The "Abortion Pill" Misoprostol in Brazil: Women's Empowerment in a Conservative and Repressive Political Environment

Ilana Löwy, PhD, and Marilena Cordeiro Dias Villela Corrêa, MD, PhD

In the aftermath of the introduction of severe restrictions on abortion in several US states, some activists have argued that providing widespread access to an abortive drug, misoprostol, will transform an induced abortion into a fully private act and therefore will empower women. In Brazil, where abortion is criminalized, the majority of women who wish to terminate an unwanted pregnancy already use the illegal, but easily accessible, misoprostol. We examine the history of misoprostol as an abortifacient in Brazil from the late 1980s until today and the professional debates on the teratogenicity of this drug. The effects of a given pharmaceutical compound, we argue, are always articulated, elicited, and informed within dense networks of sociocultural, economic, legal, and political settings. In a conservative and repressive environment, the use of misoprostol for self-induced abortions, even when supported by formal or informal solidarity networks, is far from being a satisfactory solution to the curbing of women's reproductive rights. (*Am J Public Health*. 2020;110:677–684. doi: 10.2105/AJPH.2019.305562)

In spring 2019, several US states introduced laws that severely limited access to abortion. Reacting to this development, the *New York Times* published an op-ed by the activist and women's advocate Cari Sietstra, in which she said, "Georgia's terrible law doesn't have to be the future of abortion. A self-induced abortion with misoprostol can be a safe, reliable way to end an unwanted pregnancy."[1] Self-induced abortion with misoprostol, Sietstra argued, can be a very good way to end an unwanted pregnancy, but it also empowers women and enables them to control the fate of their pregnancy privately. Misoprostol "should be seen as a prophylactic drug that deserves a place in our medicine cabinets," like an EpiPen for those with allergies. We should, Sietstra adds, ask clinicians to prescribe this drug before we need it, and women with means should share their misoprostol supply with those less fortunate.

Brazil has a long experience with the use of misoprostol as an abortifacient. Abortion is illegal in Brazil. Its inclusion as a crime in Brazil's criminal code of 1830 was confirmed in the criminal code of 1890 and consolidated in the penal code of 1940, still valid today. From the 1970s on Brazilian feminists fought to liberalize abortion, but the only important change was decriminalization of abortion for anencephaly in 2012.[2] Despite its criminalization, abortion is widespread in Brazil, especially among less-educated women, while misoprostol, readily available through informal circuits, is employed by numerous women who want to terminate a pregnancy.[3]

Its popularity notwithstanding, the dominant image of misoprostol in Brazil is not as a tool of women's empowerment. Misoprostol is linked with culpability, suffering, and potential harm to future children. Anthropologists who spoke with mothers of children with Zika-induced microcephaly from Recife, Brazil, learned that some mothers—the great majority of whom were poor and non-White—were targets of derogatory and hostile remarks:

> When circulating around the city with their children on their lap, they heard discriminatory statements about the different formation of their children's bodies, and people accused them that they had tried an abortion. Their children were called "abortion children."[4]

The idea that a woman who tries—and fails—to induce an abortion may injure her future child is not a new one. It links a view of abortion as a transgression, an illegal act, and a sin with an awareness of the danger of methods employed by desperate women to eliminate an unwanted pregnancy.[5] These methods are often extremely risky for the pregnant woman and, in some cases, can harm the fetus too. In the 1990s and early 2000s, debates on the induction of birth defects by misoprostol led to a reactivation of the popular perception of birth defects as "wages of the sin of abortion." Health professionals found out

that using this drug greatly reduced the danger of abortion for hundreds of thousands of Brazilian women.[6] At the same time, media reports fed the popular imagery of misoprostol as linked with the "production of monsters"—the literal meaning of teratogenesis—and the parallel creation of "monstrous" mothers.

THE BEGINNING OF A CONTROVERSY

Misoprostol (Cytotec), a synthetic analog of prostaglandin E1 developed in 1973 by the pharmaceutical company Searle, was originally marketed as a treatment for gastrointestinal problems. One of the side effects of this molecule, its manufacturers rapidly found out, was to induce miscarriage. In the 1980s, French endocrinologists demonstrated that a combination of mifepristone (RU-486, a steroidal antiprogestogen) with misoprostol was a very efficient way to induce an abortion. Misoprostol reached Brazil in 1985, and from 1988 on was produced by the Brazilian firm Biolab. In the late 1980s, Brazilian pharmacists started to recommend this product for terminating pregnancies as a workaround of the criminalization of abortion. At that time, misoprostol was sold in pharmacies without a prescription.

The first study of using misoprostol as an abortifacient, made by Helena Coelho and her colleagues from the Federal University of Ceara in Fortaleza, Brazil, was published in July 1991. Pharmacy students visited registered pharmacists in the Fortaleza area, asking for a drug that would terminate an early pregnancy. The majority of the pharmacists recommended misoprostol and told the buyers how to use it, but only a small minority among them also explained what the physiological effects of misoprostol were and mentioned the importance of seeing a physician after an abortion.[7]

In an article published in the *Lancet*, a German physician, Peter Schönhöfar, attracted attention to the widespread use of misoprostol in Brazil to terminate pregnancies. He argued that it was urgent to halt the sale of this drug, because "it is ineffective about half of the time, and it exposes the fetus to [the] possible risk of severe malformations."[8] Schönhöfar's claim that misoprostol is an ineffective abortifacient relied on a single clinical trial of this drug. His claim that it is a dangerous teratogen relied on a report made by Walter Fonseca and his colleagues from the University of Ceara, which linked a severe and atypical cranial malformation in five newborn babies with exposure to misoprostol early in pregnancy.[9]

