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# Delivering rapid HIV tests results after delivery: a threat to breastfeeding at birth

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## ABSTRACT

**OBJECTIVE:** To analyze factors associated with failure to breastfeed during the first hour of life, especially the influence of time of delivery of rapid HIV test results.

**METHODS:** Cohort study, beginning with the administration of the rapid test and ending the first time the baby is breastfed. The study population included 944 delivering mothers that received rapid HIV testing with a negative result in five Baby-Friendly hospitals of the High-Risk Pregnancy System in the city of Rio de Janeiro, Southeastern Brazil, in 2006. Trained interviewers obtained data from laboratory and patient charts and interviewed mothers shortly after delivery. The influence of sociodemographic variables and antenatal and delivery care characteristics on failure to breastfeed during the first hour of life was determined through a multilevel model.

**RESULTS:** Among participants, 15.6% received the result of rapid HIV testing before delivery, 30.8% after delivery, and 53.6% had not yet been informed of their results at the time of the interview. Prevalence of failure to breastfeed in the first hour of life was 52.5% (95% CI: 49.3;55.8). After adjustment, having received the result of rapid testing only after delivery doubled the risk of failing to breastfeed in the first hour (RR=2.06; 95% CI: 1.55;2.75). Other risk factors included nonwhite skin color, maternal income of up to one minimum wage, delivery by C-section, mother's lack of desire to breastfeed at birth, and mother's report that the hospital staff did not listen to her. Lack of knowledge of HIV testing from the mother's part was found to be a protective factor.

**CONCLUSIONS:** The major risk factor for not breastfeeding in the first hour of life was failure to receive the results of rapid HIV testing prior to delivery. HIV testing should be made widely available during antenatal care; rapid testing should be performed upon admission, only when indicated, and with active search and prompt delivery of results to expecting mothers.

**DESCRIPTORS:** Breast Feeding. Women. AIDS Serodiagnosis. HIV Infections, diagnosis. Infectious Disease Transmission, Vertical, prevention & control. Cohort Studies.

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## INTRODUCTION

Breastfeeding is beneficial to the health of both mother<sup>10</sup> and child.<sup>21</sup> Factors such as lack of support for breastfeeding in the context of primary health care,<sup>4</sup> separation of mother and child immediately after delivery, delayed first breastfeed, and inadequate use of supplements have been found to contribute to early weaning.<sup>13</sup>

The Baby-Friendly Hospital Initiative (World Health Organization/United Nations Children's Fund) aims to mobilize obstetric services to adopt the "Ten Steps to Successful Breastfeeding."<sup>17</sup> Step 4 recommends that mothers be helped to "initiate breastfeeding within half an hour of birth."<sup>22</sup> Such help should be provided by the health care staff while still in the delivery room, when both mother and child are alert and interacting. Skin-to-skin contact leads to a spontaneous first breastfeed within the first hour of life,<sup>16</sup> which can increase breastfeeding duration<sup>15</sup> and reduce neonatal mortality.<sup>8</sup>

Despite the advantages of breastfeeding, its practice is not indicated for HIV-positive mothers in Brazil,<sup>a</sup> given that it leads to an additional risk of mother-to-child transmission of HIV of 14% (95%CI: 7;22).<sup>7</sup> The rate of mother-to-child transmission in the absence of any intervention is roughly 20%. Combined use of Protocol 076 of the Aids Clinical Trial Group (PACTG 076) reduces this risk by 67,5%.<sup>b</sup> In Brazil, mother-to-child transmission fell from 16.0%<sup>19</sup> to 3.7%<sup>5</sup> between 1997 and 2002, even though full implementation of this protocol is still under way.

