

# Abortion in Cases of Zika Virus Congenital Infection

## *Aborto nos casos de infecção congênita pelo vírus Zika*

Vivian Maria Ribeiro Mota<sup>1</sup> Luciano Pamplona de Góes Cavalcanti<sup>2</sup> Alanna dos Santos Delfino<sup>3</sup>  
Thayse Elaine Costa Figueiredo Lopes<sup>4</sup> André Luiz Santos Pessoa<sup>5</sup> Erlane Marques Ribeiro<sup>4</sup>

<sup>1</sup> Medical School, Universidade de Fortaleza, Fortaleza, Ceará, Brazil

<sup>2</sup> Communitary health Department, Universidade Federal do Ceará, Fortaleza, Ceará, Brazil

<sup>3</sup> Medical School, Universidade Estadual do Ceará, Fortaleza, Ceará, Brazil

<sup>4</sup> Faculdade de Medicina, Centro Universitário Christus (Unichristus), Fortaleza, Ceará, Brazil

<sup>5</sup> Hospital Infantil Albert Sabin, Fortaleza, Ceará, Brazil

Address for correspondence Vivian Maria Ribeiro Mota, Medical Student, Universidade de Fortaleza, Rua Vasco de Ataíde 895, Fortaleza, CE, 60841-395, Brazil (e-mail: vivianmariaribeirimota@gmail.com).

Rev Bras Ginecol Obstet 2018;40:417–424.

### Abstract

The emergency in international public health caused by the Zika virus gave rise to the discussion about abortion in cases of congenital Zika virus syndrome (CZS). Therefore, we propose to carry out a bibliographic review on abortion in these cases. Five databases were searched using the following terms: *abortion*, *miscarriage*, and *zika*, with the interposition of the Boolean operator “AND.” In the selected literature, we found references to the lack of information concerning the risks and severity of CZS, to the great psychological distress suffered by pregnant women, and to the risk of unsafe abortions as a justification for abortion in cases of CZS. However, it is necessary to have available tests that could diagnose, in the first trimester of pregnancy, that the fetus has been affected by the virus, and that it may have important limitations, in order to subsidize the qualified discussion about abortion in these cases.

### Keywords

- ▶ zika virus infection
- ▶ abortion
- ▶ bioethics

### Resumo

A emergência provocada na saúde pública internacional por causa do vírus Zika trouxe à tona a discussão do aborto em casos de síndrome congênita de Zika. Portanto, propomos a realização de uma revisão bibliográfica sobre o aborto nesses casos. Foram pesquisados cinco bancos de dados utilizando os seguintes termos: *aborto*, *aborto espontâneo*, e *zika*, com interposição do operador booleano “E”. Na literatura selecionada, encontramos referências à falta de informações sobre os riscos e a gravidade da síndrome congênita de Zika, bem como ao grande sofrimento psicológico de mulheres grávidas e ao risco de aborto inseguro como justificativa para o aborto em casos de síndrome congênita de Zika. No entanto, é necessário ter testes disponíveis que possam diagnosticar, no primeiro trimestre da gravidez, que o feto foi afetada pelo vírus, e que ele pode ter limitações importantes, para subsidiar a discussão qualificada sobre o aborto nesses casos.

### Palavras-chave

- ▶ infecção pelo zika vírus
- ▶ aborto
- ▶ bioética

received  
November 7, 2017  
accepted  
March 6, 2018  
published online  
June 29, 2018

DOI <https://doi.org/10.1055/s-0038-1648219>.  
ISSN 0100-7203.

Copyright © 2018 by Thieme Revinter Publicações Ltda, Rio de Janeiro, Brazil

License terms



## Introduction

The World Health Organization (WHO) specifies abortion as the product of pregnancy weighing  $\sim 1.1$  that is removed or eliminated from the body of the mother at less than 22 weeks.<sup>1</sup> Therefore, any fetus that dies after this period and/or weighs less than 1.1 pounds is considered as a stillbirth. In the scenario of international health public emergency (IHPE) regarding the Zika virus, the discussion about the legalization of abortion in cases of congenital Zika virus syndrome (CZS) came to light.<sup>2</sup> In this way, we propose to conduct a review of the literature on abortion and its relationship with the cases of CZS in Brazil.

