Towards a new classification of contraceptive methods for a better sustainable development. A global bioethical approach

Hacia una nueva clasificación de los métodos anticonceptivos para un mejor desarrollo sostenible. Un enfoque bioético global

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Abstract

Sustainable Development Goals (SDG) 3.7 and 5.6 aim to achieve universal access to sexual and reproductive health services and rights by 2030. These services include family planning, in particular contraception. According to UN statistics, the use of modern contraceptive methods far exceeds that of traditional methods. However, this division between "modern" and "traditional" seems to have several inconsistencies. Based on a global bioethical approach, this article aims to propose a new classification of contraceptive methods. The need for

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complete and accurate information on family planning, and the involvement of both partners in contraceptive decisions, are key takeaways.

Keywords: contraception, family planning, women's health, gender equality.

Introduction

Sustainable Development Goal (SDG) 3.7 states that "by 2030, ensure universal access to sexual and reproductive health care services, including family planning" (1). These reproductive health services (2) primarily include contraceptive methods. UN statistics (3, p. 6) estimate that, in 2021, 77% of women of reproductive age (15-49) use modern methods, 8% use traditional method and 16% have an unmet need for family planning.[1] The most commonly used methods (3, p. 17) are female sterilization (22.9%), the male condom (21.8%), the IUD (16.8%) and the pill (15.7%). Although there are several ways to classify contraceptive methods (4, p. 291), inconsistencies remain "in the definition and criteria for classifying contraceptive methods as 'modern' contraceptives" (5, p. 31), as asserts the World Health Organization's (WHO) Department of Reproductive Health and Research. Despite these inconsistencies, UN texts, especially those of the Agenda 2030 and those that refer to it, use the classification of two categories: modern and traditional. After presenting what this classification entails [1], this article aims to analyze in detail its ambiguities [2] and to propose a new classification of contraceptive methods [3] based on a global bioethical approach. This corresponds to some of the points highlighted in the Universal Declaration on Bioethics and Human Rights (UDBHR) (6) since "the principles recognized in the UDBHR share a common base and level of support to attain a global bioethics which evolves, is flexible

[1] As it is mentioned in the document, "numbers may not add up to 100 due to rounding".

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and capable of helping solve bioethical problems as well as promoting equality and respect for human rights" (7, p. 72).

1. Contraceptive methods according to UN texts

1.1. The classification

According to the United Nations Department of Economic and Social Affairs reports, *Family Planning and the 2030 Agenda for Sustainable Development* (8, p. 21) and *World Family Planning 2022* (3, p. 4), and the who report (9, p. 301), *Family Planning: A Global Handbook for Providers*, modern methods include: oral contraceptive pills (combined/estrogen-progestin and progestin-only), injectables (combined or progestogen-only), transdermal contraceptives (implant or patch), vaginal ring (combined or progestogen-only), vaginal barrier methods (female condom, diaphragm, cervical cap, spermicidal foam, jelly, cream and sponge), intra-uterine devices/IUD (copper or levonorgestrel), the lactational amenorrhea method (LAM), male condom, male (vasectomy) and female sterilization (tubal ligation), and emergency contraception.

Traditional methods include coitus interruptus (withdrawal), periodic sexual abstinence based on the Fertility awareness-based methods[2] (FABMs) such as Calendar-based methods[3] (rhythm method/Knaus-Ogino method and Standard Days Method) and Symptoms-based methods (cervical secretions, basal body temperature, TwoDay method, Billings Ovulation Method and Symptothermal method). In addition, there are other traditional methods ["douching, prolonged abstinence, gris-gris, incantation, medicinal plants, abdominal massage and other local methods" (10, p. 24)].

[2] The three UN documents on which this research is based do not mention the Creighton Model in the list of Fertility awareness-based methods.

[3] It is important to stress that Calendar based methods should not be classified as FABMs, since the woman does not observe the cycle, but makes calculations based on previous cycles, or counts the days.