The latter claim rapidly reached the general public. In April 1991, one of the main Brazilian newspapers, *O Globo*, published an article on a presumed link between misoprostol and cranial anomalies: "Popular Abortifacient Deforms Fetuses."[10] Earlier, in November 1988, a physician explained in another major Brazilian newspaper, *Jornal do Brasil*, that an incomplete abortion with a newly developed "abortive pill," would induce severe fetal anomalies: "If we agree to the distribution of these pills in Brazil, surely we will have a generation of monsters."[11] The 1991 claim that misoprostol induced severe anomalies of the cranium was not confirmed by other studies.[12] Nevertheless, the double question of the efficiency and teratogenicity of misoprostol thereafter dominated all the debates among Brazilian doctors about the use of this drug to induce abortions.

THE BRAZILIAN EXPERIENCE

In July 1991, the Brazilian ministry of health decreed that misoprostol could be sold only by prescription and exclusively for the treatment of gastrointestinal problems.[13] As a consequence, the diffusion of this drug moved into an illegal circuit, and its price, previously very low, rose sharply. Despite the official interdiction, women could still easily purchase misoprostol in a parallel market, and even with the increase in its price, abortion with misoprostol remained cheaper than termination of pregnancy in an illegal clinic. Women explained that they elected to use misoprostol because they hoped to end their pregnancy in a private setting and because they believed that it was safer than the invasive methods of abortion. The latter opinion was shared by professionals, who rapidly linked the use of misoprostol to an observed decrease of mortality and morbidity from illegal abortions.[14] Moreover, some women also persuaded themselves that the use of misoprostol was not a "real" abortion.

In the early 1990s, misoprostol became the most popular abortive method in Brazil.[15] Women's subjective experience of misoprostol-induced abortion was, however, frequently harsh, because they often did not know what to expect and were surprised and frightened by the violence of the drug's effects. Women who took misoprostol after the recommended limit of 10 weeks of pregnancy might have had an especially harrowing experience. A 1994 study found

that the majority of the women who terminated a pregnancy with misoprostol declared that they would not use the drug again and would not recommend it to a friend.[16] Another study, from 1993, confirmed that the majority of women evaluated their experience with misoprostol-induced abortion as very negative. Many took misoprostol at night without informing anyone and without knowing what was going to happen to their bodies. They then discovered that the drug-induced abortion was longer, more painful, and messier than they had expected; many ended by having a surgical abortion.[17] Brazilian doctors interviewed by the authors of the same study had a more positive view of misoprostol. The use of this drug, they explained, greatly reduced the frequency of abortion-related complications and allowed them to perform surgical terminations of pregnancy without being held responsible for an illegal act.[18]

A 1995 study that interviewed women from Rio de Janeiro's favelas who were hospitalized for an induced abortion confirmed that the great majority of them used misoprostol. It also revealed the persistence of negative attitudes toward abortion. Nearly all the interviewed women complained that they were treated with disrespect, and some with cruelty, by the public hospital's staff. At the same time, many among them, including some who had had several abortions, strongly criticized women who "take out their baby" (*tira a criança*). A woman's duty, they explained, is to accept her child (*tem que augentar un filho!*). Their highly ambivalent discourse reflected deeply engrained cultural beliefs that see maternity as an inescapable female fate and that stigmatize women who refuse to accept this fate.[19]

In the early 1990s, many women believed that misoprostol would enable them to quietly abort in the privacy of their home.[20] Sociological studies conducted in the 21st century indicate that, with time, numerous women learned from each other what the effects of misoprostol were, relied on informal support circuits, and counted on the help of a "friend who had aborted."[21] In consequence, the goal of many of misoprostol's users shifted from achieving a complete abortion to inducing bleeding that could be presented as a spontaneous miscarriage and would allow them to obtain a curettage.[22] Women shared information about the right ways to achieve this goal: how long to wait before going to a hospital, how to find a hospital where they would be at least minimally respected, and how to present themselves to the hospital's staff.[23] These goals resonated with the gynecologists' view that in Brazil misoprostol frequently acts as a "passport" to obtain a safe abortion in a public facility.[24]

MULTIPLE MEANINGS OF EFFICIENCY

In the early 1990s, experts explained that misoprostol alone had much lower effectiveness (50%–60%) than a sequential administration of mifepristone and misoprostol.[25] Later studies indicated, however, that misoprostol alone can be a reasonably efficient abortifacient. Experts from the nonprofit organization Gynuity Health Projects were especially interested in a study of the abortive efficiency of misoprostol alone, because in many developing and intermediary countries women have no access to mifepristone.[26] When used correctly in early pregnancy (intravaginal or sublingual application of appropriate doses), they argued, misoprostol is a "good enough" abortifacient.[27] This claim was based on results of several clinical trials, mostly conducted in countries where abortion is legal, such as Cuba, Vietnam, and China. The reported effectiveness of misoprostol was more than 90% in the Cuban trials and between 65% and 85% in other trials.[28]