## Methods

We sought articles published in the Pubmed, Scielo, LILACS and Google Scholar databases from 2012 to June 2017. The electronic sources were researched in July 2017 using the advanced search in these databases and the keywords *abortion*, *miscarriage*, and *zika*, with interposition of the Boolean operator "AND." The inclusion criteria were articles available in full online, regardless of the methodological approach, published in Portuguese, English or Spanish, with abstracts indexed in the aforementioned databases. We excluded articles that did not describe cases related to abortion/Zika virus, and those that were related to miscarriages caused by Zika virus infection.

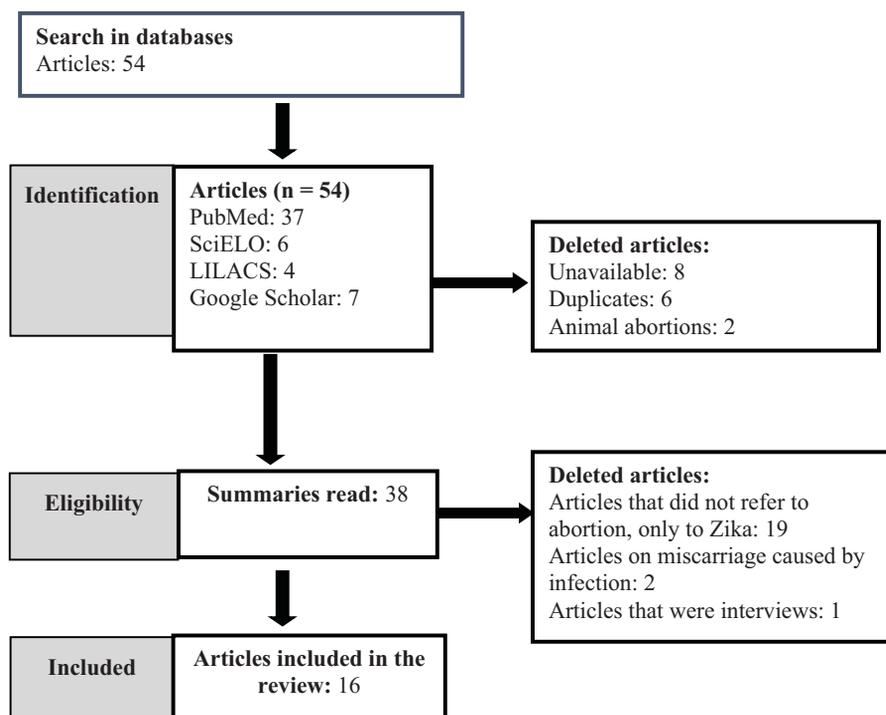
## Results

We identified 54 publications potentially eligible in accordance with the flowchart shown in ►Fig. 1. We initially

analyzed the title and abstract of the articles. After this review, and considering the exclusion criteria and duplicates, we selected 16 articles to be read in their entirety. Information pertaining to the selected articles, such as the author, year of publication, journal name, title, summary/conclusions, and whether the authors were in favor of abortion in the cases they described, is contained in ►Table 1,<sup>3-17</sup> according to the year in which the articles were published. The 16 selected articles were published in 2016 (81.3%) and 2017 (18.7%). Of these, 10 (62.5%) were published in journals that were not Brazilian. Of these journals, one was in the legal field, and the remainder was in the medical and health sciences fields. Among the authors, 15 (93.8%) were in favor of abortion for cases involving children with CZS.

