

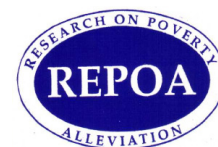
A Paper to Contribute to a Debate for the Joint Learning Initiative on Children and AIDS

“Can a Developing Country Support the Welfare Needs of Children Affected by AIDS? The Case of Brazil”

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1. Introduction

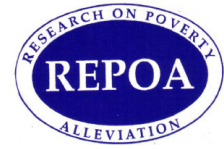
According to UNAIDS, 40 million people live with HIV/AIDS globally. Over 95% of the new AIDS cases in recent years have been registered in developing countries. Though the epidemic is largely concentrated in Sub-Saharan Africa, it is also growing quickly in the most populous countries in Asia [1]. As Anthony Fauci, Director of the United States National Institute of Allergy and Infectious Diseases, recently remarked at the 2007 Sydney AIDS Conference, though remarkable progress has been made in scaling up treatment, and two million people currently receive drugs for AIDS treatment, for each person receiving treatment, six new people are infected [2].

Children have been deeply affected by the AIDS epidemic. The United Nations classifies children affected by AIDS as: 1) children living with HIV/AIDS (orphaned or not); 2) affected orphans (defined as children who have lost one or more parents to HIV/AIDS); and 3) affected non-orphans such as children living with or relying on adults affected by HIV/AIDS [3]. Children represent 15% of new HIV infections and 17% of AIDS-related deaths worldwide [4]. Approximately 2.3 million of the 40 million people living with HIV/AIDS (PLWHA) are children, most of whom reside in Sub-Saharan Africa¹ [1]. To date, approximately 15 million children have been orphaned by AIDS [4,5]. Far less is known about children made vulnerable by AIDS.

Most children who live with HIV are infected by mother-to-child (hereafter vertical) transmission. Although vertical transmission is preventable with existing testing and treatment technologies and vertical transmission of HIV has dropped to less than 2% in most developed countries, only approximately 5-10% of all women have access to PMTCT in developing countries [1,6]. In the absence of any intervention, the probability that women pass HIV to their infants is approximately 15-30% in developed countries but 25-40% in Sub-Saharan Africa [6,7,8]. Without interventions, approximately 66% of vertical transmission takes place in the peripartum² period. Most peripartum transmission (66%) takes place during childbirth and a third of cases take place in utero, usually during the last trimester of pregnancy [6]. Much of the remainder is attributable to postpartum and longer-term breastfeeding. However, the risk vertical transmission of HIV can be radically reduced by providing highly active antiretroviral therapy (HAART) to HIV-positive pregnant women before childbirth and to their infants for several weeks after birth [6,9]. Since most children who are infected with HIV are infected by their mothers, the single most effective way to address the

¹ This definition is as individuals under the age of 15.

² Peripartum refers to the time before, during or just after delivery.



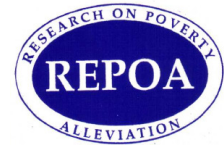
pediatric HIV/AIDS epidemic is to prevent vertical transmission of HIV [6].

Preventing vertical transmission of HIV and responding to the health and welfare needs of children living with and affected by HIV/AIDS requires significant resources as well as a robust political commitment. As a result of its policies to provide pregnant women and their newborns with prophylactic HAART, Brazil has successfully reduced vertical transmission of HIV/AIDS in recent years (Figure 1). Much less is known about the welfare of affected AIDS orphans in Brazil and Latin America more broadly. Although a 2000 study estimates that 32,000 children have been orphaned as a result of the AIDS epidemic in Brazil [10], few studies since have examined either the social or medical needs of children infected and affected by HIV/AIDS. Other research has attempted to update the estimates on AIDS orphans [11], but the conclusions of recent studies have been somewhat limited by the paucity of information on pediatric HIV/AIDS and AIDS orphans in Brazil.

In this paper, we nevertheless appraise the available evidence in order to answer the question “Can a developing country support the welfare needs of children affected by AIDS?” for the case of Brazil. We argue that a developing country can indeed take proactive steps to support the welfare needs of children affected by HIV/AIDS, focusing on Brazil. We hold that irrespective of some uncertainties about the welfare of children living with HIV/AIDS in Brazil, Brazil’s commitments to policies supporting the welfare of children affected by AIDS are best demonstrated by the country’s success in dramatically reducing vertical transmission of HIV. We attribute Brazil’s success in reducing vertical transmission of HIV to its long-standing political commitments to AIDS treatment, including prophylactic antiretroviral therapy, which the country adopted over the objections of international donors in the 1990s. Although Brazil supplemented development of its HIV/AIDS programs with World Bank loans, the interventions which have had the most demonstrable impact on the child welfare, including providing widespread access to HAART for pregnant women and their infants, have been wholly financed with local resources. This demonstrates Brazil’s commitment and proactive, effective response to addressing the welfare needs of children affected and infected by the HIV/AIDS epidemic.

