy of Comprehensive Women's Health Care (Política Nacional de Atenção Integral à Saúde da Mulher), launched by the Brazilian Health Department in 2004 and presently operating in conjunction with the Unify Health System (UHS) - Sistema Único de Saúde (SUS), aims to reduce women's morbidity and mortality, especially deaths resulting from preventable causes in all life cycles.<sup>1-3</sup>

Historically, the assistance and care provided to women by the Brazilian health system was restricted to pregnancy and the puerperium, and health actions were specific (vertical) and oriented to maternal and child health.<sup>1-3</sup> In 1984, with the creation of the "Programa de Atenção Integral à Saúde da Mulher" -

PAISM (Program for Integral Assistance to Women's Health) and the implementation of SUS, differentiated attention to women's health was initiated, related to longitudinal assistance, in addition to other aspects relevant to the health of the female population, such as prevalent gynecological diseases; prevention, detection, and treatment of neoplasms; menopause; domestic and sexual violence; and the incorporation of sexual and reproductive rights at different levels of complexity.<sup>1-4</sup>

In 2004, PAISM was restructured with new guidelines and goals for assisting women's health, known as the National Policy for Comprehensive Care for Women's Health (PNAISM), and priority was given to guarantee health care for women in Brazil during the climacteric period.<sup>1-3</sup> Climacteric is the transition period in a woman's life from the potential for reproducing to a nonreproductive phase.<sup>5</sup> At such a time, clinical changes occur in association with prolonged, permanent, and physiological hypoestrogenism,<sup>5-7</sup> and they may be related to the onset or aggravation of chronic noncommunicable diseases.<sup>8,9</sup> In this period, ranging from age 40 to 65 years, a woman can benefit from health prevention and promotion actions taken by the SUS and PNAISM.

The epidemiological mortality profile in Brazil has a marked prevalence of chronic noncommunicable diseases and shows a tendency over recent years toward reduction in the deaths, specifically of climacteric women, of the circulatory system<sup>8</sup> and ill-defined causes as well as a trending increase in neoplasms.<sup>8-10</sup>

Studies conducted in recent years on the impact of PNAISM on women's health and on the trends in the causes of disease and death among menopausal women have been scarce<sup>8-10</sup>. Studies on the mortality of Brazilian women may contribute to changes in health promotion strategies and to the monitoring of the organization and implementation of public health care policies.<sup>11-12</sup> Thus, our purpose was to identify the main causes of death in climacteric women as well as the mortality trend of such causes, especially after PNAISM implementation.

## Methods

### Study design

Secondary data analyses were performed using the Setor de Atenção Primária, Disciplina de Ginecologia, Departamento de Obstetrícia e Ginecologia, Faculdade de Medicina, Universidade de São Paulo from 2018 to 2019. Health information is centralized in the official database of the Brazilian Health Department with data managed and supplied by the IT Department of SUS (DATASUS) and by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística [IBGE]), which is the main office responsible for sociodemographic data in Brazil. In this study, data were obtained from DATASUS through access to the Systems of Information on Mortality (Sistemas de Informação sobre Mortalidade) (SIM) for retrieval of vital statistics indicators and through access to the System of Health Information (Sistema de Informações de Saúde [TABNET]) for the extraction of demographic and socioeconomic indicators.

## Data source

The DATASUS database covers approximately 96%<sup>13</sup> of the Brazilian population and provides socioeconomic data and information related to health and health care. The data made available by DATASUS are computerized records of procedures, actions, and services performed by SUS. The data go through an internal validation process before being made available for free public access. However, the individuals treated at SUS are not identified by name, rendering more recent data on the general health of the population vulnerable to subsequent alterations. Hence, they were not utilized for analysis.

## Participants

Participants were selected from the databases. Only the records of women who died between 35 and 64 years of age—but not during pregnancy or the postpartum period—who were residents of Brazil and who had a precise diagnosis were retrieved. Deaths occurring during pregnancy and the postpartum period were excluded because of the age bracket. Women who had signs and symptoms and whose clinical examinations and laboratory tests showed abnormalities were left out owing to a lack of diagnostic precision. All deaths occurring in this population between 1996 and 2016 that were reported to the SIM were included in this study.