## Discussion

Considering the articles, we noticed that most authors were in favor of abortion in the cases of CZS. However, one must be aware of the problems indicated by these articles. Most articles note that women do not have access to preventative methods and information. In view of this, the main point that should be addressed by the governments involved would be health education associated with the greater availability of quality contraceptive methods. On the other hand, the articles also address the issue of unsafe abortion, which often occurs in countries where abortion is prohibited, placing women's lives at great risk. Much of the literature favors legalizing abortion in cases of CZS, but it is important that advances be made in the availability of quality diagnostic methods so that miscarriages are not misleading.



**Fig. 1** Flowchart of the selection of the articles.

**Table 1** Information about the selected articles

Author	Year/month	Journal	Title	Abstract/conclusions	Abortion-friendly?
Rego and Palácios <sup>2</sup>	2016/Dec	<i>Revista Bioética</i>	Ética, saúde global e a infecção pelo vírus Zika: uma visão a partir do Brasil	The authors show that Zika virus infection occurs mainly in pregnant women of the poorest classes, causing both economic and information inequality to suddenly reach these women. The authors provide these facts to justify the legalization of abortion in countries where abortion is still a crime for women with Zika virus infection.	Yes
Roa <sup>4</sup>	2016/Feb	<i>The Lancet</i>	Zika virus outbreak: reproductive health and rights in Latin America	The author focuses on the lack of information regarding the severity of the consequences of the Zika virus infection, as well as the difficulty of access to the methods of contraception and reproductive health. The author exemplifies this fact by stating that the most disadvantaged women are likely to earn low wages. The article concludes by stating that the Zika epidemic may be an opportunity for governments to discuss safe abortion.	Yes
Camargo <sup>5</sup>	2016/May	<i>Cadernos de Saúde Pública</i>	O debate sobre aborto e Zika: lições da epidemia de Aids	The author refers to the legality of abortion, bringing up proposals similar to those of the AIDS epidemic in 1990. The author also refers to the increase in the number of evangelical congressmen who seek to increasingly restrict the right to abortion. The article concludes with the notion that pregnant women with fetuses with microcephaly are forced to carry on with the pregnancy and give birth, and are often abandoned by their husbands, being left with the burden of having to care for a disabled infant alone.	Yes
Pitanguy <sup>6</sup>	2016/May	<i>Cadernos de Saúde Pública</i>	Os direitos reprodutivos das mulheres e a epidemia do Zika vírus	The article discusses that the fear of microcephaly constitutes emotional torture for the mother, which brings up the issue of women's reproductive rights, which would require a revision in Brazilian legislation. It talks about the high rates of morbidity and mortality in unsafe abortions. It concludes by reinforcing the importance that the State provide assistance to mothers who decide to have their children with CZS, as well as assistance to the children.	Yes
Mayor <sup>7</sup>	2016/Jun	<i>British Medical Journal</i>	Abortion requests increase in Latin America after Zika warning, figures show	The author relates to the Pan American Health Organization's alert about the Zika virus and the increase in the number of abortion drug requests sent to the non-governmental organization Women on Web. The article shows that requests from Brazil have doubled. It concludes that the reproductive choice must be safe, legal and accessible.	Yes
Galli <sup>8</sup>	2016/Jun	<i>Cadernos de Saúde Pública</i>	Aonde está o direito ao aborto? Comentário sobre o documentário <i>Zika, The Film</i>	This is a commentary on the documentary addressing the restriction to the right of women to end a gestation. It concludes that there are difficulties both in relation to the prenatal	Yes

(Continued)

Table 1 (Continued)