2. The HIV/AIDS epidemic in Brazil

Brazil has a concentrated AIDS epidemic. HIV prevalence in Brazil among the general population is approximately 0.5%, which amounts to 666,000 individuals. HIV prevalence is often higher than 5% in vulnerable subpopulations such as injection drug users (IDUs), commercial sex



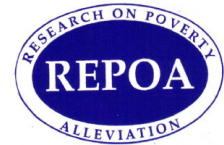
workers, and the urban poor [12,13]. In spite of the increasing feminization of the AIDS epidemic in Brazil, during the last decade, the AIDS epidemic in Brazil has generally stabilized as incidence rates leveled off in the industrialized, urban southeast, where the epidemic has historically been concentrated. In contrast with Sub-Saharan Africa, the AIDS epidemic remains a largely urban phenomenon; HIV prevalence in rural areas throughout Brazil remains very low [14]. AIDS prevalence and incidence continues to rise in the Northeast region of Brazil as well as among other vulnerable populations such as the homosexual men, the urban poor and injection drug users [13,15].

Recent estimates, based on the regular surveillance of women attending prenatal clinics and maternities, document HIV prevalence in Brazil as less than 0.5 per 1,000 [16]. This overall low prevalence, coupled with the fact that the epidemic has been concentrated among vulnerable populations such as injection drug users (most of whom are male in Brazil), homosexual men, and hemophiliacs, has resulted in relatively low HIV prevalence among women of reproductive health age in Brazil [12,17]. Despite the progressive increase in the number of women affected by the AIDS epidemic, relatively low prevalence of HIV among women of reproductive health age is an important factor influencing Brazil's relatively low rates of vertical transmission of HIV, and in turn, Brazil's relatively low prevalence of pediatric AIDS.

AIDS Policy in Brazil

Brazil, a middle-income country with relatively well-developed health infrastructure, is known for its effective response to the AIDS epidemic. A social movement for HIV/AIDS prompted early, progressive public responses to the HIV/AIDS epidemic, and Brazil was the first developing country to begin treating AIDS patients in its public health system in 1991 [18]. Since 1996, over the objections of the World Bank and other major donors, Brazil has provided free and universal access to antiretroviral drugs for treating PLWHA. Though Brazil has accepted \$425 million in World Bank loans for developing AIDS programs since 1994 (table 1), the loans have explicitly forbidden Brazil to use World Bank loans to finance drugs for AIDS treatment, including drugs to prevent vertical transmission of HIV/AIDS [19,20,21].

Since the early 1990s, Brazil has prioritized both treatment and prevention of HIV/AIDS. Working around World Bank loan restrictions, Brazil used World Bank funds to subsidize health infrastructure development, capacity building for medical professionals, epidemiological surveillance, and partnerships with civil society organizations [18]. However, Brazil has always locally



financed drugs for treatment, including drugs to prevent vertical transmission of HIV, out of the local Health Ministry budget. Highly active antiretroviral therapy (HAART) is now offered in hundreds of clinics throughout the country; Brazil scaled up HAART from approximately 35,000 to 180,000 PLWHA from 1997 to 2007. In 2007, approximately 7,150 children receive HAART.

Brazil's treatment guidelines are based on the most current clinical evidence available and include comprehensive policies to treat all people living with HIV/AIDS, including special populations such as children and adolescents, pregnant women, IDUs, and individuals co-infected tuberculosis and hepatitis. Critical components of Brazil's treatment guidelines include voluntary counseling and HIV testing for all pregnant women receiving antenatal care in public sector health clinics, policies to treat HIV-infected women with highly active antiretroviral therapy (HAART), and policies to reduce the likelihood of vertical transmission of HIV/AIDS during and after childbirth with prophylactic administration of select antiretroviral drugs to both mother and infant [22,23].³

As a result of these policies, AIDS-related morbidity and mortality have declined dramatically [24,25,26], and vertical transmission of HIV/AIDS has become rare in Brazil [22,23]. These policies have won international acclaim from a variety of different global health institutions, and Brazil is now considered a global model for other countries scaling up AIDS treatment.

Other than a forthcoming study that documents the cost of the antiretroviral drugs for Brazil's AIDS treatment programs [27], little has been written about the aggregate costs of Brazil's HIV/AIDS programs and interventions. We note, however, that during the last five years, local spending on HIV/AIDS, and particularly AIDS treatment, has far surpassed donor aid for HIV/AIDS in Brazil. Though aggregate AIDS program expenditures were not available, Figure 2 highlights Brazil's local expenditures on antiretroviral drugs from 2001 to 2005, which totaled over \$1.1 billion. In 2005, the last year for which data were available, Brazil spent approximately \$414 million of its Health Ministry budget on antiretroviral drugs; this sum alone approaches the \$450 million in World Bank loan support over more than a decade in Brazil. Though these might be considered relatively large sums for drug expenditures for one disease in a developing country, Brazil's total spending on drugs for HAART has never amounted to more than 2% of its now nearly \$20 billion federal public health budget [27]. From available data, it is unclear precisely how much Brazil has spent on reducing

³ We do not explore the clinical guidelines in detail in this paper. However, these newly updated guidelines are available in a report published by the National STD and AIDS Program of Brazil entitled "Recommendations for Prophylaxis for Vertical Transmission of HIV and HIV Treatment for Pregnant Women."



vertical transmission of AIDS, pediatric AIDS treatment, and welfare programs for children affected by HIV/AIDS; however, it is clear that these types of programs were generally beyond the scope of programs funded by World Bank loans and have been financed locally rather than by international donors.