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1.2. Contraceptive prevalence

Thus, SDG's indicator 3.7.1 defines contraceptive prevalence as "the percentage of women who are currently using, or whose partner is currently using, at least one method of contraception, regardless of the method used" (11, p. 2). According to un statistics (12), worldwide figures have risen from 18.9% in 1970 to 58.8% in 2023. In Europe and North America, the figures rose from 34.8% to 63.4% over the same period.

Two points deserve special attention. First, the definition of contraceptive prevalence is limited solely to the use of modern family planning methods, excluding traditional methods. Second, there are several reasons for the difference in contraceptive prevalence:

a) 65% of women, in developing countries, do not use modern methods (13) or prefer using the so-called traditional or natural methods (14).
b) According to the WHO (15), unintended pregnancies (UIPs) are associated with a lack of family planning and difficulties in accessing modern methods. The *Contraception Policy Atlas* (16) identifies three types of accessibility.
    a. Access to supplies/coverage: coverage of some contraceptives by the national health system, special coverage for young and vulnerable groups, and coverage for at least one Long-Acting Reversible Contraceptive (LARC) by the national health system.
    b. Access to counseling including the coverage of counseling (level of available, accessible, and affordable consultation, need for third-party consent, Legal status (marital, citizenship) is not a barrier) and prescription requirements (availability of emergency contraception and hormonal contraceptives available without prescription).
    c. Availability of online information that includes type of online information, information coverage (number of contraceptives listed, info on costs of contraceptives and info

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where to get contraceptives) and user friendliness (regional or minority language included, Web design, discoverability of the website online).

c) According to the WHO (15), two-thirds of women have stopped using contraception because of "fear of side effects".

These elements highlight the ambiguities and inconsistencies surrounding the classification, still used in UN texts today.

2. Classification ambiguities and inconsistencies

The International Conference on Population and Development (ICPD) (17) states that only complete information can guarantee women an "adequate development of responsible sexuality […] to achieve good sexual health and exercise their reproductive rights and responsibilities" (§ 7.36). Complete information also means clear definition. However, the who does not define a modern contraceptive method. As a result, the division of contraceptive methods into two groups, modern and traditional, remains an imprecise one due to the following ambiguities: temporal/historical context [2.1], effectiveness [2.2], safety [2.3], environmental impact [2.5] and gender equality [2.4]. The first two ambiguities were briefly highlighted by M. P. R. Festin *et al.*, (4, p. 290).

2.1. Temporal/ historical context

The characters "modern" and "traditional" naturally evoke a temporal axis: modern is recent and traditional is ancient. However, classifying contraceptives according to the concept of time discredits such a classification, since certain modern methods are older than certain traditional methods, and vice versa.

A chronological overview (18–20) allows us to place the appearance of the first models of what we know today (date in parentheses)

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in relation to the earlier use of these methods. The use of the condom (1880), spermicides (1906) and the IUD (1928) dates from at least 3000 BC. The equivalent use of the diaphragm (1880), the cervical cap (1830) and the female condom (1908) dates from the 2nd century BC. Contraceptive injections date from 1922. Basal body temperature and Knaus-Ogino method date from the 1930s. The pill was introduced in 1955. Billings Ovulation Method dates from the 1960s-1970s. The Creighton Model FertilityCare System (21) dates from 1976. Although classified as modern (8, p. 21; 10, p. 24) in UN texts and developed between 1980 and 1995, LAM method dates back to ancient Egypt (22, p. 44).The implant was invented in 1983. Marquette method (23) dates from 1999. Standard Days Method dates from 2001. The TwoDay method, the vaginal ring and the patch date from 2004. The Fertility Education and Medical Management method (FEMM) was created in 2012 (24) and the FemTech[4] (25) was invented in 2016.

2.2. Effectiveness

Modernity can also be approached from the point of view of effectiveness especially to avoid UIPs and to reduce the abortion rate, as claimed by the ICPD (§ 7.10, 7.13, 7.24, 8.25, 106.k), the Beijing Declaration (26, § 72.c, 72.l, 72.o, 106.k, 109.i), and Agenda 2030 SDG 3.7 and 5.6. However, many studies have shown that 48% to 73.4% of women who had an UIP were using contraception (27,28). Statistics from the Guttmacher Institute (29) show that 30% of UIPs are due to contraceptive failure methods. In this context, what are the criteria used to promote modern methods as effective and other traditional methods as less effective?