Failing to detect HIV infection during antenatal care represents the loss of an opportunity to prevent mother-to-child transmission, and the use of rapid testing for detecting anti-HIV antibodies when the mother is admitted to the hospital for delivery should occur only in exceptional cases. A study carried out in Rio de Janeiro, Brazil, found that 74.7% of pregnant women were tested for HIV.<sup>20</sup> The prevalence of women whose test results were available prior to admission was estimated at 62.5% in the whole country and at 78.3% in the Southeast Region in 2004.<sup>18</sup>

The *Nascer-Maternidades* (Birth-Maternities) initiative,<sup>c</sup> implemented in 2002, was aimed at reducing mother-to-child HIV transmission through measures such as determining the serological status of 100% of

parturient mothers not tested during antenatal care by testing for HIV immediately prior to delivery.<sup>3</sup> This test is voluntary and confidential, and must be accompanied by counseling and the mother's verbal consent.<sup>e</sup>

Beginning in 2007,<sup>d</sup> the Brazilian Ministry of Health recommends retesting in the third trimester of pregnancy for mothers tested for HIV in the first trimester. It also maintained the recommendation that the health care professional does not interrupt breastfeeding in case the mother has not yet been tested or is still awaiting test results, since contraindication of breastfeeding should be based only on a positive HIV diagnosis, and, in its absence, breastfeeding should be ensured for all children.<sup>e</sup>

Prevalence of HIV seropositivity among pregnant women in the state of Rio de Janeiro in 2007 was 0.15%, the lowest in the Southeast Region, and lower than the national prevalence in Brazil (0.21%).<sup>14</sup> Even among pregnant women not previously tested and who underwent rapid testing, this prevalence did not exceed 3.2% in a study conducted in Ribeirão Preto, state of São Paulo.<sup>6</sup> Rapid testing would therefore be expected not to have a substantial impact on breastfeeding at birth.

The aim of the present study was to investigate factors associated to failure to breastfeed within the first hour of life, and especially the role of the moment of disclosure of the result of rapid HIV testing.

## METHODS

Cohort study carried out in the municipality of Rio de Janeiro, Southeastern Brazil. The study population comprised all women who underwent rapid HIV testing upon admission for delivery to the five Baby-Friendly hospitals of the High-Risk Pregnancy System between September 11 and December 11 2006. Follow-up began at the moment of rapid HIV testing, which was obtained from the woman's laboratory records, encompassed the whole process of delivery, and ended at the moment of the baby's first breastfeed.

A pilot study carried out for sample calculation purposes showed that prevalence of failure to breastfeed at birth was 50% among seronegative women submitted

<sup>a</sup> Ministério da Saúde. Secretaria de Assistência à Saúde – PN DST/AIDS. Aleitamento x mulheres infectadas pelo HIV- recomendações. Brasília; 1995.

<sup>b</sup> Ministério da Saúde. Secretaria Executiva. Coordenação Nacional de DST e AIDS. Recomendações para profilaxia da transmissão vertical do HIV e terapia antiretroviral em gestantes. Brasília; 2003. (Manuais, 46).

<sup>c</sup> Ministério da Saúde. Portaria GM nº 2104, de 19 de novembro de 2002. Institui no âmbito do Sistema Único de Saúde - SUS o Projeto Nascer-Maternidades. *Diário Oficial Uniao*. 2002 set 21;Seção1:48.

<sup>d</sup> Ministério da Saúde. Secretaria de Vigilância em Saúde. Programa Nacional de DST e Aids. Protocolo para a prevenção de transmissão vertical de HIV e sífilis: manual de bolso. Brasília; 2007. (B. Texto Básicos de Saúde -Manuais, 80).

<sup>e</sup> Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Atenção à Saúde. Manual normativo para profissionais de saúde de maternidades da iniciativa Hospital Amigo da Criança. Referência para mulheres HIV positivas e outras que não podem amamentar. Brasília; 2004.

to rapid HIV testing. Based on this parameter, we estimated the necessary sample at 700 mothers, assuming 99% statistical power and a 95% confidence level.

The study included women submitted to rapid HIV testing and whose babies were born alive and were “rooming in” with their mothers. Women whose babies had a fifth-minute Apgar < 7 and/or who were admitted to the neonatal intensive care unit for any period of time were excluded, since in such situations breastfeeding at birth may be contraindicated. Seropositive mothers were also excluded from the analysis of failure to breastfeed in the first hour.

