

Reproductive, maternal, neonatal and child health in the 30 years since the creation of the Unified Health System (SUS)

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Abstract *This study presents an overview of public sector interventions and progress made on the women's and child health front in Brazil between 1990 and 2015. We analyzed indicators of antenatal and labor and delivery care and maternal and infant health status using data from the Live Birth Information System and Mortality Information System, national surveys, published articles, and other sources. We also outline the main women's and child health policies and intersectoral poverty reduction programs. There was a sharp fall in fertility rates; the country achieved universal access to antenatal and labor and delivery care services; access to contraception and breastfeeding improved significantly; there was a reduction in hospital admissions due to abortion and in malnutrition. The rates of congenital syphilis, caesarean sections and preterm births remain excessive. Under-five mortality decreased by more than two-thirds, but less pronounced for the neonatal component. The maternal mortality ratio decreased from 143.2 to 59.7 per 100 000 live births. Despite worsening scores or levelling off across certain health indicators, the large majority improved markedly.*

Key words *Health policy, Maternal health services, Reproductive health, Child Health Services, Vital statistics*

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Introduction

Over the past 30 years, Brazil has undergone demographic and socioeconomic changes that have had a direct impact on the quality of life of Brazilians. Healthcare in the country has evolved with the adoption of the Unified Health System (SUS), a programme which has instigated changes in health policy, notably the expansion of primary care¹. In the 1990s, the Ministry of Health (MH) implemented the Family Health Strategy as part of a national primary healthcare policy. Product of the Community Health Agents Programme, it aimed to improve access to healthcare services and expand actions directed at the health promotion and preventative health measures^{2,3}. In the first decade of the twenty-first century, the government developed programmes that aimed at reducing maternal and child mortality, while poverty reduction became the main focus of intersectoral programmes.

State and local governments have strived to implement these programmes, with some organisational criteria being defined by the federal government and others by the local government, introducing the assessment of these interventions and their health impacts. National actions aimed at improving the living conditions and health of women and children were underpinned by international agreements, such as those forged at the Cairo and Beijing Conferences and the Millennium Development Goals (MDG)⁴.

The SUS was devised following a political struggle for health reform in Brazil that was influenced by social movements. The tensions and disputes that characterised this process have resulted in significant improvements to the overall health of the Brazilian population.

This article offers a review of public sector interventions, focusing on the SUS and outcome indicators for reproductive, maternal, neonatal and child health (RMNCH), highlighting the progress made in the period 1990-2015 and future challenges. We calculated infant mortality rates for 1990 and 1995 using indirect techniques for demographic estimation (RIPSA, 2012). For subsequent years, we calculated rates directly, using data collected from vital registration systems and applying correction factors for municipalities with incomplete data. We calculated maternal mortality ratios (MMR) – shown for 2005, 2010 and 2015 – using data obtained from the MHafter the investigation of the deaths of women of childbearing age⁵. The MH calculated rates for previous years themselves. We estimated antenatal

care (ANC) and labour and delivery care indicators using information obtained from the Live Births Information System (SINASC, acronym in Portuguese), and estimated indicators related to reproductive health, breast feeding, and nutritional status using data from national surveys and publications from various sources.

Reproductive Health

Brazil's fertility rate has decreased considerably since the 1960s, when women gave birth to, on average, six children. With poor access to effective contraception, women often resorted to sterilisation by tubal ligation and abortion. In 1986, 44% of Brazilian women of childbearing age were sterilised, with this figure reaching 63% in the Northeast region at the beginning of the 1990s⁶. Whilst the practice of abortion is difficult to measure because it is illegal, results show that in 1991 there were 3.7 abortions per 100 women aged between 15 and 49 years, while 23% of pregnancies resulted in unwanted births and 31% in abortions⁷.

Between 1991 and 2000, the decline in the fertility rate was more noticeable among poor, black women with low levels of education living in rural areas and in the North and Northeast regions⁸. The overall fertility rate among these groups was 1.72 children per woman, which is below replacement level fertility (Table 1). The 2010 Census reported a decline in fertility rates among women aged between 15 and 19 years compared to the previous decade, which may be the result of postponement of reproduction. This correlated with a significant rise in levels of education among women⁸.

Abortion is still widely practiced in Brazil⁹. In 2010, a national survey conducted in urban areas¹⁰ showed that 22% of women aged between 35 and 39 years had an abortion. The same survey repeated in 2016¹¹ confirmed a high incidence of abortion, particularly the North, Centre-West and Northeast regions.

Abortion is permitted in Brazil in cases of rape or when the mother's life is in danger, and, since 2012, in cases of anencephaly. The criminalisation of abortion has been shown to reinforce inequality, as oppose to preventing the practice. While women with a higher socioeconomic status are able to afford safe abortion services, the majority are driven to use unsafe methods, such as taking misoprostol. These women then seek SUS hospital treatment at the first sign of bleeding to complete uterine evacuation and treat

Table 1. Women's and Child Health Indicators. Brazil, 1990-2015.