One of the remarkable impacts of Brazil's treatment policies is the relatively low prevalence of pediatric HIV/AIDS, which, in turn, has reduced the health and economic challenges associated with meeting the welfare needs of children affected and infected by HIV/AIDS. Drugs costs for HAART alone average \$2,500 per person per year in Brazil [27], and aggregate health costs associated with the treatment and care of PLWHA likely far surpass this sum. Preventing vertical transmission of HIV has been far less expensive than the treatment, hospitalization, and social program costs Brazil would have realized in the absence of interventions to prevent vertical transmission of HIV/AIDS.

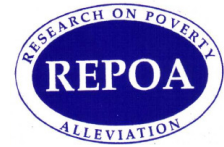
We acknowledge that challenges in addressing the welfare needs of children in other low and middle-income countries are compounded by higher HIV prevalence, more fragmentary health infrastructure, and insufficient health budgets. However, we posit that the key reason Brazil faces relatively few challenges associated with meeting the welfare needs of children affected by AIDS is the fact that the country developed an early, home-grown and effective response to the HIV/AIDS epidemic.

We now turn to the health evidence that supports these claims.

2. Vertical Transmission of HIV and Prevalence of Pediatric and Adolescent HIV/AIDS in Brazil

Vertical transmission of HIV has declined in many Latin American and Caribbean countries in recent years. A recent study attributed the less than 1% rate of vertical transmission in four countries from Latin America and the Caribbean (including Brazil, Argentina, Mexico, and the Bahamas) to the successful implementation of antiretroviral treatment and timely antiretroviral prophylaxis for HIV-positive pregnant women [28]. Recent research in Brazil also addresses the major achievements with providing prophylactic antiretroviral therapy to prevent vertical transmission of HIV as well as challenges with scaling up voluntary HIV testing and HIV prophylaxis in Brazil's more remote regions [29,30,31].

From 1980 to 2005, approximately 10,400 Brazilian AIDS cases were registered among children under five; 3,905 cases were registered among those aged 5-12; and 8,075 were registered



among those aged 13-19⁴ [11]. The most recent data from Brazil's Sentinel Surveillance Program estimates that HIV prevalence among all women delivering in public hospitals in Brazil is less than 1%, with relatively modest variation by geographic region in Brazil [23].

Most AIDS cases among children under age 13 in Brazil are attributable to vertical transmission of HIV (figure 1). The stabilization of the AIDS epidemic since the late 1990s and Brazil's policies of providing prophylactic antiretroviral therapy to HIV-positive mothers just before childbirth have resulted in a precipitous decline in the number of children aged five years old or younger diagnosed with HIV. According to data from Brazil's sentinel surveillance system, the number of new AIDS cases for children under five peaked in 1997 (figure 3).⁵ Vertical transmission of HIV decreased from 16% to 7% for HIV-positive women receiving prenatal care in Brazil's public health system between 1997 and 2002 [31]. The number of AIDS cases among adolescents aged 13 and 19 has remained relatively stable since the mid-1990s (figure 3).

In spite of Brazil's relatively low rates of HIV transmission, the National STD and AIDS Program of Brazil estimates that only 63% of women who delivered in public clinics had access to voluntary testing and HIV prophylaxis prior to childbirth [20]. Other related studies found that women who lived in urban areas and women of higher educational strata reported dramatically higher rates of than their counterparts in rural areas and of lower socioeconomic status. For example, only 19% of illiterate women had access to counseling, testing and the appropriate prophylactic antiretroviral regimens to prevent HIV, versus 64% of women who had completed eighth grade [22].

In response to these challenges, the Brazilian Ministry of Health (BMoH) recently implemented a program that requires compulsory reporting for all pregnant women who test HIV-positive, implemented policies to reduce congenital syphilis (which affects approximately 2% of women giving birth in public hospitals in Brazil) [32,33], and instituted programs to prevent vertical transmission of HIV in all public health clinics in Brazil's National Health System, the *Sistema Único de Saúde* (SUS). Compulsory reporting of HIV for pregnant women replaced the previous surveillance strategy, which only required reporting of AIDS cases [22,23].

In spite of the aforementioned challenges associated with access to HIV testing and

⁴ Brazil defines children as those aged 1-12 and adolescents as those aged 13-19. In this paper, we differentiate our analyses in this way.