Author	Year/month	Journal	Title	Abstract/conclusions	Abortion-friendly?
				diagnosis and the information that is passed on to mothers about the complexity of congenital Zika virus syndrome.	
Aiken et al <sup>9</sup>	2016/Jul	<i>New England Journal of Medicine</i>	Requests for abortion in Latin America related to concern about Zika virus exposure	The article refers to Women on Web, a non-governmental organization that provides abortive medicines. The authors survey the requests for these drugs, before and after the Zika infection outbreak, and compare countries that have legalized abortion and those that have not. They conclude that there was an increase in the number of requests for these drugs, mainly in Brazil, but it is not possible to ensure that this increase is related to the infection by the Zika virus.	Yes
Collucci <sup>10</sup>	2016/Aug	<i>British Medical Journal</i>	Brazilian attorneys demand abortion rights for women infected with Zika	The article discusses the passivity of women in taking control of their lives, in view of the illegality of abortion, as well as the importance of offering social and health support to mothers who wish to continue the gestation of fetuses with microcephaly. It concludes that women who contracted the Zika virus during pregnancy and are in great mental suffering, which has been diagnosed after medical and psychological evaluations, should be entitled to an abortion.	Yes
Ventura and Camargo <sup>11</sup>	2016/Aug	<i>Direito e Práxis</i>	Direito reprodutivo e aborto: as mulheres na epidemia de Zika	The authors discuss the matter from a legal perspective. They note the lack of access to public health services and methods of contraception for the poorest women. They conclude that, based on the reproductive rights and private autonomy in the reproductive and sexual scope proposed in the Brazilian Federal Constitution, abortion in these cases should be allowed.	Yes
Campos <sup>12</sup>	2016/Nov	<i>Medicine, Health Care and Philosophy</i>	Zika, public health, and the distraction of abortion	The author raises the idea that the discussion of abortion in the cases of congenital Zika syndrome can be a distraction when more important issues, such as preventative actions, are not being given due attention. In addition, the article refers to Zika as a neglected disease because it is related to poverty; thus, few resources are available to subsidize research for a treatment and for vaccines. It concludes that it is imperative that there be a discussion about prevention methods before discussing abortion.	No
Perry and Beca <sup>13</sup>	2017/Feb	<i>Revista Chilena de Obstetricia y Ginecología</i>	Virus Zika y aborto por correspondencia: una realidad cercana a Chile	The article shows various information about what is occurring in countries where abortion is restricted and Zika virus infection is spreading. Based on the facts, the authors try to expose women's risks of using clandestine abortions or non-governmental	Yes

Table 1 (Continued)

Author	Year/month	Journal	Title	Abstract/conclusions	Abortion-friendly?
				organizations such as Women on Web, which provides abortion drugs. The article attempts to show that in addition to the risk to the lives of women who undergo these procedures, they become criminals, making that not only a social problem, but also a legal problem.	
Blanchard and Starrs <sup>3</sup>	2017/Apr	<i>The Lancet</i>	Contraception, safe abortion, and the Zika response	The article shows that it is important for the government to invest in preventing unwanted pregnancies during times of congenital infection by the Zika virus. The authors state that it is necessary to raise women's awareness so that they do not have unwanted pregnancies, and for the government to offer the appropriate preventive methods so that they can choose the best method for them. In addition, the authors state that, if women wish to terminate a pregnancy, they should have this right and should be directed to do so as safely as possible.	Yes
Ali et al <sup>14</sup>	2017/Feb	<i>Reproductive Health</i>	Study protocol on establishment of sentinel sites network for contraceptive and abortion trends, needs and utilization of services in Zika virus-affected countries	The article describes the implementation of a counseling program for women who are pregnant or plan to become pregnant, and who are infected or at risk of infection by the Zika virus. The authors show the need for family planning, contraception and safe abortion. The goal of the program is to deploy a sentinel network of sites to transmit safe information to women in countries at the highest risk of congenital infection by the Zika virus, and it would be a pilot program in sex education for the future needs generated by other emerging infections.	Yes
Galli and Deslandes <sup>15</sup>	2016/Apr	<i>Cadernos de Saúde Pública</i>	Ameaças de retrocesso nas políticas de saúde sexual e reprodutiva no Brasil em tempos de epidemia de Zika	The article mentions that Brazil is one of the most restrictive countries in the world regarding abortion laws. The authors cite Brazilian laws, which, on the one hand, consider the reproductive and sexual rights of women and, on the other hand, are harsh and restrictive regarding abortion. In addition, the article associates restrictive laws with the Christian churches' influence on Brazilian laws. It ends by suggesting that health policies should be reviewed to provide abortion and safe information for pregnant women with congenital infection by the Zika virus.	Yes
Vélez and Diniz <sup>16</sup>	2016/Nov	<i>Reproductive Health Matters</i>	Inequality, Zika epidemics, and the lack of reproductive rights in Latin America	The article shows that social inequality leads to a greater number of cases of Zika in pregnant women from poor neighborhoods, which present more favorable conditions for the appearance of the mosquito that transmits the disease, such as lack of sanitation and health education. In view of this, these women suffer more with congenital	Yes