Indicators	1990	1995	2000	2005	2010	2015
Health Information Systems						
Coverage by SIM (%)	76.6	83.6	91.0	93.2	94.2	96.7
% of child deaths notified to the SIM	52.0	65.7	74.1	80.6	84.9	88.5
% of deaths with undefined cause	18.2	16.2	14.3	10.4	7.0	5.7
Coverage by SINASC (%)	-	82.4	92.5	95.5	95.9	96.4
Reproductive Perinatal Health						
Total Fertility Rate	2.89 ^(1.1)	2.72 ^(1.1)	2.39 ^(1.2)	2.09 ^(1.2)	1.87 ^(1.2)	1.72 ^(1.2)
% use of any type of contraceptive among women (15-49 years) who live with their partners ⁽²⁾	71.4	74.5	77.1	79.3	80.3	80.1
% use of any type of modern contraceptive among women (15-49 years) who live with their partners ⁽²⁾	64.2	68.6	72.2	75.2	76.8	77.0
Number of hospital admissions due to abortion DATASUS ⁽³⁾	-	-	247.884	250.447	220.571	205.439
% of women who did not receive antenatal care ⁽⁴⁾	-	10.9	4.9	2.6	1.8	2.2
% of women with seven or more antenatal visits ⁽⁴⁾	-	49.0	46.0	53.6	61.1	66.9
% of hospital deliveries ⁽⁴⁾	-	96.1	96.6	97.1	98.1	98.5
% of caesareans ⁽⁴⁾	-	40.2	38	43.3	52.3	55.5
% of Low birthweight ⁽⁴⁾	-	7.9	7.7	8.1	8.4	8.4
% of Preterm births ^(5,4)	-	-	-	-	11.5 ⁽⁵⁾	11.1 ⁽⁴⁾
Breastfeeding^(6,7,8,9)						
% of exclusive breastfeeding at 6 months	2.9	23.9	-	37.1	-	36.6
% of breastfeeding at 12 months	22.7	37.5	-	47.2	-	45.4
Indicators of Child and Maternal Mortality						
Rate of child mortality (/1000 live births)	53.7	40.2	30.1	25.7	18.6	15.6
% of deaths < five years due to intestinal infections	10.8	8.3	4.5	4.1	2.1	1.4
% of deaths < five years due to acute respiratory infections	10.3	9.4	5.9	5.6	4.8	4.5
% of deaths < five years due to perinatal conditions	33.6	39.8	46.1	49.4	50.6	51.2
Rate of child mortality (/1000 live births)	47.1	35.1	26.1	20.4	16.0	13.5
Rate of post-neonatal mortality (/1000 live births)	24.0	15.2	9.4	6.8	4.9	4.0
Rate of early neonatal mortality (/1000 live births)	17.7	15.7	13.1	10.5	8.1	7.3
Rate of late neonatal mortality (/1000 live births)	5.4	4.2	3.6	3.1	3.0	2.2
Maternal mortality ratio (/1000 live births)	143.2	115.7	81.5	78.2	67.5	59.7

(1.1) IBGE/DPE/Coordenação de População e Indicadores Sociais. Gerência de Estudos e Análises da Dinâmica Demográfica. UNFPA/BRASIL (BRA/02/P02) – População e Desenvolvimento – Sistematização das medidas e indicadores sociodemográficos oriundos da Projeção (preliminar) da população por sexo e idade, por método demográfico, das Grandes Regiões e Unidades da Federação para o período 1991/2030. https://ww2.ibge.gov.br/home/estatistica/populacao/projecao_da_populacao/publicacao_UNFPA.pdf (1.2) IBGE. Brasil em síntese. Taxa de Fecundidade Total – Brasil – 2000 a 2015 <https://brasilemsintese.ibge.gov.br/populacao/taxas-de-fecundidade-total.html> (2) United Nations, Department of Economic and Social Affairs, Population Division (2017). Model-based Estimates and Projections of Family Planning Indicators 2017. New York: United Nations. (3) Ministério da Saúde - Sistema de Informações Hospitalares do SUS (SIH/SUS). (4) Ministério da Saúde –Sinasc. (5) Inquérito Nacional sobre Parto e Nascimento 2011⁴³. (6) Pesquisa Nacional de Saúde Materno-Infantil e Planejamento Familiar, 1986. (7) Pesquisa Nacional de Demografia e Saúde, 1996. (8) Pesquisa Nacional de Demografia e de Saúde da Mulher e da Criança, 2006. (9) Pesquisa Nacional de Saúde, 2013.

complications¹¹. As a result, there were 205,439 hospital admissions associated with abortion in 2015 (Table 1).