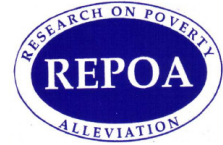
⁵ Epidemiologists debate why pediatric AIDS cases increased slightly after 2003. The slight increase may either reflect a true increase in pediatric AIDS due to increased incidence in select geographic regions, or may be a consequence of improved surveillance and case reporting. These estimates are currently under study by the National STD and AIDS Program of Brazil.



prophylaxis for pregnant women, vertical transmission of HIV remains relatively low in Brazil, likely because access to essential testing and treatment technologies is relatively stable in the South and Southeast, the regions with the highest HIV prevalence. São Paulo, for example, constitutes 25% of the Brazilian population and represents 50% of all AIDS cases in Brazil. In São Paulo, an estimated 85% of women receive comprehensive prenatal care, including HIV testing, counseling and requisite prophylaxis to prevent vertical transmission of HIV. For women who have not received antenatal care (an estimated 12% of all women delivering in São Paulo), the São Paulo State Health Ministry administers rapid HIV tests just prior to childbirth in order to determine whether to administer HAART prophylactically [29]. This suggests that the unmet need for HIV testing necessary to prevent vertical transmission of HIV is quite low in São Paulo, the Brazilian state with the highest prevalence of HIV. However, the decline in rates of vertical HIV transmission has been less pronounced in the less developed regions of the country with more fragmentary health infrastructure, including the North and Northeastern regions of Brazil [23].

In addition to its policies of preventing vertical transmission of HIV, Brazil offers HAART to all children and adolescents living with HIV/AIDS. In 2007, approximately 7,150 children and adolescents were receiving HAART in Brazil's public health system. Although life expectancy for adults living with HIV/AIDS has improved dramatically as a result of free and universal access to HAART [17,26], less is known about the survival impacts of providing HAART to children in Brazil. To date, only one small study of less than 400 patients (forthcoming in late 2007) has examined AIDS-related morbidity and mortality trends among children in Brazil. The study finds that the risk of morbidity and mortality overwhelmingly declined for HIV-positive children taking HAART [34]. To date, no study has systematically examined the population impacts of providing free and universal access to treatment on the survival of children and adolescents living with HIV/AIDS in Brazil. Nevertheless, HAART generally is associated with prolonged onset of AIDS and improved life expectancy, and has likely has reduced AIDS-related morbidity and mortality among the population of children and adolescents living with HIV/AIDS in Brazil [30].

Only one study, forthcoming in November 2007, has examined the costs of pediatric AIDS treatment in Brazil. The small study of approximately 300 children, conducted in one of Brazil's best specialty hospitals, finds that the average cost of drugs for HIV prophylaxis to prevent vertical transmission of HIV averaged approximately US \$500 per child, while the cost of drugs for treating a



child living with HIV/AIDS averaged approximately US \$4,000. Average costs of hospitalization for HIV-positive children ranged from \$450 to \$10,000 per child, depending on the child's health state at the time of admission [35]. These costs may not be representative of broader trends or standards of clinical care in greater Brazil, but do provide some preliminary insights into the costs associated with treating children living with HIV/AIDS. These costs are not excessive for Brazil, which spends nearly \$20 billion annually on health programs and approximately \$600 per capita on health expenditures, but might be out of the realm of possibility for other developing countries with higher HIV prevalence and greater budget constraints.

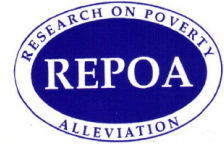
Prevalence of Orphans Due to AIDS in Brazil and the Policy Response

Perhaps because of Brazil's relatively low prevalence of pediatric HIV/AIDS, the literature on both the prevalence and welfare related to AIDS orphans in Brazil is somewhat sparse. We nevertheless discuss the available information and its implications for assessing the Brazilian policy response to addressing the welfare needs of children affected by AIDS.

It is not known precisely how many AIDS orphans live in Brazil today [36]. Using mathematical models, in 2000, Szwarcwald and coworkers estimated that 30,000 children have been orphaned in Brazil due to maternal AIDS from 1987 to 1999 [10]. Other studies (reviewed by França Junior et al. [11]) used alternative methods to estimate the number of AIDS orphans in Brazil, but the accuracy of the estimates have been somewhat compromised by data limitations.

In perhaps the best formal study carried out to date on AIDS orphans in Brazil, a 2005 article estimates the number of orphans for Brazil's southernmost state, Rio Grande do Sul. The authors find that 1,131 orphans (defined as the loss of either one or both of their parents) aged 0-14 years old, were living in Porto Alegre in the period 1998-2001. Porto Alegre is the capital of Rio Grande do Sul, a well-developed state in southern Brazil. The city's AIDS prevalence ranks third highest in the country, after São Paulo and Rio de Janeiro [36]. While this study may not represent broader Brazilian trends, it does provide some insight into the public policy response to the welfare needs of children affected and infected with HIV in a Brazilian state with relatively high HIV/AIDS prevalence.