Parturient mothers submitted to rapid HIV testing were identified by screening the laboratories of each hospital on a daily basis, and names of tested women were transcribed to the laboratory data collection forms. Form data was cross-referenced with the list of hospitalized patients at the nursing station of the room-in ward. Subjects’ hospital files were then reviewed, data on the delivery were transcribed to a daily chart, and eligible mothers were then interviewed in their rooms. In case the baby had not yet been breastfed at the time of the interview, the interviewer would return to that mother at the end of the day to collect data on the duration of the interval between birth and the first breastfeed. The hospital routine schedule was used as an aid in this recall.

Data collection instruments, all previously tested, consisted of a form for data collection in the hospital laboratory, a daily chart for determining eligibility and transcribing data from the patient chart data, and a questionnaire for the interview.

Women were interviewed by six trained nurses or nursing students. Each interviewer was assigned to one hospital, and was supervised on a weekly basis by a specific researcher and every fifteen days by the research coordinator. One of the interviewers was a substitute for the case of an eventuality.

We collected data from the live birth declaration of mothers who were eligible but were not interviewed. This data was compared to that of the mothers who were interviewed.

During the study period, there were 4,895 deliveries, and 1,396 parturient mothers (28.5%) underwent rapid HIV testing. Of this universe, 322 women (23.1%) were excluded, resulting in 1,074 eligible mothers. Of these, 42 (3.9%) refused to participate in the survey and 77 (7.2%) were lost due to early hospital discharge or other reasons, yielding a final population of 955 interviewed mothers. Sociodemographic, antenatal care, and delivery characteristics of the interviewed mothers were similar to those of losses/refusals. The only variable that differed ( $p=0.01$ ) between the groups was prior HIV status according to the patient chart.

Data analysis was carried out using Epi Info and SPSS software.

The association between the primary exposure variable “timing of disclosure of rapid HIV test result in relation to delivery” and the outcome “failure to breastfeed in the first hour of life” was analyzed by calculating the relative risk, considering the following characteristics: 1 – socioeconomic: age, schooling, race, employment, income, and presence of a partner; 2 – reproductive: parity, number of partners in life and in the last year; 3 – antenatal care: number of appointments, time of HIV testing during pregnancy and its result; and 4 – delivery care: mother’s awareness of being submitted to the rapid HIV test, result of the rapid HIV test, mode of delivery, mother’s willingness to breastfeed immediately after birth, mother considering that the hospital staff listened to her, and hospital where delivery took place.

Mothers were classified in terms of time to first breastfeed as breastfed in the first hour of life or failed to breastfeed in the first hour of life. The relative risk, with its respective 95% confidence interval, was estimated based on a multilevel model with a complementary log-log link function.<sup>9</sup> This is the link function of choice for high probability binary outcomes,<sup>12</sup> as was the case in the present study. We adopted a multilevel approach in order to capture the influence of intra-hospital correlation on failure to breastfeed in the first hour.<sup>9</sup> In this model, variables related to the facility were placed at the most clustered level, and maternal characteristics were placed at the individual level. Variables in the model with predictive power were selected by bivariate analysis, using a 20% significance cutoff for inclusion in the modeling process. The final model included all variables with significance below 5%.

This study was approved by the Research Ethics Committees of the *Instituto Fernandes Figueira/Fundação Oswaldo Cruz* and of the Municipal Secretariat of Health of Rio de Janeiro. All subjects signed a term of free informed consent prior to data collection.

## RESULTS

Prevalence of seropositivity to the rapid HIV test was 0.8% both for all parturient mothers, eligible and ineligible (11/1396), and among those interviewed (8/955). None of the eight seropositive mothers interviewed breastfed their babies during their stay in the hospital, and there were three seronegative mothers for whom it was not possible to determine the time of the first breastfeed. The outcome analysis therefore included 944 mothers. Prevalence of failure to breastfeed in the first hour was 52.5% (95%CI: 49.3;55.8).

Table 1 shows that women who were submitted to rapid HIV testing with negative results were mostly young, of nonwhite skin color, and with complete elementary

**Table 1.** Socioeconomic and reproductive characteristics of mothers submitted to rapid HIV testing in Baby-Friendly hospitals, according to bivariate analysis with respect to failure to breastfeed the newborn in the first hour of life. Municipality of Rio de Janeiro, Southeastern Brazil, 2006.