The prohibition of abortion, therefore, only increases the number of hospital admissions related to unsafe abortions. For women who at-

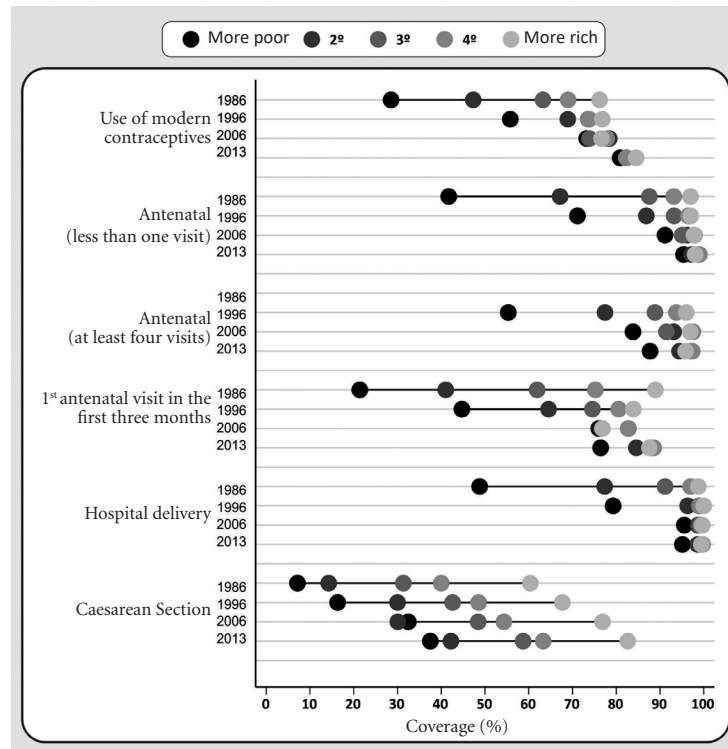
tempt unsafe abortions, admission to hospital represents the only alternative to deal with potentially lethal health complications. Post-abortion care focuses on the practice of curettage, which implies admission to hospital and waiting for treatment. The failure to prevent repeated

unwanted pregnancies and unsafe abortions is commonplace, as is the lack of information on and access to contraception¹².

Between 1995 and 2013, the number of hospital admissions because of abortions and miscarriages, and the overall number of abortions among women aged between 15 and 49 years decreased by 27% and 26%, respectively¹³. These figures suggest that women may have learned to use misoprostol more effectively, thus rendering hospital treatment unnecessary. At the same time, access to contraception improved significantly during this period (Table 1). This may have led to a decrease in the number of unwanted pregnancies. In 1986, before the creation of the SUS, 57% of women in stable relationships used contraception, compared to 80.6% two decades later. This increase was accompanied by a significant reduction in inequality in access to contraception across income quintiles (Graph 1).

Pregnancy, Labour and Delivery

A little over three million children are born in Brazil each year. Data obtained from the SINASC show that 98% of women received some form of ANC in 2015 (Table 1). According to the World Health Organization (WHO) and the MH guidelines, ANC should be continuous and include prevention, diagnosis, and treatment of disease or deficiencies, as well as health information and the provision of social, cultural and psychological support¹⁴. The WHO recommends at least eight ANC sessions, since ANC has been shown to be associated with improved perinatal outcomes for both the mother and the newborn¹⁵. There was a significant reduction in inequalities in access to ANC services between 1986 and 2013 across all income quintiles (Graph 1), with the proportion of women having seven or more ANC sessions increasing from 49% in 1995 to 67% in 2015. However, regional inequalities persist, with rates in 2015 ranging from 47% in the North to almost 80% in the South (SINASC, 2015).



Graph 1. Women's health indicators by income quintiles. Brazil, 1986-2013.

A national study of ANC showed that 60% of women were referred to a specific maternity unit for delivery¹⁶. The referral of pregnant women to a specific maternity unit from the outset of pregnancy has been obligatory under law in Brazil since 2005. However, compliance with this law is limited, particularly in the North and Northeast regions. This particularly affects adolescent mothers and women with low levels of education. Of the women who were referred to a maternity unit, 84.5% gave birth in the unit to which they were referred, while 16% sought maternity treatment in more than one hospital. As such, switching between different maternity units has been associated with severe maternal morbidity¹⁵.

The persistence of congenital syphilis, which is preventable if detected during ANC, provides further evidence of the poor quality of care. Data from almost 24,000 puerperal women in Brazil who gave birth between 2011 and 2012 showed that congenital syphilis continued to be a public health issue linked to social vulnerability and failures in ANC¹⁷. Incidence of the disease was estimated to be 3.51/1000 live births, while the vertical transmission rate was 34.3%. Furthermore, the proportion of foetal deaths among women diagnosed with syphilis was six times greater than in women who did not have the disease¹⁷. Analysis of data obtained from the SINAN for the period 2007-2012 showed that both the syphilis detection rate and disease incidence among pregnant women increased in the regions studied. This increase was attributed to improvements in the recognition of cases, given that there was an increase in rapid testing for the disease provided under the programme *Rede Cegonha* (Stork Network)¹⁸.