A 2019 information sheet issued by the feminist organization Women on Web affirms that when used correctly abortion with misoprostol alone is effective in up to 94% of cases.[29] The Gynuity information sheet provides a more conservative estimate: up to three quarters of women who take misoprostol abort in the first 24 hours, but sometimes an abortion takes longer, and some women fail to abort with this drug.[30] The Gynuity statement is probably based on a 2019 metanalysis of clinical trials of misoprostol, which affirms that 22% of the women who used this abortifacient underwent a surgical evacuation of the uterus. This metanalysis also affirms that the majority of misoprostol users declare themselves satisfied with this method of pregnancy termination.[31]

The latter statement is, however, based on an analysis of clinical trials made in countries where abortion is legal. It is reasonable to assume that participants in these trials received accurate information about misoprostol's effects, were supported by competent and sympathetic professionals, and, if the drug failed, had access to a surgical termination of pregnancy. Brazilian women use misoprostol in a very different environment, and for many, a self-induced abortion with this

drug continues to be a difficult experience.[32] Pilot programs, such as the experimental Athenas Program introduced in 2015 by the Federal University of Bahia to improve the treatment of women undergoing an abortion, although undoubtedly important, cannot provide an efficient solution to the dilemmas of hundreds of thousands of Brazilian women who use misoprostol as an abortifacient.[33] Some of the women who attempted—and failed—to terminate their pregnancy with this drug either were too afraid to go to a hospital for a curettage or changed their mind and decided to have the child. These women may face an additional hurdle: fear that their child will be born with a severe anomaly.

MOEBIUS SYNDROME AND OTHER IMPAIRMENTS

The 1991 report that connected misoprostol with severe cranial anomalies was never confirmed.[34] However, in 1993, a group of Brazilian experts, led by the geneticist Claudette Hajaj Gonzalez, linked misoprostol with Moebius syndrome, a rare inborn neurologic condition that primarily affects the muscles that control facial expression and eye movement.[35] This study linked seven cases of neurologic anomalies (four with confirmed Moebius sequence) with using misoprostol and stated:

As far as we know Brazil is unique in a very sad fact, the use (or better, the misuse) of misoprostol, a synthetic analog of prostaglandin El, commercialized as Cytotec, by women who want to abort.[36]

The description of use of misoprostol as a "sad fact" perhaps reflected a fear that its widespread use would lead to an "epidemic" of birth defects.[37] This fear did not materialize. Brazilian women massively employ misoprostol, but Moebius syndrome and related anomalies continue to be very rare.[38] They were also more solidly associated with misoprostol.

One of the most complex questions in epidemiology, the establishment of firm causal links, may be especially difficult when dealing with a potential teratogen.[39] In 1994 a US pediatrician, Thomas Shepard, established a list of seven criteria that may define a substance as a teratogen. The first four, Shepard proposed, were essential: (1) proven exposure to the agent at one or more critical times during prenatal development, demonstrated, for example, by physicians' prescriptions; (2) consistent findings by two or more high-quality epidemiological studies; (3) careful delineation of clinical cases (i.e., the description of a specific defect or defects); and (4) rare environmental exposure that is associated with a rare defect. An additional three criteria were helpful, but not indispensable: (5) teratogenicity in experimental animals; (6) an association teratogen malformation that makes clinical sense; and (7) for chemical compounds, proof that the agent acts in the body in an unaltered state.[40] When, a year later, Shepard discussed a possible association between misoprostol and Moebius syndrome, he did not apply his own criteria to the case, probably because, dealing with an illegal substance, it was difficult to ascertain what the level of exposure was.[41]

In the late 1990s and early 2000s, several studies consolidated the hypothesis that exposure to misoprostol early in pregnancy increases the probability of Moebius syndrome.[42] These studies indicated that misoprostol was associated with a significant but small (2%–3%) increase in this and similar syndromes. Two systematic reviews of the medical literature confirmed this conclusion.[43] The difficulty of assessing the risk of exposure to misoprostol when the drug is diffused through illegal circuits was partly overturned by two French studies that employed data from national toxicology and teratogenicity registries. Because physicians prescribed misoprostol to the women included in these studies, these studies fulfilled Shepard's first criterion: positive proof of exposure in a known sample of exposed individuals.

One study lumped together women exposed to misoprostol early in pregnancy because they were treated for gastrointestinal disorders and women who decided to continue the pregnancy after a failed attempt at abortion with mifepristone and misoprostol. The second study compared the effects of misoprostol on women who received the drug to end a pregnancy, with its effect on women treated with misoprostol for a different reason. Both studies confirmed the existence of a link between exposure to misoprostol and birth defects. The first study estimated such a risk at 2.2%, and the second at 3.5%.[44]

The French studies also pointed to a seldom discussed issue: women's ambivalence about their reproductive choices. Debates on ethical aspects of abortion often assume that every pregnant woman is either 100% sure that she wants to have a child or 100% sure that she rejects the pregnancy. Yet in real life women may have contradictory feelings about their pregnancy and oscillate between acceptance and

rejection. Even in France, where abortion is legal and the majority of citizens view it as a woman's right, a small number of women who failed to abort with drugs changed their mind later. It is reasonable to assume that, because Brazil combines a strong moral condemnation of abortion with lower efficacy of drug-induced abortions, more Brazilian women continue their pregnancy after failure of an attempt to end it with misoprostol. French women who decided to continue their pregnancy after a failed attempt at a medical abortion are supported by health professionals trained to respect their reproductive decisions.[45] Few Brazilian women exposed to misoprostol early in pregnancy receive such support.