Variable	Frequency		Failure to breastfeed in first hour		
	n	%	%	RR	95%CI
Age group (years) (n=944)					
13 to 19	253	26.8	49.4	0.92	0.80;1.06
20 to 34	607	64.3	53.7	1	
35 to 45	84	8.9	53.6	1.00	0.81;1.23
Schooling (n=944)					
Incomplete elementary	406	43.0	51.5	1	
Complete elementary or higher	538	57.0	53.3	1.04	0.92;1.18
Skin color (n=944)					
White	261	27.6	43.7	1	
Non white	683	72.4	55.9	1.28	1.10;1.49
Working currently or when became pregnant (n=944)					
Yes	443	46.9	52.6	1	
No	501	53.1	52.5	0.998	0.88;1.13
Maternal income (n=944)					
Mother has no income	423	44.8	53.0	1.13	0.97;1.31
One minimum wage or under	260	27.5	58.1	1.25	1.06;1.48
Over one minimum wage	261	27.6	46.4	1	
<i>Per capita</i> family income (n=877)					
One minimum wage or under	739	84.4	54.0	1	
Over one minimum wage	138	15.6	48.6	0.90	0.75;1.08
Has a partner (n=944)					
Yes	826	87.5	52.3	1	
No	118	12.5	54.2	1.04	0.87;1.24
Parity (n=939)					
Primipara	372	39.6	51.3	0.92	0.69;1.23
2 to 3 children	444	47.3	53.4	0.99	0.83;1.20
4 or more children	123	13.1	53.7	1	

education. Almost half the mothers worked outside home at the time of the interview or when they became pregnant. Only 27.6% of mothers earned more than one minimum wage per month. *Per capita* family income was up to one minimum wage in 84.4% of households. The great majority of women had a partner; of these, 66.3% had had other relationships in life, and 13.4% had had such a relationship within the last year (data not shown in the table). In bivariate analysis, earning one minimum wage or less and nonwhite skin color were found to be risk factors for failure to breastfeed in the first hour.

The current pregnancy had been planned in 31.6% of cases, and 8.8% of mothers did not receive antenatal care. The majority of mothers (78.7%) reported having been screened for HIV during antenatal care, of which 79.8% had received a negative result and 20.2% were unaware of the result of their testing. None of these characteristics was significantly associated with the outcome (Table 2).

Regarding hospital care, 75.0% of mothers were aware of the fact that they were being tested for HIV by the hospital. When asked about when they were informed of the test's result, only 15.6% had received the result prior to delivery, 30.8% had received it shortly after delivery, and over half of the mothers (53.6%) had still not received the results of this test at the time of the interview (Table 3). The proportion of women with undetermined timing of result disclosure according to the mother's hospital charts was similar (51.5%).

Babies were delivered by caesarian section in 32.5% of cases. Unwillingness to breastfeed in the delivery room was reported by 42.6% of mothers. The major reason for this was the mother's belief that it was the hospital's duty to define this routine, followed by unfavorable condition of the baby. The majority of deliveries were concentrated in three hospitals. There was a large discrepancy in terms of prevalence of the outcome among these institutions, ranging from 15.6% to 88.6%

**Table 2.** Antenatal care characteristics of mothers submitted to rapid HIV testing in Baby-Friendly hospitals, according to bivariate analysis with respect to failure to breastfeed the newborn in the first hour of life. Municipality of Rio de Janeiro, Southeastern Brazil, 2006.

Variable	Frequency		Failure to breastfeed in first hour		
	n	%	%	RR	95% CI
Number of antenatal care appointments (n=935)					
0	82	8.8	52.4	0.96	0.77;1.20
1 to 3	104	11.1	51.9	0.95	0.77;1.16
4 to 6	291	31.1	50.2	0.92	0.79;1.05
7 or more	458	49.0	54.8	1	
Timing of HIV test (n=906)					
Not tested	193	21.3	52.8	0.97	0.81;1.16
First trimester of pregnancy	248	27.4	54.4	1	
Second trimester of pregnancy	312	34.4	49.4	0.91	0.77;1.06
Third trimester of pregnancy	153	16.9	54.2	1.00	0.83;1.20
Result of HIV test (n=733)					
Negative	585	79.8	52.6	1	
Did not know	148	20.2	50.0	0.95	0.79;1.14

of failure to breastfeed in the first hour depending on the hospital. The proportion of mothers that reported that the hospital staff did not listen to them was 23.8%. All hospital characteristics were significantly associated with failure to breastfeed in the first hour in at least one category (Table 3).