## Variables

### *Age patterns of mortality*

Data on causes of death were retrieved according to the tenth edition of the International Classification of Diseases (ICD-10)<sup>14</sup>. Women who died between 35 and 64 years of age had their records retrieved and were stratified into 4-year age brackets (35–39, 40–44, 45–49, 50–54, 55–59, and 60–64 years) and year of death.

The estimates of the resident population were obtained from two projections made by IBGE.<sup>10</sup> The population estimates for the years between 1996 and 2000 was based on the intercensal projections covering the years between 1981 and 2012 and was organized by age bracket, sex, and housing status, and that between 2001 and 2015 from projections for the 2000 to 2006 period, the population was classified by sex and age. The resident population was arranged into 4-year age brackets.

Mortality rates were calculated as the number of women deaths per 100,000 resident population.. The resultant rate was standardized by age by the direct method, with the world population as a reference.<sup>15</sup>

### *Periods related to PNAISM*

Rate behavior was analyzed according to ranges related to the year of PNAISM implementation. The pre-implementation period corresponds to the 1996 to 2004 range and the post-implementation period to the subsequent 2005 to 2016 range.

## Ethical considerations

This study analyzed secondary data freely accessible to the public and thus respects work ethics and upholds good research practices. As a result, the work cannot present any approval number given by the research ethics committee. According to resolution number 510 of the National Health Council published on April 5, 2016, studies conducted with secondary data or with public data that render identification of the individual impossible are not required to be submitted for approval or evaluated by the research ethics regulatory system in Brazil, be it the Research Ethics Committee or the National Council on Research Ethics.<sup>16</sup>

## Data analysis

Frequency distributions of causes of death, using the ICD-10 categories, was performed with absolute numbers and frequency relative to the number of deaths documented during the period. Trends were evaluated by linear regression, and the slope (B) and the respective 95% confidence interval, the explained variance ( $R^2$ ), and the probability value (p) were calculated. The significance level was set at 5%. Stata 11® (StataCorp, LCC) was used.

## Results

Deaths from non-obstetric causes of women aged 35 to 64 years totaled 2,286,723 between 1996 and 2016. The major causes of death were classified as circulatory system diseases (29.39%, 736,972 deaths), neoplasms (26.17%, 656,385 deaths), respiratory tract diseases (7.29%, 182,182 deaths), nutritional and metabolic endocrine disorders (6.81%, 170,881 deaths), and external causes of morbidity and mortality (5.49%, 137,674 deaths), totaling 75.1% of the deaths in that period (Table 1).

**Table 1.** Distribution of deaths of climacteric women residents of Brazil between 1996 and 2016 according to ICD-10.

Classification	Section (ICD)	Deaths	%
Diseases of the circulatory system	V	736972	29.39
Neoplasms (tumors)	II	656385	26.17
Diseases of the respiratory system	X	182812	7.29
Endocrine, nutritional, and metabolic diseases	IV	170881	6.81
External causes of morbidity and mortality	XX	137674	5.49
Some infectious and parasitic diseases	I	134545	5.37
Diseases of the digestive system	XI	126787	5.06
Diseases of the genitourinary system	XIV	50040	2.00
Diseases of the nervous system	VI	32301	1.29
Mental and behavioral disorders	V	16038	0.64
Diseases of the musculoskeletal system and connective tissue	XIII	15501	0.62
Blood and hematopoietic organ diseases and some immune disorders	III	15271	0.61
Diseases of the skin and subcutaneous tissue	XII	5976	0.24
Congenital malformations, deformations, and chromosomal abnormalities	XVII	5064	0.20
Diseases of the ear and mastoid process	VIII	355	0.01
Certain conditions originating in the perinatal period	XVI	64	0.003
Diseases of the eye and adnexa	VII	57	0.002

#### ICD-10: International Classification of Diseases-10

Trend analysis of the five major causes of death showed a reduction in mortality in the circulatory system ( $\beta = -2.5$ ; 95% CI, -2.9 to -2.2;  $R^2 = 0.91$ ;  $p < 0.001$ ) and respiratory system ( $\beta = -0.2$ ; 95% CI, -0.4 to -0.02;  $R^2 = 0.18$ ;  $p = 0.030$ ), in the external causes of morbidity and mortality ( $\beta = -0.2$ ; 95% CI, -0.3 to -0.04;  $R^2 = 0.25$ ;  $p = 0.012$ ) as well as an increase in mortality resulting from neoplasms ( $\beta = 0.7$ ; 95% CI, 0.5 to 0.9;  $R^2 = 0.77$ ;  $p < 0.001$ ) (Figure 1).