MISOPROSTOL AS A COLLECTIVE SOCIAL SPECTACLE

In 2001, the journal *Canadian Family Physician* published a letter from a general practitioner who had learned that one of his patients had been treated with misoprostol without knowing that she was pregnant and asked what the risk for her future child was. The consulted experts, the Canadian Gideon Koren and the Brazilian Lavinia Schüler (coauthors of studies of links between misoprostol and inborn anomalies), answered that risk was low. Children born to women exposed to misoprostol have a 30-fold increased risk of Moebius syndrome, but because this malformation is extremely rare, the absolute risk of giving birth to a child with this syndrome is still very small. Because of the thalidomide disaster, many women believed that after exposure to a teratogenic drug they had a 25% or greater chance of giving birth to an impaired child. It was important to explain to them that the risk of exposure to misoprostol is incomparably smaller.[46]

Koren and Schüler wrote for physicians in a country where abortion is legal. The Brazilian debate on putative links between misoprostol and birth defects was conducted in a very different political and sociocultural context. Scholars that supported the legalization of abortion in Brazil argued that the debate on the teratogenic risks of misoprostol was pointless. When a woman takes this drug to terminate a pregnancy, the pertinent question is not whether the misoprostol is dangerous to the fetus but how to ascertain that when this drug fails she can end the pregnancy by a different method. The real problem is not misoprostol but the criminalization of abortion.[47] This is an important point. We focus here, however, on a somewhat different question: the transformation of the Brazilian debate on the teratogenicity of misoprostol from a topic debated only by experts as a "social problem."[48]

Once a given biomedical issue becomes a "collective social spectacle," the US sociologist Charles Bosk has argued, the complexities, nuances, and subtleties that are embodied in specific clinical situations are erased through public exposure in the media.[49] Brazilian newspapers and television networks have widely published stories about misoprostol-induced birth defects. Some stories point to the existence of a risk without indicating its magnitude.[50] Others dramatize this risk. An *O Globo* article from February 1995 that discussed a BBC program on the extensive use of misoprostol as an abortifacient in Latin America quoted a fetal medicine expert, Antonio Moron, who affirmed that misoprostol is more dangerous than thalidomide.[51]

A 2013 short film produced by the Brazilian television network R7 opens with the dramatic statement that when a woman who takes misoprostol fails to abort, there is a "big chance" that she will give birth to a child with Moebius syndrome. Next, an anonymous woman explains that she tried to terminate a pregnancy with misoprostol and that now her child has a distorted face, and a pediatric neurologist, Maria Joaquina Marques-Dias, explains that the majority of Brazilian children with Moebius syndrome are born to women exposed to misoprostol. The film then shows Mafiosi-looking men selling misoprostol. It ends with a question: Why can this illegal and dangerous drug be so easily purchased in Brazil?[52]

Brazilian media rarely provide data on the absolute risk of neurologic anomalies linked with exposure to misoprostol. Moreover, as the 1988 newspaper article on the danger of an "abortive pill" and the 1991 article on fetuses deformed by a "popular abortive drug" attest, the claim that abortifacients produce monsters preceded the display of links between misoprostol and Moebius syndrome. The pioneer of sociology of scientific knowledge, Ludwik Fleck, argued that the strong belief that syphilis equals "bad blood" stimulated a tenacious quest for a serological test for this disease.[53] The belief that an "abortive pill" will induce birth defects favored a search for the teratogenic effects of misoprostol and then the transformation of a suspected link between this drug and visible inborn anomalies into a popular belief. Mothers of microcephalic babies

accused of giving birth to "abortion children" illustrate the fate of a complex medical question that, to follow Charles Bosk, was "washed out by the klieg lights and culturally resonant dramatic framings that mark the discussion of private troubles as public issues receiving media attention."[54]

In Brazil, the publicity given to the teratogenicity of misoprostol unfolded in the context of strong condemnation of women who elect to terminate a pregnancy, especially of those who belong to lower socioeconomic strata.[55] Pharmaceutical action, the anthropologists Anita Hardon and Emilia Sanabria have explained, is not reducible to the intrinsic properties of a given molecule but is articulated, elicited, and informed within a "meshwork" of experimental, regulatory, and care settings.[56] The Brazilian "misoprostol meshwork" includes intersections of medicine, religion, and law but also social precariousness, injustice, and daily aggressions, particularly where women's bodies are concerned. It was also strongly linked with disparaging attitudes toward the sexuality of poor, non-White women.[57]

MEDICAL ABORTION IN CONTEXT

In a country characterized by dramatic inequalities and a high level of gender violence, women's ability to decide whether and when they will be mothers is but one of many changes needed to promote true gender equality in Brazil. It is, nevertheless, an important element of the struggle for this equality. Ideally, all women should have not only access to legal and safe abortions but also the choice of the method by which they wish to terminate an unwanted pregnancy.[58] When abortion is legal and accessible, it is also not unreasonable to discuss the benefits and risks of making misoprostol available as a "prophylactic drug," a step that will allow some women to "privatize" an early termination of pregnancy. The situation in Latin America, and increasingly in some US states, is, however, very different.