(Continued)

**Table 1** (Continued)

Author	Year/month	Journal	Title	Abstract/conclusions	Abortion-friendly?
				Zika virus syndrome because they must spend more time caring for their children, often leaving them to go to work. Thus, the authors argue that having a child with neurological diseases only increases the burden they already carry due to poverty and vulnerability.	
Burke and Moreau <sup>17</sup>	2016/Sep	<i>Seminars In Reproductive Medicine</i>	Family Planning and Zika Virus: The Power of Prevention	The article seeks to show that family planning programs can be a powerful tool to reduce the impact of congenital Zika virus syndrome, especially in Latin American countries. The authors focus on restrictive abortion laws in some Latin American countries, which are among the main foci of Zika virus infection, and show an increase in the number of abortion drug requests in those countries. Thus, the authors argue that, in addition to prevention and planning, there must be safe abortion facilities for cases of congenital Zika virus syndrome.	Yes

Much of the selected literature refers to the lack of information about the risks and severity of CZS. In fact, there is a need to discuss various points of view, and, from there, allow women access to safe and legal abortion. An abortion provided in Brazil can be considered unsafe because of the ignorance of the professionals<sup>18</sup> and the fact that abortion is a crime according to Brazilian law, and it is among the main causes of maternal mortality in the country. Therefore, it is considered a public health problem, indicating that we must consider its dimension.<sup>19,20</sup> In addition, the discussion should be a way to educate, from personal impressions, life experiences, beliefs and cultures of the people involved, regardless of the socio-economic level, to the technical knowledge of the related professionals in the context. In Brazil, induced abortion is related to unfavorable socioeconomic conditions.<sup>21,22</sup> From the bilateral elucidation of the suggestion of abortion, as well as its risks and indications, patients may be able to make an informed decision.<sup>23</sup>

The topic of abortion involves several areas, including the legal, economic, social and psychological fields. Moreover, the impact on women's life, health and autonomy is perceptible, and it is still possible to perceive the difference in these variables in countries where the procedure is legal. In Asia and in countries such as the United States, where abortion is permitted, access to the procedure is not widespread because of a lack of sufficient federal resources and difficulty in the access to health services.<sup>24</sup> In addition, the political influence of the Christian churches on the laws criminalizing abortion is still very strong, especially in Latin American countries.<sup>25</sup>

In Brazil, the first Criminal Code of the Empire, from 1830, criminalized the act of abortion and, in 1890, the Penal Code also criminalized self-induced abortion. The constitutional amendment 2848/1940 made abortion legal in situations of

risk to the life of the pregnant woman and of rape.<sup>26</sup> Only in 2012 a new amendment was approved, which allowed abortion also in cases of unequivocal diagnosis of anencephaly.<sup>27</sup> However, unsafe abortion in Brazil has a strong association with high rates of maternal mortality.<sup>28</sup>

In Brazil, there is evidence that the access to safe abortion methods by women with lower purchasing power is different from the access of women with more financial resources. However, this situation may not change with the legalization of abortion, which occurred in the United States and Asia.<sup>25</sup> This situation happens mainly because many women wait too long for specialized consultations, and there is a lack of hospital beds and of access to complementary tests to diagnose genetic diseases during prenatal care. In addition, considering that in Brazil abortion does not constitute an obstetric emergency, these pregnant women may again be queued for an elective procedure with a great risk that when their turn arrives, their babies have already been born.