The effectiveness of contraceptive methods is measured by the Pearl Index (PI), a statistical index that represents the number of pregnancies observed per 100 couples during the first year of optimal use

[4] FemTech refers to products, software and digital health technologies used particularly to improve women's health.

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of any contraceptive method. The index presents theoretical effectiveness, which should be compared with practical effectiveness. The latter is obtained on a sample basis, including women and couples who did not use contraception because they forgot to take the pill, used condoms incorrectly or did not pay attention to the ovulation cycle.

The who's contraceptive effectiveness table (9, p. 415) is a combination of two studies: the first is carried out in the USA by J. Trussel and A. Aiken (30, pp. 844-845) and the second is carried out in developing countries by C. Polis et al. of the Guttmacher Institute (29). According to this table, modern methods have a higher effectiveness than traditional ones including FABMs methods.

Nevertheless, it is inconsistent to rely on the PI to assess contraceptive effectiveness, to distinguish between "modern" and "traditional" methods, and to promote modern methods as more reliable. This is due to the mode of action of each of these two categories of contraceptives. On the one hand, modern methods have a rapid effect, which varies between the time of use and 7 days after the first use or the start of menstruation. The study to measure their efficacy according to the PI must be conducted during the first year of contraceptive use. On the other hand, since there is no immediate intermediate element (mechanical or hormonal), FABMs are based on an observational protocol. Indeed, several studies have shown that the only condition allowing PI to be used correctly for FABMs is that the women chosen for the study had already been trained in one of these methods. The Symptothermal method (31) gave a result of 0.4 UIP per 100 women with abstinence on fertile days and 1.8 overall. Under the same conditions, the Billings Ovulation Method (32) showed an efficacy of 0.5 versus 2 for the IUD. The Marquette method (33) had a result between 2 and 6.8. Even "the efficacy of a contraceptive mobile application is higher than usually reported for traditional fertility awareness-based methods" (34).

In addition, it is important to note that contraceptive failure depends on a number of factors (35): a) the woman's age (the older the woman, the higher the failure rate), b) marital status (high rate among unmarried or cohabiting women), c) the economic level of

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the country (more failures in poorer countries), and d) the interactions with medications taken at the same time as certain contraceptive methods (especially hormonal methods).

2.3. Safety

While the ICPD calls on states to "provide accessible, complete and accurate information about various family-planning methods, including their health risks and benefits, possible side effects" (§ 7.23 b) and while SDG 3 insists on protecting and promoting women's health, the who states that two-thirds of women have stopped using modern contraception because of "fear of side effects" (15). The most used methods with significant risks include combined oral contraceptive (COC) pill [2.3.1], progestin-only contraception [2.3.2] and the copper IUD [2.3.3]. Some other risks are common to contraceptives [2.3.4] which can have also an environmental impact [2.3.5]. However, it is important to understand that the risks are not systematic. Their occurrence depends on many factors, such as genetic predisposition, lifestyle, etc.

2.3.1. The Combined oral contraceptive pill

COC have consequences on the psycho-neuro-endocrinological system such as: women's perception of their choice of partner (36, pp. 102-144), reduced sexual desire (37), reduced orgasm due to reduced clitoral volume (38) (leading to increased pain during intercourse), depression (39), suicide attempts (40), post-partum depression (41), collateral hormonal effects (42, pp. 105-111), altered memory (43) in general, and topographical (44) and emotional memory (45) in particular, verb generation task (46), face recognition (47), alterations in hypothalamic and pituitary gland (48) and in fear-related brain morphology (49).