With respect to labour and delivery care, 98.5% of women gave birth in a health facility in 2015, which is in line with global trends. Moreover, no significant regional differences were found (Table 1), reflecting significant reductions in inequalities in access to hospital care since the creation of the SUS across income quintiles (Graph 1).

A study conducted by Leal et al.¹⁹ that used data from the *Pesquisa Nascer no Brasil* (the Born in Brazil Survey), showed that less than 50% of women who gave birth vaginally received labour and delivery care in accordance with the 'best recommended practices', as set out by WHO. Furthermore, unnecessary interventions were shown to be high. Results also showed that rates were higher among women that presented a low-

er health risk¹⁹. The same results demonstrated that 55% of women who gave birth during the period of this study received a caesarean section (Table 1), and that there was a progressive increase in the proportion of women having caesarean section between 1987 and 2014. Excessive unnecessary caesarean section was even observed in women from lower income groups (Graph 1). Following a systematic review conducted in 2015, the WHO issued a statement confirming that there was no evidence to prove the benefits of caesarean delivery for women or infants at rates higher than 10%²⁰. Despite the association between caesarean delivery and negative perinatal outcomes for both women and infants²¹⁻²⁴, including "near miss"¹⁵ and maternal death²⁵, the rate of caesarean section in the private health sector in Brazil is 87%¹⁹.

Preterm births accounted for 11.1% of total births in the country (Table 1), which is almost double that of European countries^{27,28}. No notable differences between geographic regions and the public and private sector were found²⁶. Spontaneous preterm birth was linked to social vulnerability, while non spontaneous preterm birth (over 90% of caesarean sections in the private sector) were associated with a higher socioeconomic status²⁶.

The prevalence of low birth weight (LBW) (weight < 2500 g) in Brazil increased from 7.9% in 1995 to 8.4% in 2010, continuing at the same rate in 2015. The reasons for this increase during a period in which significant progress was made across various socioeconomic indicators are not well known.

LBW is associated with maternal education levels and race/skin colour. The prevalence of LBW has been shown to be greater among illiterate women²⁹ and black women (9.7%), and lower among indigenous women (7.4%).

LBW has also been found to be directly proportional to the size of the municipality, with prevalence rates of 7.6% in municipalities with less than 20,000 inhabitants and 9.1% in those with over 500,000 inhabitants³⁰. Prevalence of LBW is higher in the Southeast, South and Center-West regions than in the North and Northeast regions. One possible explanation for this surprising finding is the poor quality of information systems in the North and Northeast regions, which may lead to the underreporting of cases^{31,32}.

Improved access to ANC services and labour and delivery care in the SUS contributed to a decline in negative outcomes. Nevertheless, the SUS

still faces challenges in improving the quality of care and overcoming barriers facing the integration of different levels of care. The high rate of unnecessary caesarean section may be reducing the health benefits of this type of procedure especially women from higher income groups.

Breastfeeding

Impressive progress has been made in relation to breastfeeding since the 1970s when the average duration was less than three months³³. There has been a sharp rise in the proportion of infants being breastfed up to 12 months, from 26% in 1986 to 47% in 2006, levelling out to 45% in 2013³⁴. Likewise, there was a significant increase in the proportion of infants being exclusively breast fed for the first six months, from 5% in 1986 to 37% in 2013³⁴. The progress made as a result of interventions at community, health service and policy level means that Brazil has a positive influence on the world stage in this area³⁵. Actions include: the regulation of the International Code of Marketing of Breast-milk Substitutes and monitoring of the implementation of the code by the IBFAN network (www.ibfan.org.br); the training of health professionals in the SUS to support breastfeeding; large-scale media campaigns to raise public awareness surrounding breastfeeding; regulation of maternity leave; and the creation of a network of baby-friendly hospitals and breast milk banks³⁵. Despite clear progress, it should be noted that these rates levelled out between 2006 and 2013 and that two-thirds of mothers did not ensure exclusive breastfeeding for six months, as recommended by the WHO.

Infant nutrition

National surveys conducted over recent decades show that significant improvements have been made in the nutrition of Brazilian infants. Based on the latest available data, we observed a significant reduction in the prevalence of height deficit, from 37.1% in 1974/75 to 7.1% in 2006/2007. We also observed a sharp reduction in regional inequalities, with rates in the Northeast region approaching those of the Southeast, but with persistent inequalities between the North and other regions. The prevalence of weight deficit also decreased during this period. While national surveys show that infant obesity rates levelled out³ in 2006/2007, other sources suggest that they continued to increase at a significant pace. A study of a cohort of live births in 2015

in Pelotas showed that prevalence of overweight in infants at 12 months was 12.2%, representing a significant increase compared to a 1982 cohort (6.5%). Furthermore, a pooled international analysis of 2,416 population based measurement studies showed that 26.6% of Brazilian girls and 30% of boys aged between five and nineteen years were either overweight or obese³⁶.