The availability of misoprostol in Latin America has dramatically reduced mortality and morbidity linked with illegal abortions. It has also lessened abortion-related stress, especially for women who have access to efficient support networks and can escape hostility and fear mongering. Misoprostol can thus be described as an important damage-reducing device. Alas, terminating a pregnancy with misoprostol continues to be a distressing event for many Brazilian women, especially vulnerable ones: those who are young, non-White, less educated, isolated. Abortion can be traumatic for vulnerable women everywhere, but in Brazil using misoprostol in a context of criminalization of abortion, strong social disproval, ignorance, solitude, and fear of giving birth to an impaired child may produce a uniquely distressing configuration for very large numbers of women. Such a configuration is very different from the positive image of self-induced abortion as an empowering event. Damage reduction is an important public health goal, but when the damage is rooted in an unjust law, an important concern should be to change that law. AJPH

ABOUT THE AUTHORS

Ilana Löwy is with the Centre de Recherche Médicine, Science, Santé et Societé- CERMES 3 (Institut national de la santé et de la recherche médicale, Centre national de la recherche scientifique, École des hautes études en sciences sociales, Paris V), Paris, France. Marilena Cordeiro Dias Villela Corrêa is with the Instituto de Medicina Social, Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil.

Correspondence should be sent to Ilana Löwy, CERMES, Site CNRS, 7 Rue Guy Moquet, 94801 Villejuif, France (e-mail: ilana.lowy@cnrs.fr). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

This article was accepted December 30, 2019.

doi: 10.2105/AJPH.2019.305562

CONTRIBUTORS

The authors contributed equally to the research and the writing of this article.

ACKNOWLEDGMENTS

I. Löwy is grateful for her Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro fellowship, which makes possible her stay as a visiting scholar at Insituto de Medecina Social of State University of Rio de Janeiro and her collaboration with M. Corrêa.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

ENDNOTES

1. Cari Sietstra, "Georgia's Terrible Law Doesn't Have to Be the Future of Abortion. A Self-Induced Abortion With Misoprostol Can Be a Safe, Reliable Way to End an Unwanted Pregnancy," *New York Times*, May 11, 2019, https://www.nytimes.com/2019/05/11/opinion/abortion-pregnancy-misoprostol.html (accessed February 9, 2020). In November 2019, seven of the Democratic Party presidential candidates declared that they support the over-the-counter sale of abortion-inducing drugs. As far as we know, they did not discuss the importance of providing, at the same time, reliable information and quality support to women who wish to terminate a pregnancy with these drugs. Maggie Astor, "On Abortion Rights, 2020 Democrats Move Past 'Safe, Legal and Rare,'" *New York Times*, November 25, 2019.

2. Lucila Scavone, "Politicas feministas do aborto," *Estudos Feministas*, *Florianópolis* 16, no. 2 (2008): 675–680.

3. Debora Diniz and Marcelo Medeiros, "Aborto no Brasil: uma pesquisa domiciliar com técnica de urna," *Ciência e saúde coletiva* 15, suppl. 1 (2010): 959–966; Debora Diniz, Marcelo Medeiros, and Alberto Madeiro, "Pesquisa nacional de aborto, 2016," *Ciência e saúde coletiva* 22, no. 2 (2017): 653–660. These surveys positively correlate frequency of abortion with education level; they do not include data on race.

4. Rosamaria Carneiro and Soraya Resende Fleischer, "'I Never Expected This, It Was a Big Shock': Conception, Pregnancy and Birth in Times of Zika

Through the Eyes of Women in Recife, PE, Brazil," *Interface, comunicacao, saude é educaçao* 22, no. 66 (2018): 709–719, quotation p. 717.

5. Affluent Brazilian women can safely terminate an unwanted pregnancy. Ricardo Senra, "Aborto já é livre no Brasil. Proibir é punir quem não tem dinheiro," interview with Drauzio Varella, *BBC Brasil*, February 2, 2016.

6. Debora Diniz and Marilena Correa, *Aborto e saude publica. 20 anos de pesquisa no Brasil* (Rio de Janeiro, Brazil: UERJ, 2008).

7. Helena Coelho, Chizuri Misago, Walter Da Fonseca, Domingos Sousa, and Julio De Araujo, "Selling Abortifacients Over the Counter in Pharmacies in Fortaleza, Brazil," *Lancet* 338, no. 8761 (1991): 247. The research was conducted by the Grupo de Prevenção ao Uso Indevido de Medicamentos. Coelho and her colleagues added that knowledge about misoprostol's capacity to induce abortions had spread rapidly in the late 1980s. Its source is unknown. They do not comment on pharmacists' readiness to sell drugs to induce illegal abortion, perhaps because many Brazilian pharmacists operate in a gray zone between legitimate, borderline, and illegitimate use of pharmaceuticals.

8. Peter Schönhöfar, "Misuse of Misoprostol as Abortifacient May Induce Malformations," *Lancet* 337, no. 8756 (1991): 1534–1535, quotation p. 1535.

9. Walter Fonseca, Ana Julia Cauto Alencar, Francisco Sullivan Bastos Mota, and Helena Lutescia Luna Coelho, "Misoprostol and Congenital Malformations," *Lancet* 338, no. 8758 (1991): 56. The spokesperson of Searle reacted to Schönhöfar's text with an affirmation that (1) the use of misoprostol as an abortifacient is a clear case of misuse of a drug developed for a very different purpose, and (2) misoprostol does not induce fetal anomalies in experimental animals. Wilson W. Downie, "Misuse of Misoprostol," *Lancet* 338, no. 8761 (1991): 247. Fonseca and his colleagues, unlike Schönhöfar, explicitly linked the dangers of the use of misoprostol as an abortifacient to the criminalization of abortion.