We can also note a hepatic overload due to the double passage in the liver (metabolization-distribution and metabolization-elimination)

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leading to an overconsumption of micronutrients, consequently to a deficit of certain minerals, trace elements and vitamins, as in the case of the decrease of zinc which favours the early appearance of osteoporosis (50)and to bone turnover in young adult women.\nMETHODS: Cross-sectional study. Blood and urine samples from non-users (-OCA; control; n=69, but also to an excess of copper and vitamin D (42, pp. 78-98; 51, pp. 60, 158-169).

In addition, certain proteins involved in blood clotting are altered (52), leading to venous thromboembolism (53) (phlebitis and pulmonary embolism) and arterial thromboembolism (stroke and myocardial infarction).

Other studies have highlighted the risks of autoimmune diseases, especially for women with a genetic predisposition, such as myocarditis (54), systemic lupus erythematosus (55), multiple sclerosis, Crohn's disease and interstitial cystitis (56).

What's more, the International Agency for Research on Cancer (IARC) classifies COC as Group 1 carcinogenic to humans (57, pp. 21, 35). Thus, women who use the pill have a higher risk of developing breast, cervical and liver cancer (57, pp. 283-293, 295-296) than women who do not use the pill.

2.3.2. Progestin-only contraception

The progestin-only pill can may cause unpredictable bleeding and the drospirenone-based micropill may increase the potassium levels in the blood, thereby increasing cardiovascular risks (42, pp. 181-182).

The etonogestrel-based implant carries thromboembolic risks (58), and other risks listed by the WHO (9, p. 133) including acne, mood changes, bleeding, headache, dizziness, nausea and abdominal pain.

The levonorgestrel IUD, particularly Mirena (59, pp. 15-16), can cause ectopic pregnancy (60-62), group A streptococcal sepsis (GAS), pelvic inflammatory disease, perforation, ovarian cysts, bleeding pattern, and vulvovaginitis.

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Studies indicate a significant association between the use of the progestin-only injectable contraceptive, such Depot medroxyprogesterone acetate (DMPA), and an increased risk for acquisition and transmission of HIV-1. It is important to note that this contraceptive is commonly used in regions with high HIV-1 prevalence has a higher risk (63,64).

Macroprogestins (pill or injection), i.e. those in high doses, carry a major risk: intracranial meningioma (65,66).

The use of progestin-only contraceptives is also associated with a significant (20-30%) increase in the risk of breast cancer (67,68) and a delayed fertility (69).

2.3.3. Copper IUD

According to the WHO, women who use the copper IUD may be at risk of: prolonged and heavy monthly bleeding (9, p. 166) which can lead to anaemia (70,71), cramps, severe lower abdominal pain indicating either pelvic inflammatory disease or ectopic pregnancy, uterine perforation, high blood copper levels above the norm which could have serious consequences: "neurological symptoms such as depression, fatigue, irritability, excitation, and difficulty focusing are reported too. In most severe forms, copper toxicity leads to rhabdomyolysis, cardiac and renal failure, methemoglobinemia, intravascular hemolysis, hepatic necrosis, encephalopathy, and ultimately death" (72).

2.3.4. Other risks

Another rare but real risk is intrauterine pregnancy (59, p. 15) with an IUD (levonorgestrel or copper) which causes a higher rates of vaginal bleeding, chorioamnionitis and placental abruption, the risk of miscarriage and preterm delivery (73).

Progestin injections, implants and copper IUD cause also a significant weight changes (74).

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2.4. Environmental impact

Since the SDGs interact with each other in a transversal way, it is important to note that modern contraceptive methods, as a fundamental element of family planning, also have a a non-negligible environmental impact.

On the one hand, the production of certain mechanical contraceptives such as condoms and the copper IUD has a significant impact on global warming due to the pollution caused during their production (75–78), and on the health of living beings due to the toxic materials used in the process (79).

On the other hand, hormonal contraceptives considered to be endocrine disruptors (80, pp. 22, 76, 86) - especially those based on17α-Ethinylestradiol (EE2), have an impact on aquatic life [feminization (81), intersexuation (82), reproductive disruption (83–85) and extinction (86)] and on human life due to EE2 residues in water [prostate cancer (87,88), reduced masculine fertility (80,89,90), fetal growth and health problems such as hypo-plastic left heart syndrome and gastrochisis (91), disruption of fetal and neonatal testicular development (92), autism spectrum disorder (93,94)].