After adjustment using the multilevel model, having received the result of the rapid HIV test after delivery doubled the risk of failure to breastfeed in the first hour of life. Other factors that contributed towards delaying the onset of breastfeeding were nonwhite skin color, maternal income of up to one minimum wage, delivery by caesarian section, mother's unwillingness to breastfeed at birth, and mother's report that the hospital staff would not listen to her. Unawareness of being tested for HIV was shown to be a protective factor (Table 4).

## DISCUSSION

In the present study, over one-quarter (28.5%) of parturient mothers were submitted to rapid HIV testing, a proportion similar to that detected in a survey of 30 Brazilian maternity wards (28.1%).<sup>a</sup> In 2006, the Ministry of Health recommended that rapid HIV tests be administered to parturient mothers who, in the absence of testing during antenatal care, authorized its administration after counseling by the health care team.<sup>b</sup> Counseling refers to the exchange of information on

the benefits of early diagnosis in terms of controlling mother-to-child transmission, as well as understanding the possible results of testing and their impact on the woman's life.<sup>f</sup> Notwithstanding, of the 955 women undergoing rapid HIV testing interviewed, 585 (61.3%) already had a negative result from testing during antenatal care. In addition to rapid HIV testing being administered to almost two-thirds of subjects in the absence of indication according to the norms at the time, testing was often done without any counseling and without the subjects consent, given that 25% of women were not even aware that they were being tested.

The hospitals in which this survey was conducted adhere to the "Ten Steps to Successful Breastfeeding".<sup>17</sup> In such hospitals, it is expected that at least 80% of mothers delivering normally, and 50% of those delivering by caesarian section, should breastfeed in the first hour of life.<sup>22</sup> However, in the present study, under half (47.5%) the mothers submitted to rapid HIV testing breastfed their children in the first hour, a proportion only slightly higher than that estimated by the *Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher* (National Mother and Child Health and Demographics Survey) for Brazil as a whole (43.0%) and for the Southeast Region (37.7%) in 2006.<sup>c</sup> In the hospitals studied, this outcome had multiple determinants, of which the most important was having received the result of rapid HIV testing after delivery.

<sup>a</sup> Santos EM, Westman S, Reis AC, Alves RG. Avaliação do grau de implementação do programa de controle de transmissão vertical do HIV em maternidades do "Projeto Nascer", 2007 [cited 2009 Nov 21]. Brasília; 2007. Available from: <http://www.aids.gov.br/data/documents/storedDocuments/%7BB8EF5DAF-23AE-4891-AD36-1903553A3174%7D/%7B3F5A1D6B-09D0-4450-9060-2B5241E5F16B%7D/Avaliacao%20Grau%20Implementacao%20Projeto%20Nascer.pdf>

<sup>b</sup> Ministério da Saúde. Portaria GM nº 2104, de 19 de novembro de 2002. Institui no âmbito do Sistema Único de Saúde - SUS o Projeto Nascer-Maternidades. *Diário Oficial Uniao*. 2002 set 21;Seção1:48.

<sup>c</sup> Ministério da Saúde. Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher -PNDS-2006. Brasília; 2008.

**Table 3.** Delivery care characteristics of mothers submitted to rapid HIV testing in Baby-Friendly hospitals, according to bivariate analysis with respect to failure to breastfeed the newborn in the first hour of life. Municipality of Rio de Janeiro, Southeastern Brazil, 2006.