There is no prerogative for abortion in the cases of confirmed maternal infection by Zika virus. Until now, commercially available tests for specific laboratory diagnosis, such as the reverse transcription polymerase chain reaction (RT-PCR), detect viral particles and suggest that the mother had contact with viruses, but they do not guarantee that the fetus has been infected or that it will have microcephaly or any of the other limitations associated with CZS. Most prenatal diagnoses of microcephaly or brain injury in cases of CZS are made in the third trimester of pregnancy, when it is no longer possible to discuss abortion but of preterm or infanticide.<sup>29,30</sup>

The possibility of amniocentesis for the diagnosis of CZS has been raised. However, studies have shown that the examination should be performed only after the 15th

week, due to the risks to the fetus, which is in line with the late diagnosis of the other methods. Positivity in the fluid may suggest that the fetus is infected, that is, it does not allow diagnostic certainty. In addition, the negativity in the amniotic fluid is not completely reliable in showing that the fetus is not infected.<sup>31</sup> Therefore, amniocentesis is a procedure that poses numerous risks, and is not effective in order to make a definitive diagnosis, which is necessary for an abortion.

The legalization of abortion in the first trimester of pregnancy in cases of confirmed maternal infection by Zika virus may pave the way for potentially healthy fetuses to be aborted. Abortion in fetuses with congenital malformations of infectious cause, mainly toxoplasmosis, rubella and cytomegalovirus, has already been discussed among specialists over the years. This discussion was made possible by the development of tests, such as the RT-PCR, that can diagnose these diseases early.<sup>32</sup> However, concerning the Zika virus, we must consider that, although studies have shown that the placenta is more sensitive to Zika virus attack in the first trimester of pregnancy and does not have the immunological defenses fully constituted to block the entry of the virus, there is also scientific evidence of cases in which the pregnant woman had laboratory-confirmed infection by Zika virus, and the fetus was not affected.<sup>29,33,34</sup> Thus, abortions may be performed motivated only by the fear of having a disabled child.

Other unanswered questions arise concerning this topic, such as why the discussion of abortion in Brazil is only associated with Zika virus infection. After all, the country is affected by other genetic and congenital diseases that are incompatible with life, and that may even be diagnosed in the uterus, but pregnant women are prohibited by law to have abortions, except in cases of anencephaly.<sup>27</sup> Is the situation of the country's lack of health structure for the treatment of rare diseases or congenital malformations not the same as that of the children affected by CZS? Why do the other more common causes of disability, such as the sequelae of prematurity or neonatal hypoxia, which do not have access to early stimulation, not garner the same concern? Does those who discuss the abortion of children with CZS-associated microcephaly hear the opinion of the mothers of those affected?

Recent articles have indicated a prevalence of CZS of ~ 10% of the fetuses of women who had Zika virus infection confirmed in the laboratory during gestation, and the legalization of abortion in these cases could directly implicate the death of potentially healthy fetuses or of those without microcephaly.<sup>32</sup>

## Conclusion

We must consider that there is still great social inequality in Brazil, and if there was an effective program of mosquito prevention, in addition to access to quality contraceptive methods and access to proper sex education programs, women would be better able to understand the situation and to make more informed decisions concerning their right to have an abortion. In addition, it is necessary to develop

tests that can diagnose in the first trimester of pregnancy if the fetus was affected by the Zika virus to subsidize a qualified discussion about abortion in cases of CZS. As long as there are no earlier and more accessible forms of diagnosis of CZS, we will risk suggesting the abortion of potentially healthy fetuses or even performing infanticide rather than abortion.

## Conflicts of Interest

The authors have no conflicts of interest to disclose.