The study, based on household surveys of AIDS orphans, finds that informal networks of relatives and friends have been equally important in addressing orphans' social needs. Of the orphans interviewed for the study, approximately 95% were not living in orphanages or public institutions at the time of the survey. Half the orphans were living with their extended families; a



quarter lived with their other parent, and another quarter lived with relatives, friends and neighbors in informal arrangements. Nearly 75% of the orphans reported receiving counseling and testing for HIV, and HIV prevalence was 9% among all orphans who had been tested [36].

This first study suggests that informal networks of relatives and friends who received minimal or no support from the state have been a fundamental component of support systems for orphans. Although UNAIDS recommends avoiding institutionalization of AIDS orphans when stable networks of families and friends are available [4], the only study on the welfare of AIDS orphans in Brazil suggests that improving public infrastructure to address orphans' social needs might bolster existing efforts, particularly since the study reports that orphans face significant problems with social marginalization and stigma [36].

To date, no research has examined non-orphan children affected by HIV/AIDS in Brazil. Further research is needed to examine the social and welfare needs of AIDS orphans in Brazil outside of Rio Grande do Sul, as well as non-orphaned children made vulnerable by HIV/AIDS in greater Brazil.



Conclusions

We conclude that the impact of AIDS on Brazilian children has been largely mitigated by the timely implementation of measures to prevent vertical HIV transmission. To date, little is known about the health and social welfare of children affected and infected by HIV/AIDS; the small number of pediatric AIDS cases in Brazil has resulted in relatively little scientific research related to the welfare of children and pediatric affected and infected by HIV/AIDS in Brazil. However, the Brazilian government has committed to providing free and universal access to AIDS treatment for all children living with HIV, has implemented health infrastructure towards that end, and currently treats over 7,000 children living with HIV/AIDS.

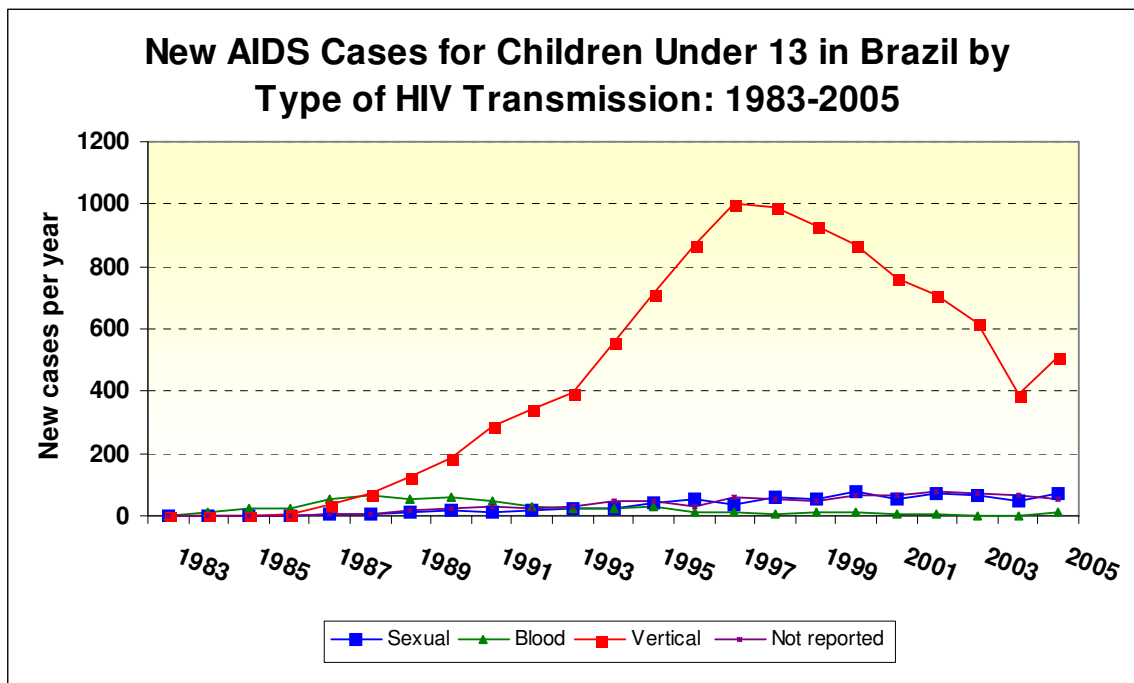
By using World Bank loans to subsidize AIDS programs and health infrastructure development while locally financing drugs necessary for AIDS treatment as well as prevention of vertical HIV transmission, Brazil has successfully mitigated the impact of the HIV/AIDS epidemic on children. Although no studies have explicitly examined the macroeconomic impacts of World Bank loans for HIV/AIDS in Brazil, with an over \$1 trillion dollar economy and annual public health spending of approximately \$20 billion, foreign aid related to HIV/AIDS in Brazil seems not to have distorted Brazil's economic development or national health programs. Brazil, with relatively well-developed health infrastructure, low HIV prevalence, progressive public policy responses to the AIDS epidemic, early foreign aid for HIV/AIDS, a large economy and large health portfolio undistorted by foreign aid, is an exceptional case of a developing country response to HIV/AIDS. We nevertheless conclude that by largely preventing vertical transmission of HIV/AIDS, and disregarding donor advice about prioritizing prevention over AIDS treatment, Brazil has successfully avoided what could have been a major public health crisis related to pediatric HIV/AIDS.