Variable	Frequency		Failure to breastfeed in first hour		
	n	%	%	RR	95% CI
Aware of rapid HIV testing (n=944)					
Yes	708	75.0	56.5	1	
Not sure/no	236	25.0	40.7	0.72	0.61;0.85
Result of rapid HIV test (n=943)					
Negative	442	46.9	55.2	1	
Did not know	501	53.1	44.8	0.72	0.64;0.81
When mother received result of rapid test (n=935)					
Before delivery	146	15.6	47.3	1	
Did not receive result	501	53.6	44.3	0.94	0.77;1.14
After delivery	288	30.8	69.4	1.47	1.22;1.77
Mode of delivery (n=944)					
Normal	637	67.5	47.9	1	
Caesarian section	307	32.5	62.2	1.30	1.15;1.46
Willingness to breastfeed at birth (n=940)					
Yes / Somewhat	542	57.4	46.3	1	
No	402	42.6	60.9	1.32	1.17;1.48
Mother's report that staff listened to her (n=944)					
Yes	719	76.2	50.1	1	
Somewhat / No	225	23.8	60.4	1.21	1.06;1.37
Hospital (n=944)					
1	387	41.0	85.5	1	
2	275	29.1	24.0	0.28	0.23;0.35
3	215	22.8	29.3	0.34	0.28;0.42
4	32	3.4	15.6	0.18	0.08;0.41
5	35	3.7	88.6	1.04	0.91;1.17

Rapid testing for anti-HIV antibodies uses screening tests that produce results in 30 minutes or less.<sup>a</sup> However, the rapidity of the test does not ensure that its result will be available to the maternity staff or to the parturient mother within this same timeframe. During fieldwork, we observed that, in the five hospitals involved, the laboratory where tests were performed was not located on the same floor as the maternity ward, which made searching for results more difficult. Obtaining test results from the laboratory is the responsibility of the professional who ordered the test,<sup>b</sup> however, the large demand for rapid testing and the excessive work load of health professionals may also

have compromised agility in obtaining these results. In a survey assessing the degree of implementation of the *Projeto Nascer* (Project Birth), only 26% of laboratories delivered the results of rapid HIV testing in time for intervention, this indicator showing a critically low degree of implementation.<sup>c</sup> The Brazilian Ministry of Health<sup>d</sup> states that it is the duty of the health facility to ensure that the result is delivered in due time, and that the health care professional should not disallow breastfeeding for mothers whose HIV test results are not available. However, we found that conduct was not homogeneous in the different hospitals investigated, which contributed towards the large differences in

<sup>a</sup> Ministério da Saúde. Secretaria de Vigilância em Saúde. Programa Nacional de DST e AIDS. Recomendações para profilaxia da transmissão materno-infantil do HIV e terapia anti-retroviral em gestantes. Brasília; 2004. (Manuais, 46)

<sup>b</sup> Conselho Federal de Medicina. Resolução CFM nº 1665, de 7 de maio de 2003. *Diário Oficial Uniao* 2003; 3 jun, Sec 1:83-4

<sup>c</sup> Santos EM, Westman S, Reis AC, Alves RG. Avaliação do grau de implementação do programa de controle de transmissão vertical do HIV em maternidades do "Projeto Nascer", 2007 [cited 2009 Nov 21]. Brasília; 2007. Available from: <http://www.aids.gov.br/data/documents/storedDocuments/%7BB8EF5DAF-23AE-4891-AD36-1903553A3174%7D/%7B3F5A1D6B-09D0-4450-9060-2B5241E5F16B%7D/Avaliacao%20Grau%20Implementacao%20Projeto%20Nascer.pdf>

<sup>d</sup> Ministério da Saúde. Secretaria de Vigilância em Saúde. Secretaria de Atenção à Saúde. Manual normativo para profissionais de saúde de maternidades da iniciativa Hospital Amigo da Criança. Referência para mulheres HIV positivas e outras que não podem amamentar. Brasília; 2004.

**Table 4.** Multilevel complementary log-log model of determinants of failure to breastfeed in the first hour of life among mothers submitted to rapid HIV testing in Baby-Friendly hospitals. Municipality of Rio de Janeiro, Southeastern Brazil, 2006.