10. "Abortivo commun no Brasil deforma fetos" [Popular Abortifacient in Brazil Deforms Fetuses], *O Globo*, April 10, 1991. The *Globo* article, printed before the publication of the text of Fonseca et al. in the *Lancet*, relied on a preliminary report made by the Ceara group in a seminar held on April 9, 1991, at the National Institute for Quality Control in Drugs, Fiocruz, Rio de Janeiro. Schönhöfar's article mentioned the same report.

11. Gerson Rodrigues do Lago, "Pílula abortiva," *Jornal do Brasil*, November 8, 1988, 7. Lago's article was a comment on a talk by the French endocrinologist Emile Baulieu during an international congress on endocrinology in Rio de Janeiro. Baulieu headed the team that developed mifepristone, but in his article, Lago explained that the "abortive pill" is a prostaglandin called "misoprostol," perhaps confusing the two molecules.

12. The geneticist Lavinia Schüler and her colleagues from the Brazilian teratogenic information system at the Hospital des Clinicas, Porto Allegre, failed to uncover links between misoprostol and birth defects. Lavinia Schüler, Patricia W. Ashton, and Maria Teresa Sanseverino, "Teratogenicity of Misoprostol," *Lancet* 339, no. 8790 (1992): 437.

13. In 1998, misoprostol was included in the list of drugs subject to special control, and from 2000 on its use was regulated by the newly created National Agency of Sanitary Vigilance (Agencia Nacional de Vigilancia Sanitaria). For a detailed study of Brazilian regulation of misoprostol, see Marilena Corrêa and Miryam Mastrella, "Aborto e misoprostol: usos médicos, práticas de saúde controvérsia científica," *Ciência e Saúde Coletiva* 17, no. 7 (2012): 1777–1784, esp., pp. 1779–1781.

14. Sarah Costa and Martin Vessey, "Misoprostol and Illegal Abortion in Rio de Janeiro, Brazil," *Lancet* 341, no. 8855 (1993): 1258–2261.

15. Regina Maria Barbosa and Margareth Arilha, "The Brazilian Experience With Cytotec," *Studies in Family Planning* 24, no. 4 (1993): 236–240, quotation p. 237. Mifepristone was not available in Brazil, legally or illegally.

16. Helena Lutéscia Coelho, Ana Claudia Teixeira, Maria de Fatima Cruz, et al., "Misoprostol: The Experience of Women in Fortaleza, Brazil," *Contraception* 49, no. 2 (1994): 101–110.

17. Margareth Arilha and Regina Maria Barbosa, "Cytotec in Brazil: At Least It Does Not Kill," *Reproductive Health Matters* 2 (1993): 41–52.

18. Barbosa and Arilha, "Brazilian Experience With Cytotec," 239. Women who reported a more positive experience with misoprostol aborted very early in their pregnancy, were accompanied by another person during the process, and did not need a curettage.

19. Clarice Novaes de Mota, *A practica do aborto provocado no Rio de Janeiro: A perspectiva da clientes e professionais de saude. Relatorio final da pesquisa*, UFRJ 1995. Unpublished reneotyped document. File SH-19, fond Sara Hawker, Archives, Casa Oswaldo Cruz, Fiocruz. This study was funded by a US nongovernmental organization, the International Project Assistance Service, based in North Carolina. De Mota has noted that the interviewed women practically never mentioned the men who made them pregnant.

20. Sarah Costa, "Commercial Availability of Misoprostol and Induced Abortion in Brazil," *International Journal of Gynecology & Obstetrics* 63, suppl. 1 (1998): S131–S139.

21. Wendell Ferrari, "'Foi a melhor coisa que eu fiz.' Aborto induizido entre adolescentes de la Zona Sul do Rio de Janeiro" [unpublished master's thesis], Instituto de Psicologia, Universidade Federal de Rio de Janeiro, 2017; Nanda Isele Gallas Duarte, "O dispositive da maternidade em tensao. A polifonia das narratives sobre aborto provocado em uma comunidade online" [unpublished master's thesis], Instituto Fernandez Figueria, Fiocruz, Rio de Janeiro, 2018. In surveys coordinated by Debora Diniz, 45% of the women who employed nonspecified "drugs" to terminate a pregnancy in 2010 and 52% of those who employed such drugs in 2016 aborted without a curettage in a hospital. Diniz and Medeiros, "Aborto no Brasil"; Diniz et al., "Pesquisa nacional de aborto."

22. Diniz and Medeiros, "Aborto no Brasil"; Diniz et al., "Pesquisa nacional de aborto"; Debora Diniz and Marcelo Medeiros, "Itinerários e métodos do aborto ilegal em cinco capitais brasileiras," *Ciencia e Saude Collectiva* 17, no. 7 (2012): 1671–1681; Duarte, "O dispositive da maternidade em tensao," 67–69.

23. Diniz and Medeiros, "Itinerários e métodos"; Debora Diniz and Alberto Madeiro, "Cytotec e aborto: a polícia, os vendedores e as mulheres," *Ciencia e Saude Collectiva* 17, no. 7 (2012): 1795–1804. Misoprostol, Diniz and Madeiro explain, was often purchased from vendors at the community (favelas) drug stores; such vendors are "local agents" for the sale of this drug.

24. Barbosa and Arilha, "Brazilian Experience With Cytotec," 239.

25. Editorial, "Misoprostol and Legal Medical Abortion," *Lancet* 338, no. 8777 (1991): 1241–1242.

26. Gynuity Health Projects, founded in 2003 by Beverly Winikoff, a previous program director for the Reproductive Health and Population Council, is dedicated to the promotion of reproductive and maternal health worldwide. Gynuity Health Projects, "Vision and Mission," https://gynuity.org/vision-mission (accessed February 4, 2020).