Table 1. World Bank Loan Budgets for AIDS Programs in Brazil

Project	Total project amount*	Brazil contribution*	World Bank contribution*
AIDS I 1993- 1997	250	90	160
AIDS II 1999- 2002	300	135	165
AIDS III 2003- 2006	200	100	100
Totals	750	325	425

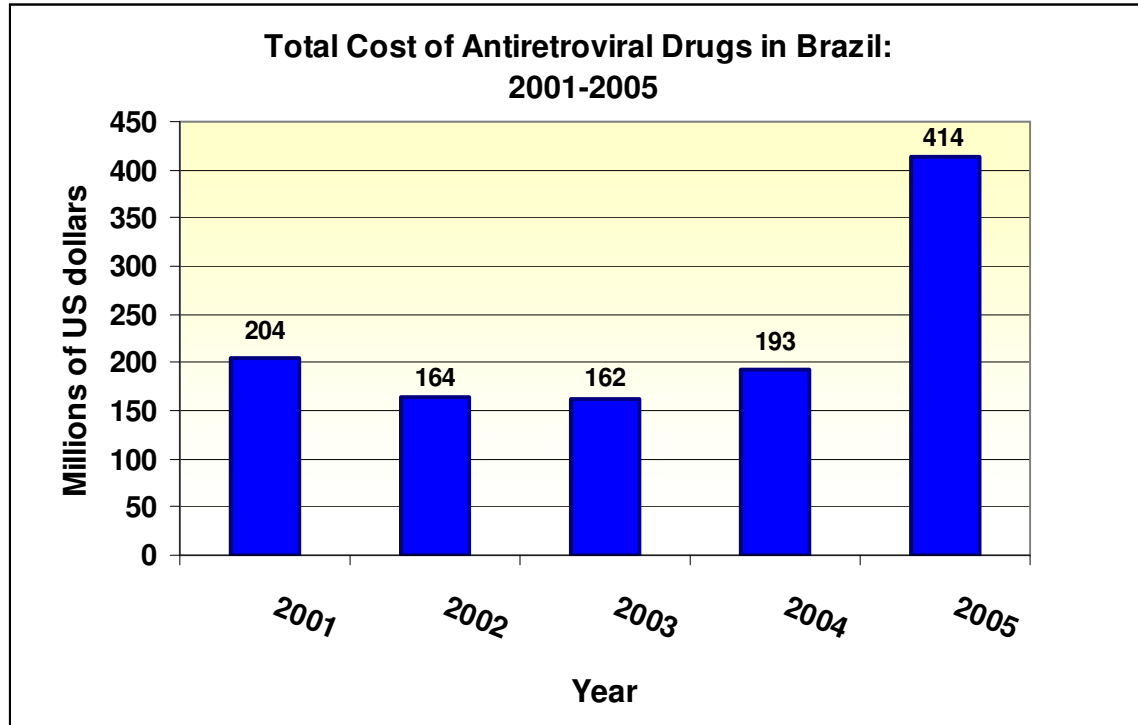
Source: World Bank Loan Project Appraisal Documents
*=(reported in \$US millions)

Figure 1.