Nutrition transition is the shift in dietary consumption that coincides with a complex mix of rapid sociodemographic changes characterised by increasing consumption of ultra-processed foods and a sedentary lifestyle, affecting both children and adolescents³⁷. In this respect, it is likely that Brazil is experiencing the same transition process that is affecting the rest of Latin America³⁸.

Infant and Child Mortality

Child mortality, defined as the probability of a child dying before reaching the age of five, declined significantly between 1990 and 2015 (Table 1), from 53.7 to 15.6 per 1000 live births (a reduction of more than two-thirds), meaning that Brazil achieved the fourth Millennium Development Goal.

Among deaths with a definable cause, intestinal infectious disease proportional to mortality decreased from 14% to 1.4% in the period 1990-2015 (Table 1). Associated with malnutrition, lack of sanitation, and deficiencies in primary care, diarrhoea-proportional mortality stood out as an important marker of improved child health status. Furthermore, acute respiratory infection-proportional mortality decreased by over half.

The sharp decline in child mortality was in large part due to the fall in child mortality within the first year of life, from 47.1 to 13.5 per 1000 live births (Table 1), which is equivalent to an annual decrease of 4.9% for the country as a whole. The drop in post-neonatal mortality rates was more pronounced than that of neonatal mortality rates (from 23.1 to 9.5 per 1000 newborns), with deaths concentrated mainly in the early neonatal period. In 2015, 70% of child deaths occurred during the neonatal period, 54% of which were within the first week of life.

The largest reductions in child mortality rates in the period 2000-2010 occurred in the Northeast region (5.9% per year), followed by the North region (4.2%), contributing to a reduction in regional inequalities³⁹. The fact that reductions were largest in regions with a lower socio-

economic status reflects improvements in access to primary healthcare services directed at maternal and child care^{4,40}. The universal adoption of immunisation also played an important role in the reduction of child mortality. The last notified death from measles was in 1999, and there was a significant reduction in the number of deaths from neonatal tetanus, from 141 in 1990 to only one in 2015.

The current national rates of child mortality in Brazil are in line with those of countries with similar levels of per capita income⁴¹, a fact that did not occur until the middle of the first decade of the twenty-first century³. However, the challenge remains to reduce the rate of neonatal mortality, particularly in the early neonatal period. Factors connected to antenatal, labour and delivery care key for this⁴².

Maternal Mortality (MM)

MM is a preventable cause of death and its reduction has been the focus of national and international efforts⁴³. Brazil witnessed a significant decline in the maternal mortality ratio (MMR) between 1990 and 2000, from 143.2 to 81.5 per 100 000 live births (Table 1), which is equivalent to an annual decrease of 5.5%. However, progress began to slow in the year 2000, with an annual decrease of less than 2%. This rate picked up somewhat in 2010, nevertheless, with an annual decrease of 2.4% up to 2015 when MMR stood at 59.7 per 100 000 live births. However, the MMR remains unacceptably high, considering that it is three to four times greater than rates in developed countries (based on figures from the beginning of the second decade of the twenty-first century). More disaggregated data area shows that the MMR exceeded 100/100 000 live births in two states⁵.

In 2015, 20.7% of deaths were due to hypertensive disorders during pregnancy, delivery and puerperium, 17.5% to labour and delivery complications, and 13.2% to complications predominantly related to the puerperium. Complications resulting from abortion appear in fifth place on the list of leading causes of maternal death, accounting for 7% of all deaths. The leading cause was unspecified obstetric conditions, accounting for 29.7% of deaths. A study carried out in the State of Minas Gerais showed that the proportion of maternal deaths due to abortion was twice the national rate⁴⁴. The reduction of MM due to abortion constitutes a major challenge given the level of unsafe illegal abortions carried out.

The high rate of unnecessary caesarean section among women from higher income groups potentially increases the risk of death from postpartum haemorrhage and anaesthesia related complications²⁵.

Interventions addressing the determinants of maternal and child health

Policies and reproductive, maternal, neonatal, child and adolescent health programmes

Actions geared toward improving child health in Brazil date back to the beginning of the twentieth century. However, the first major milestone in this area was the *National Immunisation Programme* (PNI, acronym in Portuguese) in 1973, which had a significant impact on child health (Chart 1).

Also before the creation of the SUS, the *Comprehensive Women's Healthcare Programme* (PAISM, acronym in Portuguese), created in 1983, is also considered a milestone in that it goes against the conventional perspective, confirming that women's health extends beyond their reproductive capacity. By ensuring that access to family planning formed a part of the right to healthcare, it anticipated the concepts of sexual and reproductive health rights introduced by the Cairo and Beijing conferences a decade later⁴⁵. The movement initiated by the PAISM played a key role in the creation of a separate department within the Ministry of Health dedicated to women's health in 1990. In 1985, the *Comprehensive Child Healthcare Programme* (PAISC, acronym in Portuguese) and the *National Programme for the Humanisation of Delivery and Birth* were launched. The latter aimed to promote the humanisation of labour and delivery care practices and to recognise the work of traditional midwives⁴⁶.