Mortality from circulatory system diseases was significantly reduced following implementation of the PNAISM ( $\beta = -0.58$ ; 95% CI -0.68 to -0.48;  $r^2 = 0.93$ ;  $p < 0.001$ ), but no significant changes were observed in mortality from neoplasms ( $\beta = 0.07$ ; 95% CI -0.01 to 0.15;  $r^2 = 0.22$ ;  $p = 0.070$ ). There were changes in the behavior of mortalities brought on by endocrine, nutritional, and metabolic diseases, diseases of the respiratory system, and external causes. Mortality from endocrine and nutritional diseases did not change in the pre-PNAISM period ( $p = 0.601$ ); however, it began to decline in the post-PNAISM period ( $\beta = -0.09$ ; 95% CI, -0.13 to -0.05;  $R^2 = 0.64$ ;  $p = 0.001$ ).

Additionally, the decrease in mortality from diseases of the respiratory system in pre-PNAISM ( $\beta = -0.20$ ; 95% CI, -0.29 to -0.10;  $R^2 = 0.73$ ;  $p = 0.002$ ) changed to a slight increase in post-PNAISM ( $\beta = 0.05$ ; 95% CI, 0.001 to 0.09;  $R^2 = 0.28$ ;  $p = 0.043$ ), and the pre-PNAISM decrease in the mortality of external causes exhibited no significant changes in the period subsequent to PNAISM implementation ( $p = 0.456$ ) (Table 2).

**Table 2.** Changes in the major causes of death of climacteric women from pre-implementation to post-implementation of the National Policy of Comprehensive Women's Health Care

Sections	Pre-PNAISM 1996 to 2004			Post-PNAISM 2005 to 2016		
	$\beta$ (95% CI)	R <sup>2</sup>	p*	$\beta$ (95% CI)	R <sup>2</sup>	p*
Diseases of the circulatory system	-0.092 (-1.22 to -0.60)	0.85	<0.001	-0.58 (-0.68 to 0.48)	0.93	<0.001
Neoplasms (tumors)	0.02 (-0.17 to 0.22)	0.13	0.817	0.07 (-0.01 to 0.15)	0.22	0.070
Diseases of the respiratory system	-0.20 (-0.29 to -0.10)	0.73	0.002	0.05 (0.001 to 0.09)	0.28	0.043
Endocrine, nutritional, and metabolic diseases	0.02 (-0.08 to 0.12)	0.09	0.601	-0.09 (-0.13 to -0.05)	0.64	0.001
External causes of morbidity and mortality	-0.16 (-0.22 to -0.09)	0.80	0.001	0.01 (-0.02 to 0.04)	0.03	0.456

\*Linear regression; 95% CI: 95% confidence interval; R<sup>2</sup>: explained variance;  $\beta$ : Slope  
PNAISM: Política Nacional de Atenção Integral à Saúde da Mulher (National Policy of Comprehensive Women's Health Care)

## Discussion

In this study, the diseases of the circulatory and respiratory systems as well as endocrine, nutritional, and metabolic diseases, and those of external causes accounted for approximately 50% of the deaths of women in the 35 to 64 age bracket, while neoplasms alone were responsible for 26% of women's deaths in that same population.

The convergence of proposals originating from the Brazilian National Health System over these years as well as the development of public health policies for women, such as the Comprehensive Assistance Program for Women's Health (PAISM) in 1984, and its new guidelines in 2004 that represent a milestone in the history of public policies aimed at women, breaking the traditional perspective of maternal and child life with the advent of the importance of prevention and health promotion for non-transmissible chronic diseases<sup>1,2,4,17</sup>.