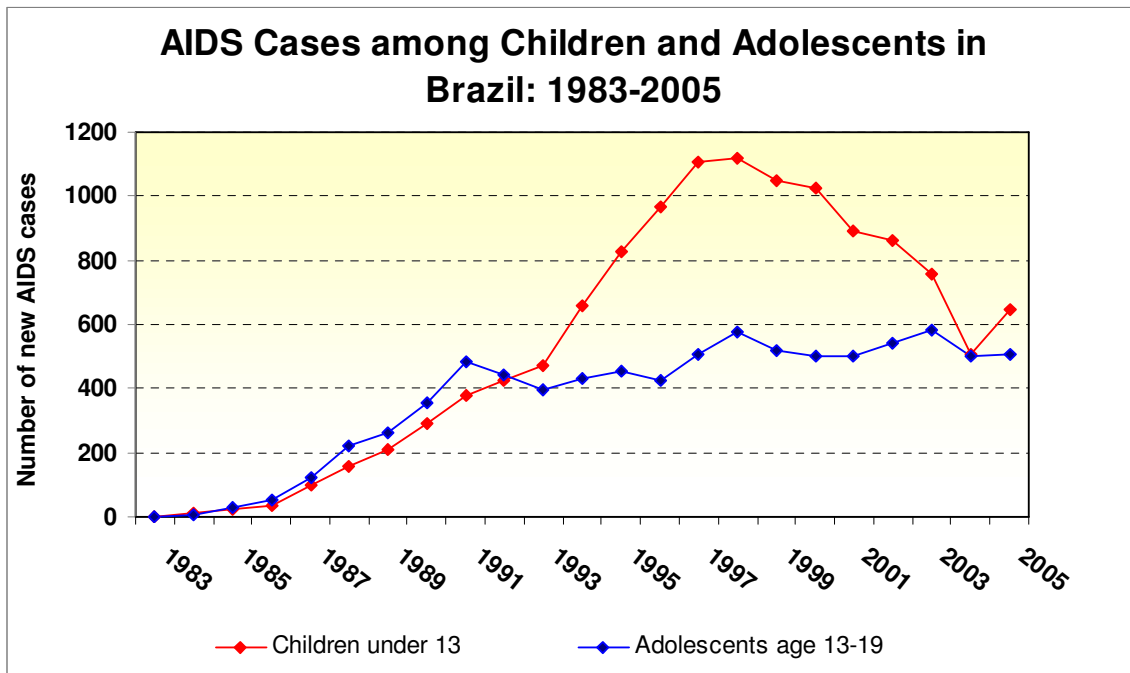
Source: National STD and AIDS Program of Brazil, 2007

Figure 2.

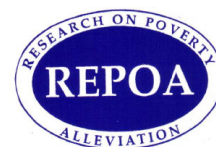


Data Source: Nunn, Fonseca, Bastos et al, PLoS Medicine, October 2007.

Figure 3.



Source: National STD and AIDS Program of Brazil, 2007

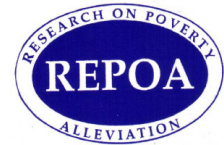


References

1. UNAIDS (2006). Report on the Global AIDS Epidemic, Geneva, UNAIDS.
2. "World Losing Fight Against AIDS." (2007). *BBC Online*: July 23, 2007.
3. Declaration of Commitment on HIV/AIDS: Global Crisis, Global Action (2001). June 27, 2001. **UNGASS 26/2**.
4. Child Protection and Children Affected by AIDS. A Companion Paper to the Framework for the Protection, Care and Support of Orphans and Vulnerable Children Living in a World with HIV and AIDS (2006). Geneva, UNAIDS.
5. Children on the Brink: A Joint Report of New Orphan Estimates and a Framework for Action (2004). Geneva, UNAIDS, UNICEF and USAID.
6. Prendergast, A., Tudor-Williams, G., Jeena, P., et al. (2007). "International Perspectives, Progress, and Future Challenges of Paediatric HIV Infection." *Lancet* **370**(9581): 68-80.
7. Connor, E.M., Sperling, R.S., Gelber, R., et al. (1994). "Reduction of Maternal-Infant Transmission of Human Immunodeficiency Virus Type 1 with Zidovudine Treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group." *New England Journal of Medicine* **331**(18): 1173-80.
8. "Epidemiology, Clinical Features, and Prognostic Factors of Paediatric HIV Infection. Italian Multicentre Study." (1988). *Lancet* **2**(8619): 1043-6.
9. Tonwe-Gold, B., Ekouevi, D.K., Viho, I., et al. (2007). "Antiretroviral Treatment and Prevention of Peripartum and Postnatal HIV Transmission in West Africa: Evaluation of a Two-tiered Approach." *PLoS Med* **4**(8): e257.
10. Szwarcwald, C., Lourenço, C.T.d.A. and De Castilho, E.A. (2000). "Estimativa do Número de Órfãos Decorrentes da AIDS Materna, Brasil, 1987-1999." *Cadernos da Saúde Pública* **16**(Supp 1): 129-34.
11. França Junior, I., Doring, M. and Stelle, M.I. (2006). "Orphans and Vulnerable Children Affected by HIV/AIDS in Brazil: Where do we Stand and Where are we Heading?" *Revista de Saúde Pública* **40**(Supp): 23-30.
12. Fonseca, M. and Bastos, F. (2007). "Twenty-five Years of AIDS in Brazil: Main Epidemiological Findings." *Cadernos da Saúde Pública* **In Press**.