Variable	RR	95% CI
Skin color		
White	1	
Nonwhite	1.40	1.12;1.74
Maternal income		
Mother has no income	1	
One minimum wage or under	1.23	0.97;1.56
Over one minimum wage	1.56	1.21;2.00
Aware of rapid HIV testing (n=944)		
Yes	1	
Not sure/no	0.72	0.55;0.94
Result of rapid HIV test (n=943)		
Negative	1	
Did not know	0.94	0.54;1.65
When mother received result of rapid test (n=935)		
Before delivery	1	
Did not receive result	1.03	0.56;1.90
After delivery	2.06	1.55;2.75
Mode of delivery (n=944)		
Normal	1	
Caesarian section	1.70	1.40;2.07
Willingness to breastfeed at birth (n=940)		
Yes / Somewhat	1	
No	1.42	1.18;1.72
Mother's report that staff listened to her (n=944)		
Yes	1	
Somewhat / No	1.34	1.08;1.68

prevalence of failure to breastfeed in the first hour found between these institutions.

Prevalence of positivity to the rapid test was 0.8%, twice that detected in the state of Sergipe, Northeastern Brazil (0.4%)<sup>11</sup> and also twice that of Brazil as a whole in 2004 (0.4%),<sup>18</sup> possibly because the survey was restricted to hospitals within the high-risk pregnancy system.

For mothers who are positive to the rapid HIV test, the Brazilian Ministry of Health recommends the administration of intravenous AZT for at least three hours prior to delivery, that artificial membrane rupture not be performed, and that delivery proceed by caesarian section.<sup>a</sup> We conclude, therefore, that the delay in disclosing the result of rapid HIV tests in these hospitals affected not only breastfeeding among seronegative mothers, but also the establishment of measures to prevent mother-to-child transmission among seropositive ones.

In the multivariate model, delivery by caesarian section increased the risk of the outcome by 70%. Though a lower proportion of breastfeeding at birth is expected among mothers who deliver by caesarian section, the proportions observed among mothers submitted to rapid HIV testing (52.1% for normal delivery and 37.8% for caesarian section) still by far exceed recommended levels.<sup>22</sup> Another variable associated with the outcome was the mother reporting that she was unwilling to breastfeed her baby at birth. However, when investigating the causes for this unwillingness to breastfeed, we found that the major reason given by mothers was that they considered that such a routine should be defined by the hospital. This claim suggests that women abdicate their own will in favor of the hospital's routine. In the hospitals investigated, the majority of mothers (76.2%) felt that the hospital staff listened to what they had to say about themselves and their babies. However, among mothers who felt this was not true, risk of failing to breastfeed in the first hour was 34% higher.

<sup>a</sup> Ministério da Saúde, Programa Nacional de DST e AIDS. Projeto Nascer. Brasília: Ministério da Saúde, 2003.

We observed 56% excess risk of failure to breastfeed in the first hour among mothers earning up to one minimum wage, and 40% among mothers of nonwhite skin color. Such excess risk may be due to poorer mothers being considered by the hospital staff as a risk group. One can assume that counseling was more frequent among mothers considered as high risk, for whom a greater degree of precaution with regard to breastfeeding in case of undefined HIV status may have been adopted. The mother's unawareness of having been submitted to the rapid HIV test was found to be a protective factor against the outcome.

In addition, multivariate analysis showed that not knowing the result of the rapid HIV test at the time of the interview was not associated with the outcome. Women who were unaware even of the administration of the rapid test were probably not identified by the health care professionals as belonging to a risk group, and rapid testing in these cases may have been simply a routine procedure.

Certain limitations of the present study must be considered. We were able to determine the timing of disclosure of the result of the rapid test for less than half of the mothers due to the absence of information in the patient chart that would allow us to determine the time of disclosure, as well as to the fact that hospitals did not promptly communicate the result of HIV testing to the mother as soon as it was available. There was also a potential for recall bias with regard to the timing of the first breastfeed, given that this parameter was estimated by mothers themselves. Careful interviewer training may have contributed to reduce such bias.