Based on all these facts, it makes sense to ask how modern contraceptive methods can be promoted in SDGs 3.7 and 5.6 when they negatively affect many others: SDG 2.1 (access to safe, nutritious and sufficient food while water and fish are polluted), SDG 6.3 (improve water quality by reducing chemical pollution while endocrine disruptors used) SDG 14.1 (reduce marine pollution which affects one of the most important sources of food: seafood), SDG3 (preservation of health especially women's), SDG 6.3 (quality drinking water), and SDG 13 (climate change while the production of some contraceptives has an impact on global warming).

2.5. Gender equality

As SDG 5 aims to achieve gender equality and empower all women, and since SDG 5.6 aims to "ensure universal access to sexual and

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reproductive health and reproductive rights", the 2030 Agenda 2030 has introduced indicator I 5.6.1 to analyze the proportion of women aged 15 to 49, in 57 countries, who make their own informed decisions about health care, contraceptive use and sexual relations. Furthermore, the United Nations Population Fund (UNFPA, United Nations sexual and reproductive health agency) points out that focusing on the promotion of female contraceptives without taking into account "men's needs and knowledge [...] raises the human rights and ethical issue of gender equality" (95, p. 69). Indeed, the use of modern contraceptives raises two issues of equality.

On the one hand, studies have shown that many women are unaware of their partner's views on contraceptive use (96). In addition, many men prefer to use traditional methods for three reasons: a) because they want to be involved in the decision (97); b) because they don't know enough about the practical use of modern contraceptives (98); c) because they are afraid of the side effects the woman might suffer (99).

On the other hand, some may blame men for not using male contraception (100, p. 50) [hormonal (101–104), Heat-based contraception (105), non-hormonal contraception (106–108), reversible occlusive contraception (109–111) and immunotherapy contraception (112,113)]. In this regard, the ICPD has already encouraged the use of voluntary and appropriate male methods of contraception (§7.8).

From an equality perspective, this is an understandable criticism. However, there are three main barriers to progress in the development of male contraceptives: social constraints, according to which contraception is a woman's business; the lack of economic competition due to the low success rate of male contraceptives; and men's fear of suffering negative consequences (95, pp. 70-71; 100, p. 50). However, the physiological difference in gametogenesis between men and women was never mentioned, even though it plays a fundamental role in the way contraceptives work.

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3. A new classification of contraceptive methods

Following analysis of the ambiguities and inconsistencies highlighted above, here is a new classification based on a global bioethical approach. Excluding two methods [3.1], three criteria [3.2] are used to divide the contraceptive methods into three categories [3.3].

3.1. Exclusion

Male contraceptive methods (other than condoms and vasectomy) are not included in this classification because of the lack of consensus, hindsight and scientific studies favoring their marketing.

Emergency contraception is also not included because of the ethical dilemmas surrounding its mode of action, which could be considered abortifacient when it prevents implantation of the embryo (114–116).

3.2. Criteria

The three criteria are purpose, scientificity and invasiveness.

a) The **purpose criterion** allows contraceptive methods to be divided into two groups. On the one hand, there are contraceptive methods whose sole purpose is to prevent pregnancy. On the other hand, there are birth spacing methods based on knowledge of the female cycle, the body, how it functions and how to respect it. Two other criteria are used to divide the two groups into different categories.
b) The **scientificity criterion** is based on scientific studies that follow precise observation protocols to verify the effectiveness of the methods.
c) The **invasiveness criterion** is based on respect for physical integrity and must be examined at three different levels: the use (oral, vaginal or dermal) of a foreign element to the body that is likely to have risks and/or side effects, the surgical

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intervention and the alteration of body function. Only one level is required for invasiveness.