13. Dourado, I., Veras, M.A., Barreira, D., et al. (2006). "Tendências da Epidemia de AIDS no Brasil Após a Terapia Anti-retroviral." Revista de Saúde Pública **40**(supp): 91-7.
14. Petersen, M.T., C; Bastos, FI; Hacker, MA; Beck, E & Noronha, J (2006). . In: Beck, EJ et al. (eds.). (2006). Brazil. The HIV Pandemic: Local and Global Implications. Beck, E. J., Mays, N., Whiteside, A. and Zuniga, J. London, Oxford University Press: 429-46.
15. Hacker, M., Leite, I., Renton, A., et al. (2006). "Reconstructing the AIDS Epidemic among Brazilian Injection Drug Users." Cadernos de Saúde Pública **22**(4): 751-60.
16. Szwarcwald, C.S.-J., PR (2006) (2006). Estimativa da Prevalência de HIV na População Brasileira de 15 a 49 anos, 2004. Boletim Epidemiológico AIDS Boletim Epidemiológico AIDS III(1), Brasília, Programa Nacional de DST/AIDS do Brasil.
17. Bastos, F.I., Nunn, A., Hacker, M., et al. (forthcoming 2008). AIDS in Brazil: The Challenge and the Response. Public Health Aspects of HIV/AIDS in Developing Countries: Epidemiology, Prevention and Care. International, S. New York, Springer International.
18. Nunn, A. (Forthcoming 2008). Life After Death: The History of AIDS Treatment in Brazil. Philadelphia, University of Pennsylvania Press.
19. Project Appraisal Document on a Proposed Loan in the Amount of \$165 Million to the Federative Republic of Brazil for a Second AIDS and STD Control Project. (1998). Washington DC., World Bank.
20. Brazil AIDS and STD Control Project: World Bank Staff Appraisal Report (1993). Washington DC, World Bank.
21. Brazil AIDS and STD Control III (2003). Washington DC, World Bank.
22. Recomendações para Terapia Anti-retroviral em Adultos e Adolescentes Infectados pelo HIV (2006). Brasília, Ministério de Saúde, Programa Nacional de DST/AIDS.
23. Recomendações para Profilaxia da Transmissão Vertical do HIV e Terapia Anti-retroviral em Gestantes (2007). Brasília, Programa Nacional de DST e Aids.
24. Guimarães, M. (2000). "Temporal Trends in AIDS-associated Opportunistic Infections in Brazil, 1980-1999." Cadernos da Saúde Pública **16**(supp 1): 21-36.
25. Teixeira, P., Vitoria, M.A. and Barcarolo, J. (2004). "Antiretroviral Treatment in Resource-poor Settings: the Brazilian Experience." AIDS **18**(Supp 3): S5-7.
26. Marins, J.R., Jamal, L., Chen, S., et al. (2003). "Dramatic Improvement in Survival Among Adult Brazilian AIDS patients." AIDS **17**(11): 1675-82.



27. Nunn, A., da Fonseca, E., Bastos, F.I., et al. (2007). "Evolution of Antiretroviral Drug Costs in Brazil in the Context of Free and Universal Access to AIDS Treatment " Public Library of Science Medicine **In press, August 2007**.
28. Read, J., Cahn, P., Losso, M., et al. (2007). "Management of Human Immunodeficiency Virus-infected Pregnant Women at Latin American and Caribbean Sites." Obstetrics and Gynecology **109**(1458-67).
29. Matida, L.H., da Silva, M.H., Tayra, A., et al. (2005). "Prevention of Mother-to-child Transmission of HIV in São Paulo State, Brazil: An Update." AIDS **19 Suppl 4**: S37-41.
30. Souza-Junior, P., Szwarcwald, C., Barbosa, J.A., et al. (2004). "HIV Infection During Pregnancy: The Sentinel Surveillance Project, Brazil 2002." Revista de Saúde Pública **38**(6): 764-72.
31. de Brito, A.M., de Sousa JL, Luna CF, et al. (2006). "Trends in Maternal-infant Transmission of AIDS after Antiretroviral Therapy in Brazil." Revista de Saúde Pública **40**(Supp): 18-22.
32. Ramos, A.N., Matida, L.H., Saraceni, V., et al. (2007). "Control of Mother-to-child Transmission of Infectious diseases in Brazil: Progress in HIV/AIDS and Failure in Congenital Syphilis." Cadernos da Saúde Pública **forthcoming, November 2007**.
33. Rodrigues CS, G.M. (2004). "Syphilis Positivity in Puerperal Women: Still a Challenge in Brazil." Revista Panamericana Salud Pública **16**(3): 168-75.
34. Candiani, T., Pinto, J., Cardoso, C., et al. (2007). "Impact of Highly Active Antiretroviral Therapy on the Incidence of Opportunistic Infections, Hospitalizations and Mortality among Children and Adolescents Living with HIV/AIDS in Belo Horizonte, Minas Gerais, Brazil." Cadernos da Saúde Pública **forthcoming Nov 2007**.
35. Marques, H.H.d.S., Couttolenc, B.F., Latorre, M.d.R.D.d.O., et al. (2007). "Costs of Care to Children with HIV/AIDS or Exposed to the Virus in a Teaching Hospital." Cadernos da Saúde Pública **Nov 2007**.
36. Doring, M., Franca Junior, I. and Stella, I.M. (2005). "Factors Associated with Institutionalization of Children Orphaned by AIDS in a Population-based Survey in Porto Alegre, Brazil." AIDS **19** (Suppl 4): S59-63.