The discussion about public policies and climacteric women emphasizes the importance of preventing damage and promoting health, considering that the life cycle is mainly associated with hormonal instability and the reduction of estrogen levels that interfere with mortality due to cardiovascular diseases and neoplasms. However, the unavailability of health services interferes with the demand of women in the climacteric period to receive guidance and resolution on issues that affect the life stage<sup>18-22</sup>.

In addition, the authors recommended the need to put into practice the constitutional right to integrality in health and to contemplate health promotion, prevention, and recovery in Brazilian health policies. This achievement must preserve women's rights and expand assistance services, so that they can correspond, quantitatively and qualitatively, to the demands of female users of the Brazilian health system<sup>23,24</sup>.

The epidemiological profile of mortality in Brazil currently shows a marked predominance of circulatory system diseases and neoplasms as causes of death since 1985. In that year, such causes overrode infectious and parasitic diseases and became the chief agents of death in the country.<sup>25,26</sup> This tendency, specifically in women in the climacteric, was demonstrated by Schmitt et al.<sup>8</sup>, who found, in decreasing order, circulatory system diseases, neoplasms, symptoms, signs, and ill-defined disorders, respiratory system diseases, external causes (external causes of morbidity and mortality), diseases of the digestive system, infectious and parasitic diseases, endocrine, nutritional, and metabolic diseases, genitourinary system diseases, and nervous system diseases.

In our study, 75.1% of the deaths that have occurred in the last 20 years were caused by circulatory system diseases, neoplasms, respiratory system diseases, endocrine, nutritional, and metabolic diseases, and external causes of morbidity and mortality. The death distribution shown by the categorizations of the tenth International Classification of Diseases is similar to the distribution of deaths among women found in the results of national studies.<sup>8-11</sup>

The higher percentages found for cardiovascular diseases, neoplasms, and metabolic diseases constitute a familiar scenario to women in the age bracket corresponding to post menopause,<sup>26,27</sup> and they are attributed to factors related to lifestyle, such as smoking, alcoholism, excess weight, and high blood pressure.<sup>27</sup> These are frequent habits and concomitant diseases reported during post menopause and may occur or aggravate as a result of physiological and progressive hypoestrogenism.<sup>26,27</sup>

The downward slope of the mortality rates of cardiovascular and metabolic diseases and the increase in neoplasm mortality were observed in a study by Mondul et al.<sup>6</sup>, who found that mortality from circulatory and ill-defined diseases was declining and that for neoplasms was moving upward.

One of the guidelines of PNAISM is related to health care in all of women's life phases and mainly to the circumstances that aggravate health, but can be avoided, prevented, or detected early on, such as breast and cervical cancers.<sup>1-4</sup>

Implementation of PNAISM allowed menopausal women to have access to health care and was an incentive to the family health care strategy teams to act at the level of public policy, orienting the promotion, prevention, and health actions in all Brazilian territories.<sup>12,24</sup> It was also a stimulus for family health care strategy policies aimed at controlling chronic noncommunicable diseases. Both may have contributed to the reduction in mortality from circulatory system diseases.<sup>19-24</sup>

In the course of the 20 years of this study (1996–2016), the mortality tendency of neoplasms remained constant compared to the other major causes of death. Furthermore, mortality from neoplasms did not increase among menopausal women in Brazil, according to our results. This was a scenario that maintained its stability independent of and subsequent to the implementation of PNAISM (2005–2016).

Implementation of public policies aimed at an early diagnosis and treatment of cancer—such as the National Cancer Care Policy (Política Nacional de Atenção Oncológica) in 2005, along with the Greater Health Program (Programa Mais Saúde) in 2009, and the National Plan for a Stronger Network for Cancer Prevention, Diagnosis, and Treatment (Plano Nacional de Fortalecimento da Rede de Prevenção, Diagnóstico e Tratamento do Câncer) in 2011—diminished the cancer load in Brazil.<sup>28-31</sup>

The stability of the mortality rates for neoplasms in the post-PNAISM period detected in the present study may be regarded as an expected result, given the cancer progression time from early detection to the time of death with respect to breast<sup>28</sup> and cervical<sup>29</sup> cancers as well as an improvement in the filling out of forms and in the quality of information of the information systems concerning the causes of death.<sup>28-30</sup> Still, the stability of the cancer mortality rates may be viewed as a warning for the type of unorganized screening performed in Brazil, with breast and cervical cancers at the forefront in women's health.<sup>31</sup>

There was no reduction in deaths from respiratory diseases, a finding also shown in the results of Schmitt et al.<sup>8</sup> The implementation success of other public policies, such as that of smoking,<sup>32</sup> could have changed the outcome. However, it is worth highlighting that, despite the studies,<sup>33,34</sup> which demonstrate the harmful effects of environmental pollution, the behavioral changes in women who have been smoking less in the recent decades, and the promotion of smoking cessation campaigns, mortality from respiratory diseases has not decreased.