27. In countries where abortion is illegal, some women can still access a combination of mifepristone–misoprostol distributed through the mail by organizations such as Women on Web. However, only a small fraction of Brazilian women employed their services or used the information they provide. Moreover, in December 2019, the two main providers of Internet connections in Brazil blocked access to the Women on Web site on their networks. Nathalia Brage, "Claro e vivo bloquieam acesso a site com inforrmacao sobre aborto seguro. Intercept," 2019, https://theintercept.com/2019/12/12/net-claro-e-vivo-bloqueiam-site-aborto-seguro (accessed December 22, 2019).

28. Kelly Blanchard, Tara Shochet, Kurus Coyaji, Nguyen Thi Nhu Ngoc, and Beverly Winikoff, "Misoprostol Alone for Early Abortion: An Evaluation of Seven Potential Regimens," *Contraception* 72, no. 2 (2005): 91– 97.

29. Women on Waves, "How to Do an Abortion With Pills," https://www.womenonwaves.org/en/page/6104/how-to-do-an-abortion-with-pills (accessed December 22, 2019). This estimate is based on data from the World Health Organization, *Safe Abortion. Technical and Policy Guidance for Health Systems*, 2nd ed. (Geneva, Switzerland: 2012), 115.

30. International Women's Health Coalition; Gynuity Health Projects, "Abortion With Self-Administered Misoprostol: A Guide for Women," https://gynuity.org/assets/resources/polbrf_misoprostol_self-guide_en.pdf. (accessed December 22, 2019).

31. Elizabeth G. Raymond, Margo S. Harrison, and Mark A. Weaver, "Efficacy of Misoprostol Alone for First-Trimester Medical Abortion: A Systematic Review," *Obstetrics and Gynecology* 133, no. 1 (2019): 137–147. This metanalysis was made by Genuity experts; the majority of the analyzed data come from Cuban clinical trials.

32. Maria das Dores Nunes, Alberto Madeiro, and Debora Diniz, "Historias de aborto provocado em Teresina Piaui, Brasil," *Ciencia e Saude Coletiva* 18, no. 8 (2013): 2311–2318; Silvia de Zordo, "The Biomedicalization of Illegal Abortion: The Double Life of Misoprostol in Brazil," *Histoira, Ciencias, Saude-Manguinhos* 23, no. 1 (2016): 19–35; Maria Luiza Heilborn, Cristiane da Silva Cabral, Elaine Reis Brandão Livi Faro, Fabíola Cordeiro, and Rogério Lopes Azize, "Itinerários abortivos em contextos de clandestinidade na cidade do Rio de Janeiro—Brasil," *Ciência & Saúde Coletiva* 17, no. 7 (2012): 1699–1708; Cecilia McCallum, Greice Menzes, and Ana Paula Reis, "The Dilemma of a Practice: Experiences of Abortion in a Public Maternity Hospital in the City of Salvador, Bahia," *Histoira, Ciencias, Saude- Manguinhos* 23, no. 1 (2016): 36–52.

33. Adriana Monteiro dos Santos Lopes, "Programa de atençao extra hospitalar as pacientes em situaçao de abortamento," 2015, https://www.passeidireto.com/arquivo/53418746/protocolo-manual-prog-atenas-1-revisao-14122015 (accessed February 9, 2020).

34. Fonseca et al., "Misoprostol and Congenital Malformations."

35. Claudette Hajaj Gonzalez, Fernando R. Vargas, Ana Beatriz Alvarez Perez, et al., "Limb Deficiency With or Without Moebius Sequence in Seven Brazilian Children Associated With Misoprostol

Use in the First Trimester of Pregnancy," *American Journal of Medical Genetics* 47 (1993): 59–64. Misoprostol, experts proposed, induces uterine contractions, which may temporarily disrupt blood flow to the fetal brain. Such a disruption may induce a faulty development of the 6th and 7th cranial nerves and lead to the development of Moebius syndrome.

36. Hajaj Gonzalez et al., "Limb Deficiency," 59.

37. Barbosa and Arilha, "Brazilian Experience With Cytotec," 239.

38. Claudette Hajaj Gonzalez, Maria Joaquina Marques-Dias, Chong Ae Kim, et al., "Congenital Abnormalities in Brazilian Children Associated With Misoprostol Misuse in First Trimester of Pregnancy," *Lancet* 351 (1998): 1624–1627.

39. The recent difficulty of firmly linking Zika virus infection during pregnancy with birth defects illustrates this point.

40. Thomas Shepard, "'Proof' of Human Teratogenicity," *Teratology* 50 (1994): 97–98.

41. Thomas H. Shepard, "Möbius Syndrome After Misoprostol: A Possible Teratogenic Mechanism," *Lancet* 346, no. 8977 (1995): 780. In controlled clinical trials of misoprostol-induced abortion, the level of exposure was known, but it is reasonable to assume that women who participated in these trials did not give birth to live children.