## References

- 1 Silva VLM. *Aborto: Uma Discussão Ética* [dissertation]. Caxias do Sul, Brasil: Universidade de Caxias do Sul; 2013
- 2 Rego S, Palácios M. Ética, saúde global e a infecção pelo vírus Zika: uma visão a partir do Brasil. *Rev Bioet* 2016;24:430-434. Doi: 10.1590/1983-80422016243141
- 3 Blanchard K, Starrs AM. Contraception, safe abortion, and the Zika response. *Lancet* 2017;389(10079):1603. Doi: 10.1016/S0140-6736(17)31010-3
- 4 Roa M. Zika virus outbreak: reproductive health and rights in Latin America. *Lancet* 2016;387(10021):843. Doi: 10.1016/S0140-6736(16)00331-7
- 5 Camargo TMCR. The debate on abortion and Zika: lessons from the AIDS epidemic. *Cad Saude Publica* 2016;32(05):e00071516. Doi: 10.1590/0102-311 × 00071516
- 6 Pitanguy J. Os direitos reprodutivos das mulheres e a epidemia do Zika Vírus. *Cad Saude Publica* 2016;32:e00066016. Doi: 10.1590/0102-311 × 00066016
- 7 Mayor S. Abortion requests increase in Latin America after Zika warning, figures show. *BMJ* 2016;353:i3492. Doi: 10.1136/bmj.i3492
- 8 Galli B. Aonde está o direito ao aborto? Comentário sobre o documentário Zika, The Film. *Cad Saude Publica* 2016;32:eES010616. Doi: 10.1590/0102-311xes010616
- 9 Aiken AR, Scott JG, Gomperts R, Trussell J, Worrell M, Aiken CE. Requests for abortion in Latin America related to concern about Zika virus exposure. *N Engl J Med* 2016;375(04):396-398. Doi: 10.1056/NEJMc1605389
- 10 Collucci C. Brazilian attorneys demand abortion rights for women infected with Zika. *BMJ* 2016;354:i4657. Doi: 10.1136/bmj.i4657
- 11 Ventura M, Camargo TMCR. Direito reprodutivo e aborto: as mulheres na epidemia de Zika. *Rev Direito e Práx* 2016;7:622-651
- 12 de Campos TC. Zika, public health, and the distraction of abortion. *Med Health Care Philos* 2017;20(03):443-446. Doi: 10.1007/s11019-016-9739-9
- 13 Perry CN, Beca IJB. Virus ZIKA y aborto por correspondencia, una realidad cergana a Chile. *Rev Chil Obstet Ginecol* 2017;82:89-92. Doi: 10.4067/S0717-75262017000100015
- 14 Ali M, Miller K, Folz R, Johnson BR Jr, Kiarie J. Study protocol on establishment of sentinel sites network for contraceptive and abortion trends, needs and utilization of services in Zika virus affected countries. *Reprod Health* 2017;14(01):19. Doi: 10.1186/s12978-017-0282-9
- 15 Galli B, Deslandes S. Threats of retrocession in sexual and reproductive health policies in Brazil during the Zika epidemic. *Cad Saude Publica* 2016;32(04):e00031116. Doi: 10.1590/0102-311 × 00031116
- 16 Vélez AC, Diniz SG. Inequality, Zika epidemics, and the lack of reproductive rights in Latin America. *Reprod Health Matters* 2016;24(48):57-61. Doi: 10.1016/j.rhm.2016.11.008
- 17 Burke A, Moreau C. Family planning and Zika virus: the power of prevention. *Semin Reprod Med* 2016;34(05):305-312. Doi: 10.1055/s-0036-1592068