The reduction in mortality from endocrine, nutritional, and metabolic diseases following PNAISM implementation, as shown in this study as well as in mortality from circulatory system diseases, may be associated with a reduction in shared risk factors, such as diabetes mellitus and dyslipidemia,<sup>35</sup> and with the health care provided to (Brazilian) diabetic patients, by making available pharmacological treatments (oral hypoglycemic drugs and insulin) through the SUS.<sup>35</sup>

The mortality analysis of neoplasms as a whole and not as separate entities—some of which are the top priority list of women's health care in PNAISM (particularly cervical and breast cancers)—is a limitation of the present study. However, PNAISM should reduce morbidity and mortality due to neoplasms in general. In addition, the implementation of National Health Policies does not clearly place health indicators or targets related to health parameters. The analysis of its results is limited by: a) the lack of ascertainment of menopause status is poor and inconsistent in DATASUS database ; b) the ecologic design which only correlates the mortality rates to time periods before and after the PNAISM so that other factors unrelated to implementation of the PNAISM may have changed during these time periods which could account for any changes so that any attribution of causality is inappropriate; c) the analyses did not include adjustment for any potential confounding factors such as smoking, body mass index, family history or exposure to air pollution and is in fact between the temporality of the data analysis process. In relation to this point, it should be considered that the age of women in our case-by-case analyses was between 35 and 64 years old, which is less than the age of mortality among women in our country. Thus, it could be a limitation of our study.

What is novel about this study is that it acknowledges PNAISM as a public health milestone and as a wellspring of thought more than two decades after its implementation. This national policy is one of the pillars in SUS<sup>36,37</sup> of the maintenance and assurance of actions for prevention and promotion that impact women's mortality, specifically during the climacteric period. Thus, analyses of women's health indicators, such as mortality rates and health diagnoses, are necessary and should make it possible to monitor the benefits of PNAISM, taking into account health care levels and the female life cycle.<sup>38</sup>

## Conclusions

The primary causes of death among menopausal women are circulatory system diseases and neoplasms, followed by respiratory system diseases, endocrine, nutritional, and metabolic diseases as well as external causes. Among climacteric women after PNAISM implementation, there is a downward trend in the rates of mortality from circulatory system diseases and from endocrine, nutritional, and metabolic diseases, and there is stability in the rates of neoplasm and respiratory system diseases.

The analysis of women's health indicators, such as mortality rates, is fundamental to enable the monitoring of benefits and results related to PNAISM as well as directing the design and implementation of other new health policies to be developed for women.

## List Of Abbreviations

PNAISM	Política Nacional de Atenção Integral à Saúde da Mulher
UHS	Unified Health System
SUS	Sistema Único de Saúde
DATASUS	IT Department of SUS
IBGE	Instituto Brasileiro de Geografia e Estatística
SIM	Sistemas de Informação sobre Mortalidade
ICD-10	International Classification of Diseases-10
R <sup>2</sup>	coefficient of determination
CI	confidence interval

## Declarations

**Ethics approval and consent to participate:** Not applicable

**Consent for publication:** Not applicable

## Availability of data and materials

The datasets generated and/or analyzed during the current study are available in the DATASUS repository, <http://datasus.saude.gov.br/mortalidade-1996-a-2017-pela-cid-10-2/>

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## Authors' contributions:

ICES have made substantial contributions to the conception, design of the work, interpretation of data, and drafting of the work.

FWFS has made substantial contributions to the design of the work, acquisition, analysis, interpretation of data, and drafting of the work.

JLSR has made substantial contributions to the design of the work and have substantively revised it.

LTSZ have made substantial contributions to the design of the work and have substantively revised it.