In the 1990s, the *Community Health Agents Programme and Family Health Strategy* brought significant improvements in access to primary healthcare services particularly in more remote and rural areas, and widened the coverage of reproductive and child healthcare services. Studies have shown that for each 10% increase in coverage of the Family Health Strategy, there was a 4.6% reduction in child mortality⁴⁰. Also in this decade, Brazil implemented the *Baby Friendly Hospital Initiative* (BFHI), developed by the WHO and UNICEF, and aimed to promote a change in behaviour and routines that cause early weaning. The launch of the BFHI followed the Innocenti Declaration on the protection,

Chart 1. Policies, programmes, and other legislation relating to women's and child health. Brazil, 1973 to 2018.

Governance level	1973-1989	1990-1999	2000-2009	2010-2014	2015-2018
Intersectoral		Child and Adolescent Statute (1990)	<i>Programa Bolsa Família</i> (2004)	National Early Childhood Plan(2011) <i>Brasil Carinhoso</i> (2012)	Early Childhood Legal Framework (2016) <i>Criança Feliz</i> (2016)
Health System	Creation of the Unified Health System –SUS (1988)	Community Health Agent Programme (1991) Family Health Strategy (1994)		<i>Programa Mais Médicos</i> (2013)	
Women's health	Comprehensive Women's Healthcare Programme - PAISM (1984)		National Programme for the Humanisation of Delivery and Birth(2000) National Pact for the Reduction of Maternal and Neonatal Mortality (2004) <i>Lei do acompanhante</i> (2005) <i>Lei da vinculação à maternidade</i> (2007) Maternity Unit Improvement Plan for the Northeast and Amazônia Legal regions (2009)	<i>Rede Cegonha</i> – Maternal, and Child Care Network (2011)	National Pregnancy Care Guidelines – the Caesarean Section (2015) National Care Guidelines on Natural Delivery (2016)
Child Health	National Immunisation Programme (1973) Comprehensive Children's Healthcare Programme- PAISC (1984)	Baby Friendly Hospital Initiative (1990) National Project for the Reduction of Child Mortality (1995)	National Programme for the Humanisation of Delivery and Birth and National Policy for Humanized LBW Newborn Care - Kangaroo Mother Care (2000) Pact for the Reduction of Child Mortality in the Northeast and Amazônia Legal regions(2009)	<i>Rede Cegonha</i> – Maternal, and Child Care Network (2011)	The National Policy for Comprehensive Children's Healthcare - PNAISC (2015)

promotion and support of breastfeeding, which recognised that breastfeeding “Reduces incidence and severity of infectious diseases, thereby lowering infant morbidity and mortality”. Following the implementation of this and other measures under the National Breastfeeding Policy, Brazil was recognised as a reference for its achievements in promoting breastfeeding by a study comparing 150 countries⁴⁷. The policy was reinforced by the creation of the Human Milk Bank Network, the promotion of initiatives designed to support

women who want to continue breastfeeding after they return to work, and annual breastfeeding campaigns (Chart 1).

The 1990s also saw the emergence of the first *National Project for the Reduction of Child Mortality* (PRMI, acronym in Portuguese), which prioritised specific municipalities selected according to poverty indicators. The majority of these municipalities were located in the Northeast. This initiative improved primary health-care and sanitation services, and simultaneously

Primary Care and Health

The Family Health Strategy (ESF, acronym in Portuguese) began in 1994, and was initially called the Family Health Programme (PSF, acronym in Portuguese). It took inspiration from the principles of primary healthcare set out by the Alma Ata Conference. Its creation constituted an important stage in the consolidation of the SUS and it is defined as central to the National Primary Health Policy (PNAB, acronym in Portuguese). A number of studies have evaluated the impacts of the ESF on health, consistently revealing positive effects. Municipalities with a high level of ESF coverage show a higher use of primary health services and have made faster progress in relation to health indicators such as: the reduction in child mortality (particularly post-neonatal) and mortality among children under five years old, especially in relation to specific causes like diarrhoea and respiratory infections; the reduction in admissions to hospital due to causes that are preventable through primary care; and the reduction in mortality caused by cardiovascular and cerebrovascular disorders.

promoted intersectoral coordination involving national and international institutions and civil society organizations.

By the year 2000, child deaths were more common during the perinatal period. Programmes created in this year focused on promoting adequate labour and delivery care practices⁴⁶, including the *National Programme for the Humanisation of Delivery and Birth*, and the National Policy for Humanised LBW Newborn Care - *Kangaroo Method*, which aimed at promoting successful breastfeeding^{48,49}.