42. E.g., Anne L. Pastuszak, Lavinia Schüler, Carlos E. Speck-Martins, et al., "Use of Misoprostol During Pregnancy and Möbius' Syndrome in Infants," *New England Journal of Medicine* 338, no. 26 (1998): 1881–1885; Ieda Orioli and Eduardo E. Castilla, "Epidemiological Assessment of Misoprostol Teratogenicity," *British Journal of Obstetrics and Gynaecology* 107, no. 4 (2000): 519–523. Only one study did not find a significant increase in teratogenicity following misoprostol use. Lavinia Schüler, Anne Pastuszak, Maria Theresa Sanseverino, et al., "Pregnancy Outcome After Exposure to Misoprostol in Brazil: A Prospective, Controlled Study," *Reproductive Teratology* 13, no. 2 (1999): 147–151.

43. Tatiane da Silva Dal Pizzol, Flavia Pozzobon Knop, and Sotero Serrate Mengue, "Prenatal Exposure to Misoprostol and Congenital Anomalies: Systematic Review and Meta-Analysis," *Reproductive Toxicology* 22, no. 4 (2006): 666–671.

44. Catherine Vauzelle, Delphine Beghin, Marie-Pierre Cournot, and Elisabeth Elefant, "Birth Defects After Exposure to Misoprostol in the First Trimester of Pregnancy: Prospective Follow-Up Study," *Reproductive Toxicology* 36 (2013): 98–103; Marine Auffret, Nathalie Bernard-Phalippon, Joelle Dekemp, et al., "Misoprostol Exposure During the First Trimester of Pregnancy: Is the Malformation Risk Varying Depending on the Indication?" *European Journal of Obstetrics, Gynecology and Reproductive Biology* 207 (2016): 168–192. These studies followed, respectively, 235 and 265 exposed women. An earlier French study indicated that mifepristone alone does not induce birth defects.

45. Approximately half of the French women exposed to misoprostol early in pregnancy who learned that the fetus had structural anomalies decided to continue the pregnancy; the other half elected a termination. Vauzelle et al., "Birth Defects After Exposure to Misoprostol"; Auffret et al., "Misoprostol Exposure During the First Trimester."

46. Gideon Koren and Lavinia Schüler, "Taking Drugs During Pregnancy: How Safe Are the Unsafe?" *Canadian Family Physician* 47, no. 5 (2001): 951–953.

47. Kelly Blanchard, Beverly Winikoff, and Charlotte Ellertson, "Use of Misoprostol During Pregnancy and Möbius' Syndrome in Infants," *N Engl J Med* 339, no. 21 (1998): 1553–1554; Helena Lutéscia Coelho, "Misoprostol: a solução não é tão simples," *Revista de Saúde Pública* 32, no. 4 (1998): 394–395; Corrêa and Mastrella, "Aborto e misoprosto."

48. Stephen Hilgartner and Charles L. Bosk, "The Rise and Fall of Social Problems: A Public Arenas Model," *American Journal of Sociology* 94, no. 1 (1988): 53–78.

49. Charles L. Bosk, "Bioethics, Raw and Cooked: Extraordinary Conflict and Everyday Practice," *Journal of Health and Social Behavior* 51, suppl (2010): S133–S146.

50. E.g., Jairo Bouer, "Pílula para aborto causa lesões em feto quando falha," *Folha de Sao Paolo,* July 11, 1994; Paulo Cesar Nascimento, "Vendido ilegalmente, medicamento causa malformações congênitas," *Journal de Unicamp*, August 17, 2003.

51. "Remedio contre ulcera deforma fetos," *O Globo*, February 4, 1995.

52. R7; Fala Brasil, "Causa de paralisia facial em crianças, Cytotec é vendido livremente no Brasil," 2013, http://recordtv.r7.com/fala-brasil/videos/causa-de-paralisia-facial-em-criancas-cytotec-e-vendido-livremente-no-brasil-06102018 (accessed December 22, 2019). The film creates confusion between the (probably accurate) statement that the majority of Brazilian children with Moebius syndrome are born to mothers who have attempted to terminate the pregnancy with misoprostol and the (grossly misleading) statement that women who continue the pregnancy after taking the drug have a "big chance" of giving birth to an impaired child.

53. Ludwik Fleck, *Genesis and Development of a Scientific Fact*. Chicago, IL: Chicago University Press, 1979 (1935).

54. Bosk, "Bioethics, Raw and Cooked," 136.

55. On disparaging attitudes toward lower class women's sexuality and their sexual "irresponsibility" that leads to unwanted pregnancies, see Emilia Sanabria, "From Sub- to Super-Citizenship: Sex Hormones and the Body Politic in Brazil," *Ethnos* 75, no. 4 (2010): 377–401; de Zordo, "Biomedicalization of Illegal Abortion."

56. Anita Hardon and Emilia Sanabria, "Fluid Drugs: Revisiting the Anthropology of Pharmaceuticals," *Annual Review of Anthropology* 46 (2017): 117–132.

57. This point is developed by de Zordo, "Biomedicalization of Illegal Abortion"; Sanabria, "From Sub- to Super-Citizenship"; and Heilborn et al., "Itinerários abortivos."

58. Drug-induced abortion, which is, e.g., strongly recommended by the British Pregnancy Advisory Service for all abortions up to 10 weeks, is a very good choice for some, but not all, women because individual reactions to abortive drugs are variable and cannot be fully predicted. See testimonies on the Web site Women on Web (mostly of women who terminated a pregnancy in countries where abortion is illegal), https://www.womenonweb.org/en/page/488/i-had-an-abortion (accessed December 22, 2019) and the Web site of the Pregnancy Choices Directory (mostly of women from the United Kingdom, where abortion is legal). "Abortion Stories," https://www.pregnancychoicesdirectory.com/peoplesstories/abortion (accessed December 22, 2019).