- 18 Vieira EM. [The question of abortion in Brazil]. *Rev Bras Ginecol Obstet* 2010;32(03):103–104. Doi: 10.1590/S0100-72032010000300001
- 19 Vieira EM. [Legal abortion: knowledge of the professionals and implications of public policies]. *Rev Bras Ginecol Obstet* 2012;34(01):1–3. Doi: 10.1590/S0100-72032012000100001
- 20 Benute GRG, Nonnenmacher D, Nomura RMY, de Lucia MC, Zugaib M. [Perception influence of professionals regarding unsafe in attention to women's health]. *Rev Bras Ginecol Obstet* 2012;34(02):69–73. Doi: 10.1590/S0100-72032012000200005
- 21 Borsari CMG, Nomura RM, Benute GRG, Lucia MCS, Francisco RPV, Zugaib M. [Abortion in women living in the outskirts of São Paulo: experience and socioeconomic aspects]. *Rev Bras Ginecol Obstet* 2013;35(01):27–32. Doi: 10.1590/S0100-72032013000100006
- 22 Santos APV, Coelho EdeA, Gusmão MEN, Silva DO, Marques PF, Almeida MS. Factors Associated with Abortion in Women of Reproductive Age. *Rev Bras Ginecol Obstet* 2016;38(06):273–279. Doi: 10.1055/s-0036-1584940
- 23 Milanez N, Oliveira AE, Barroso ADV, Martinelli KG, Esposti CDD, Santos Neto ET. Gravidez indesejada e tentativa de aborto: práticas e contextos. *Sex Salud Soc (Rio J)* 2016;(22):129–146. Doi: 10.1590/1984-6487.sess.2016.22.06.a
- 24 Guttmacher Institute. *Making Abortion Services Accessible in the Wake of Legal Reforms: A Framework and Six Case Studies*. 2012. <https://www.guttmacher.org/report/making-abortion-services-accessible-wake-legal-reforms-framework-and-six-case-studies>. Accessed June, 2017
- 25 Freitas A. *Aborto: Guia para Profissionais de Comunicação*. Recife, PE: Grupo Curumim; 2011
- 26 Bitencourt CR. Aborto. In: Bitencourt CR. *Tratado de Direito Penal, 2: Parte Especial: dos Crimes Contra a Pessoa*. 16. ed. São Paulo: Saraiva; 2016:183–209
- 27 Conselho Federal de Medicina. *Resolução CFM No. 1.989/2012 (Maio 14, 2012)*. Dispõe sobre o diagnóstico de anencefalia para a antecipação terapêutica do parto e dá outras providências. [http://www.portalmédico.org.br/resolucoes/CFM/2012/1989\\_2012.pdf](http://www.portalmédico.org.br/resolucoes/CFM/2012/1989_2012.pdf). Accessed: in June 2017
- 28 Cecatti JG, Guerra GVQL, Sousa MH, Menezes GMS. [Abortion in Brazil: a demographic approach]. *Rev Bras Ginecol Obstet* 2010; 32(03):105–111. Doi: 10.1590/S0100-72032010000300002
- 29 Brasil P, Pereira JP Jr, Moreira ME, et al. Zika virus infection in pregnant women in Rio de Janeiro. *N Engl J Med* 2016;375(24):2321–2334. Doi: 10.1056/NEJMoa1602412
- 30 Petersen LR, Jamieson DJ, Powers AM, Honein MA. Zika Virus. *N Engl J Med* 2016;374(16):1552–1563. Doi: 10.1056/NEJMra1602113
- 31 Oduyebo T, Polen KD, Walke HT, et al. Update: Interim Guidance for Health Care Providers Caring for Pregnant Women with Possible Zika Virus Exposure - United States (Including U.S. Territories), July 2017. *MMWR Morb Mortal Wkly Rep* 2017;66(29):781–793. Doi: 10.15585/mmwr.mm6629e1
- 32 Gollop TR. Aborto por anomalia fetal. *Rev Bioet* 2009;2:1–6
- 33 Sheridan MA, Yunusov D, Balaraman V, et al. Vulnerability of primitive human placental trophoblast to Zika virus. *Proc Natl Acad Sci U S A* 2017;114(09):E1587–E1596. Doi: 10.1073/pnas.1616097114
- 34 Honein MA, Dawson AL, Petersen EE, et al; US Zika Pregnancy Registry Collaboration. Birth defects among fetuses and infants of US women with evidence of possible Zika virus infection during pregnancy. *JAMA* 2017;317(01):59–68. Doi: 10.1001/jama.2016.19006