In the same year, Brazil committed itself to the *Millennium Development Goals*, and to “[sparing] no effort to free our fellow men, women and children from the abject and dehumanizing conditions of extreme poverty”. The goals included the reduction of child mortality rates by two-thirds and the maternal mortality ratio by three-quarters by 2015⁵⁰.

The *National Policy for Comprehensive Women’s Healthcare (PNAISM*, acronym in Portuguese), which was formulated via consultation

with social movements, health professionals and specialists, came into force in 2004. Applying the principles set out in the PAISM, the PNAISM represented a step forward in recognising the diversity of women. The programme encompassed the specific health needs of different groups (black, indigenous, rural workers, etc.) throughout all stages of life and put an emphasis on sexual and reproductive health rights. The following year saw the introduction of a set of rules and regulations concerning the humanisation of abortion care and of the *Lei do Acompanhante* (Patient Companion Law), which guaranteed parturient women the right to choose a companion to support them during labour, delivery, and the immediate post-partum period in the SUS. In 2007, the Law N°: 11.634 (*Lei da vinculação à maternidade*) was passed. It stipulated that pregnant women should be referred to a specific maternity unit from the outset of pregnancy.

Following the lower than expected decrease in MM, the National Health Council made it compulsory to report maternal deaths. Moreover, programmes that focused on reducing maternal and infant mortality rates were introduced in the Northeast and Amazônia Legal regions to combat regional inequalities. In 2004, the government also created the *Programa Bolsa Família*⁵¹ (the Brazilian Conditional Cash Transfer Programme), which aimed at reducing poverty.

In 2011, the maternal, neonatal and child care network *Rede Cegonha* (Stork Network) was created. The network incorporated all of the above actions to ensure access to quality maternal and neonatal healthcare services, ranging from antenatal and labour and delivery care, to care for child growth and development up to 24 months, and family planning. It also aimed to promote a welcoming and comfortable environment and to improve capacity of healthcare institutions to resolve complications. Other important initiatives included the National Care Guidelines for Caesarean Section and for Natural Delivery, produced in 2015 and 2017, respectively. These initiatives were based on guidelines developed by the National Institute for Health and Care Excellence (NICE), part of the United Kingdom’s National Health Service.

To address the shortage of doctors in the SUS and promote a more equal distribution of doctors across primary care services, the government created the *Programa Mais Médicos* (More Doctors Programme).

As part of the *National Early Childhood Plan*, the focus of child healthcare was broadened to

include the rights of children up to the age of six. This plan targeted Early Child Development (ECD). In 2012, the intersectoral programme *Brasil Carinhoso* (Caring Brazil) began to prioritise care for young children from families receiving the *Bolsa Família*. In 2016, these initiatives were complemented by the introduction of the *Early Childhood Legal Framework* (Federal Law No: 13.257) and the Ministry of Social and Agricultural Development's *Programa Criança Feliz* (Happy Child Programme) – the main strategy of this programme was to promote ECD in families benefitting from poverty reduction strategies. *The National Policy for Comprehensive Child Healthcare* (PNAISC, acronym in Portuguese), introduced in 2015, set out a strategic plan of action to ensure comprehensive child healthcare that took into consideration the challenges of the twenty-first century (Chart 1).

Poverty and inequality reduction policies

Social protection consists of a set of policies and programmes directed at reducing poverty, vulnerability, exposure to risk, and enhancing people's capacity to manage social and economic risks such as unemployment, social exclusion, disease, disability, and ageing.

Conditional cash transfer programmes (CCTP) were implemented in at least 18 countries across Latin America. The *Bolsa Família* (BF) in Brazil was aimed at boosting poverty reduction efforts via the transfer of cash to poor families on the condition that the pre-established criteria were met⁵². These criteria were generally related to the health and education of the women and children. Given the potential impact of these programmes on poverty, food security, access to health services, nutrition, and health, numerous studies have been conducted across different countries in Latin America to evaluate the effects on nutrition and health, particularly in children. Various studies have shown that CCTPs make a consistent contribution towards the reduction of poverty (particularly extreme poverty) and inequality, and the improvement of health^{53,54}. In Brazil, studies have shown that the BF helped to improve access to food and health services, enhance nutrition, and reduce child mortality rates⁵¹. This method has, in turn, played an essential role in improving child health indicators, surpassing the commitments of the fourth Millennium Development Goal. Other positive impacts have been reported, for which there is limited evidence, such as improvements in the cognitive development of children and the reduction

Zika virus Congenital Syndrome

In 2015, there was an outbreak of microcephaly in Brazil caused by the Zika virus, a congenital infection. The crisis was declared a national public health emergency and resulted in an unprecedented number of microcephaly cases and other congenital abnormalities of the central nervous system. In 2016, the Zika virus was recognised as a significant vector of congenital malformations, affecting the cognitive development of many children. Of the 2,869 cases confirmed up to July 2017, a large proportion of cases were not receiving specialist care. This reveals the limits of the SUS in treating children with severe neurological disorders.