Despite these limitations, we were still able to identify as the most important risk factor for failure to breastfeed in the first hour of life the disclosure of the rapid test result after delivery, which led to an increase in risk even greater than that associated with delivery by caesarian section. Although in the present study we did not compare women who underwent rapid HIV testing to those who did not, our results suggest that the process of administering the test alone had an impact on the onset of breastfeeding. We found that, even among mothers whose rapid test result was disclosed before delivery, prevalence of breastfeeding at birth was lower than that reported for Baby Friendly Hospitals.<sup>1</sup> One may assume that, when the volume of deliveries is large, the result of the rapid HIV test is not sought by the delivery team in due time even when it is available in the patient chart.

Given that our present results, which were consistent among all the hospitals investigated, were obtained in facilities characterized by promoting breastfeeding, the situation is likely to be similar or possibly even worse in the remaining maternity wards in the city of Rio de Janeiro.

Since 2007, the Brazilian Ministry of Health<sup>a</sup> recommends that, whenever possible, in addition to performing an HIV test during the mother's first antenatal care appointment, a second test be administered at the beginning of the third trimester. This recommendation may have increased the demand for rapid testing due to the lack of a second test result when the mother is admitted to the hospital for delivery. HIV testing, even among low-risk mothers, is associated with a high level of anxiety.<sup>2</sup> Therefore, ideally this test would be performed, and its result made available, still during pregnancy, not only due to greater likelihood of preventing mother-to-child transmission,<sup>b</sup> but also to ensure that testing does not generate anxiety at a moment as sensitive as delivery.

We therefore recommend that the system of cross-reference between the antenatal care service and the laboratory that carries out the testing be reevaluated, so that testing and result disclosure be completed before the mother is admitted for delivery. Hospital services should request the rapid test only when indicated, implement active search for the results of requested tests, and promptly disclose this result to parturient mothers, since test results are the property of the patient.<sup>c</sup>

It would be appropriate for the National Healthcare System, which provides the more expensive rapid HIV test, to guide institutions in the adequate implementation of rapid testing, thus contributing towards preventing mother-to-child transmission and fulfilling Step 4<sup>22</sup> among seronegative women submitted to this test.

We further recommend greater articulation between the different governmental policies for pregnancy/ puerperal care. Our data show that the implementation of prevention of mother-to-child transmission of HIV at the moment of delivery, which is understood to be a priority measure, has been taking place without appropriate articulation with the norms of the Baby-Friendly Hospital Initiative, of the antenatal care program, and of the National Policy for Humanization of Delivery and Birth.<sup>d</sup> Among the obstacles to this implementation are the sheer volume of deliveries taking place in certain

<sup>a</sup> Ministério da Saúde. Secretaria de Vigilância em Saúde. Programa Nacional de DST e Aids. Protocolo para a prevenção de transmissão vertical de HIV e sífilis: manual de bolso. Brasília; 2007. (B. Texto Básicos de Saúde -Manuais, 80).

<sup>b</sup> Ministério da Saúde. Secretaria Executiva. Coordenação Nacional de DST e AIDS. Recomendações para profilaxia da transmissão vertical do HIV e terapia antiretroviral em gestantes. Brasília; 2003. (Manuais, 46).

<sup>c</sup> Conselho Federal de Medicina. Resolução CFM nº 1498, de 10 de julho de 1998. Institui o Programa de Educação Continuada Excelência Médica, que contará com um Conselho Editorial escolhido na comunidade científica nacional ligada ao assunto. *Diário Oficial Uniao*. 1998 jul 27;Seção1:69.

<sup>d</sup> Ministério da Saúde. Portaria GM nº 2104, de 19 de novembro de 2002. Institui no âmbito do Sistema Único de Saúde - SUS o Projeto Nascer-Maternidades. *Diário Oficial Uniao*. 2002 set 21;Seção1:48.



institutions, the lack of training and continuous updating of health care professionals, and operational issues involving rapid HIV testing and its counseling routine.

Therefore, fulfilling Step 4 of the Baby-Friendly Hospital initiative<sup>22</sup> is directly linked to developing

measures capable of improving the integrality and breadth of care provided to women during pregnancy, delivery, and puerperium, contributing towards strengthening women's autonomy and improving the quality of maternal and child health care.

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