FA has made substantial contributions to the acquisition and analysis, and substantively revised it.

ECB has made substantial contributions to the conception and has substantively revised it.

JMSJ has made substantial contributions to the conception and has substantively revised it.

All authors have approved the submitted version and have agreed to both be personally accountable for each author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even those in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

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## Figures

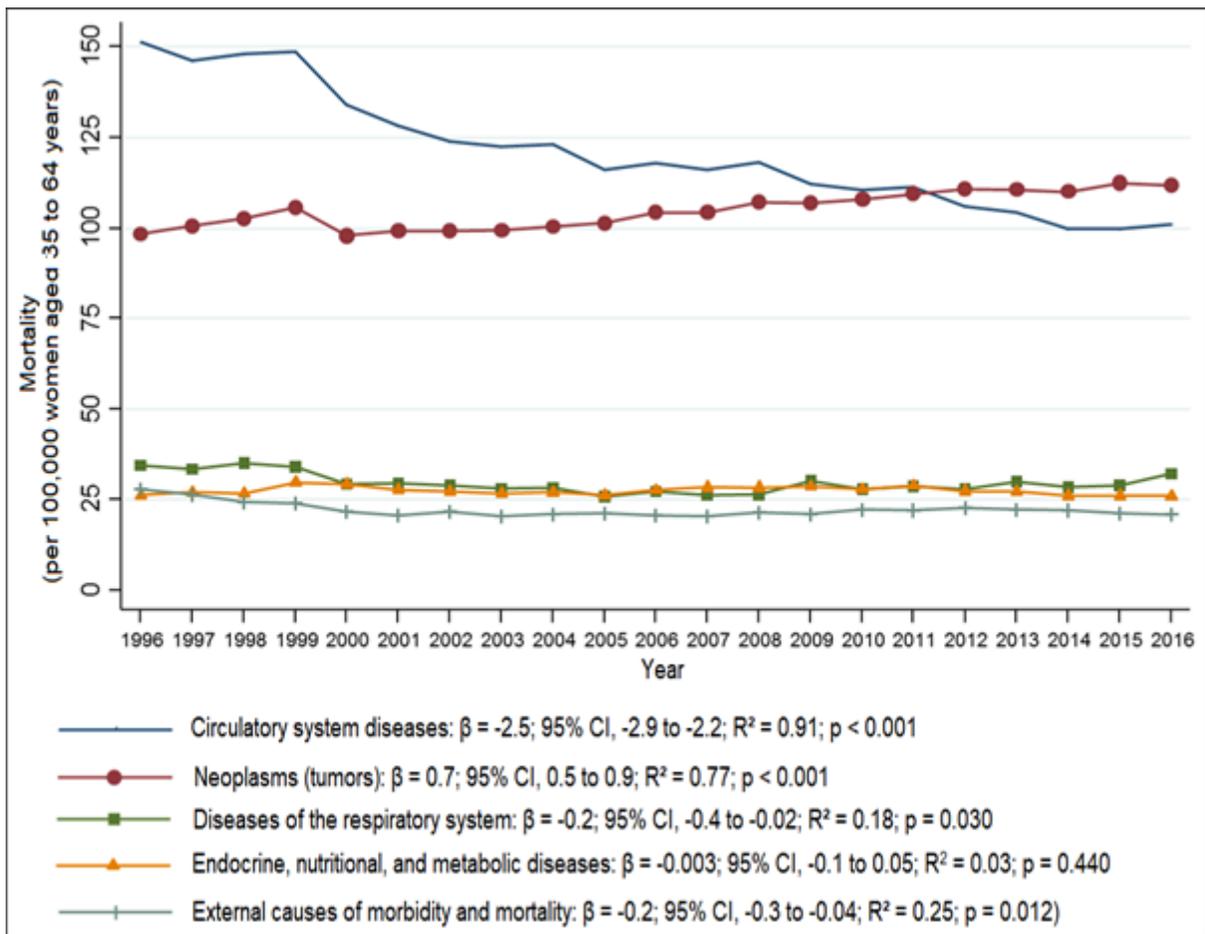


Figure 1

Mortality trend of the main causes of death in Climacteric Brazilian women between 1996 and 2016