The epidemic had major consequences for women, who were advised that they should consider delaying pregnancy to avoid having babies with birth defects, disregarding difficulties in access to contraception, particularly emergency contraception, and ignoring the issue of unsafe abortion. As such, the need for a review of restrictive Brazilian legislation regarding abortion was brought back into question.

in incidence of certain infectious diseases, such as Hansen's disease and tuberculosis.

The proportion of Brazilians living below the poverty line (US \$ 1.90 a day) fell from 24.7% in 2001 to 7.4% in 2014, which is equivalent to a reduction of 70% in 13 years. Even considering other cut-off points for measuring poverty, this reduction remains significant⁴¹. However, in 2015, the proportion of people living in poverty started to grow once again, as a result of cuts in programmes such as the BF, and for other reasons.

Final considerations

Over the last 30 years, Brazil has experienced profound changes in the quality of health, with a marked impact on maternal and child health. Social determinants of health, such as poverty, low levels of education, poor housing and sanita-

tion, and social exclusion were tackled by adopting intersectoral policies and promoting wealth redistribution. There has been a noticeable fall in fertility rates and rapid urbanisation. Furthermore, extensive vertical health programmes have enhanced the control of diseases preventable by vaccine and of other infectious diseases, such as diarrhoea and pneumonia. Finally, the implementation of the SUS has enabled the universalisation of healthcare, which has resulted in a considerable reduction in inequalities in access to healthcare.

Multiple policies were developed to promote reproductive, maternal and child health after the creation of the SUS. Public participation in the formulation and monitoring of these policies occurred via committees, councils and conferences, and has intensified since the first decade of the twenty-first century. This process was characterized by progress, setbacks, disputes, and consensus; the results for which have been recorded in the epidemiological indicators presented in this study.

Brazil has seen significant improvements in health information systems and growth of the academic and care community within the field of public health, which has allowed for the training and qualification of thousands of professionals working across all levels of the public health system. The dynamic nature of the health sector is evidenced by the large number of women and child health initiatives and programmes outlined above. Although the impact of these methods varies, the way they are formulated and implemented demonstrates the strength of public health in Brazil.

In terms of coverage and impact on health indicators, on balance the results of this process are positive, especially for child health. The level of coverage of family planning, antenatal and delivery care is high, with significant reductions in social and regional inequality. The quality of Brazil's immunisation and breastfeeding programmes are recognised globally, as a result of the well documented positive impact on child health that they have had. There has also been a sharp reduction in malnutrition across all social classes. All these factors have contributed to a significant fall in child mortality, although reductions in neonatal mortality were not as significant. Despite progress, child mortality in 2015 was still seven to eight times higher than in countries with the lowest mortality rates⁵⁵.

The rate of progress has not been the same for maternal health. Following a prolonged pe-

riod of stagnation, MMR began to fall slightly in 2010. However, in 2015 the rate was still around 20 times higher than in countries with the lowest mortality rates⁵⁶. The fact that abortion is illegal has played a part, although the amount of abortion related hospital admissions has shown a downward trend. This is possibly due to the fact that the widespread use of misoprostol is replacing other less safe methods. Problems in the quality of labour and delivery care, and pregnant women switching from one health facility to another have contributed to persistently high MM and perinatal mortality rates. Furthermore, the high rate of unnecessary caesarean section continues to be a risk factor for maternal death that could otherwise be avoided.

In stark contrast to the progress made across the majority of reproductive, maternal, and child health indicators, women and children face three serious problems: the astonishingly high rate of unnecessary caesarean section, preterm births, and childhood obesity. There is no medical justification for the excessive rate of caesarean section in Brazil, which currently stands at over 50%, making the country the world leader. The epidemic of preterm births, partially attributable to unnecessary caesarean section and the low quality of ANC, has short term consequences for both neonatal morbidity and mortality, and longterm impacts relating to the potential intellectual underdevelopment of premature infants. Finally, the childhood obesity epidemic has serious consequences for non-communicable diseases related to morbidity in adulthood.

This comprehensive review outlines progress and trends in reproductive, maternal and child health in Brazil in the 30 years since the SUS was created. It shows that, while some health conditions have worsened and others have remained stable, the large majority have shown significant improvements. Overall, the result has been an advancement for reproductive, maternal and child health and a significant reduction in inequalities on both a national and regional scale. Other articles in this volume show that in order to maintain progress it is necessary to tackle the underfunding of the SUS to ensure the effective operation of health services. Recent political setbacks pose a serious threat not only to its existence, but also to the preservation of policies and programmes that successfully take into consideration the leading social determinants of health. Although it is still too soon to assess the effect of these changes, the possibility of adverse effects on maternal and child health cannot be ignored.

Collaborations

MC Leal worked on the design, writing and final review of the article. CL Szwarcwald, PVB Almeida, EML Aquino, ML Barreto, F Barros and C Victora, contributed in the writing and final revision of the article.

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