3.3. Categories

By combining the criteria of scientificity and invasiveness, we can indentify three categories:

a) Popular Methods: non-scientific and non-invasive;
b) Interfering Artificial Methods: scientific and invasive;
c) Physiological Methods (with or without technical assistance: FemTech): scientific and non-invasive.

A. Groupe 1: Contraceptive purpose

a. Category 1: Non-scientific and non-invasive.

Popular methods

Coitus interruptus (withdrawal), douching, prolonged abstinence, gris-gris, incantation, medicinal plants, abdominal massage and other local methods.

b. Category 2: Scientific and invasive.

Interfering artificial methods

Oral contraceptive pills (combined/estrogen-progestin and progestin-only), injectables (combined or progestin-only), transdermal contraceptives (implant or patch), vaginal ring (combined or progestin-only), vaginal barrier methods (female condom, diaphragm, cervical cap, spermicidal foam, jelly, cream and sponge), intra-uterine devices/IUD (copper or levonorgestrel), male condom, male and female sterilization (vasectomy and tubal ligation).

B.Group 2. Birth spacing purpose

c. Category 3: Scientific and non-invasive.

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Physiological methods (with or without technical assistance: FemTech)

- The natural method of ovulation inhibition: Lactational amenorrhea method (LAM).
- Statistical predictive methods: the Rhythm method/ Knaus-Ogino method and Standard Days method.
- Methods of Cycle Observation (MCO)[5] (20, p. 11): Basal body temperature, TwoDay method, Billings Ovulation Method, Symptothermal method, Creighton Model FertilityCare System, Marquette method and FEMM method.

4. Conclusion

The proposed new classification may have its limitations and further research is necessary to refine it. For this reason, it is not presented as the only answer to the ambiguities and inconsistencies in the division between modern and traditional methods. Nevertheless, this classification, which emphasizes natural methods (category 3), is more in line with the objectives of sustainable development, as it is based on a global bioethical approach with advantages at several levels.

a) It emphasizes the importance of respecting the woman's body, the rhythm of her fertility (117) and the preservation

[5] "Methods of Cycle Observation" is the French translation of "Méthodes d'observation du cycle" (MOC). It was coined, in 2016, by Dr. Sophie Saab-Tsnobiladzé, MD, FertilityCare & NaProTechnology consultant. These methods "are scientific and reliable methods for monitoring the ovulatory cycle, based on daily observation of the woman's fertility biomarkers according to a precise protocol (specific to each method). They can be used to determine whether the day which just ended was a fertile or infertile day. […] They go beyond the notion of fertility management and are aimed at all women [...] who wish to take care of their gynecological health" (20, pp. 160-161).

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of her health [UDBHR, art. 14.2 (a)] by avoiding all unnecessary disturbances and risks.

b) It emphasizes the principle of gender equality and the principle of equity [UDBHR, art. 10]. While the choice to use modern contraceptive methods is seen as liberating, the onus is on the woman alone to take care of everything that goes with it: medical follow-up, the commitment to take the pill on time, the stress of not forgetting, the risks and side effects involved, and so on. In this sense, promoting these modern contraceptive methods does not seem to achieve gender equality. Gender equality can only be achieved if both protagonists are involved as much as possible, in accordance with their anthropo-physiological identity, in the process deciding "freely and responsibly the number and spacing of their children" (ICPD, Principle 8 and § 7.12). Especially with MCO, woman and her partner accompanied and supported by specialized practitioners, learn and understand together the physiology of her body. The motivation and ability to live with abstinence during fertile periods (118) have as a result a strengthening of the couple's bond (119).

c) It emphasizes methods that are environmentally friendly, because they do not pollute and do not affect human or environmental health. This helps to protect and promote "the interests of the present and future generations" [UDBHR, art. 2 (g), 14.2 (b), 16 and 20].

d) It responds to the call for health accessibility [UDBHR, art. 14.2 (a) and 15.1 (b)], especially the economic accessibility, which is a barrier for many women. This is because the majority of Physiological Methods are based on the observation of the woman's cycle. woman's cycle and technical assistance is affordable. Once done, it is almost for life, but regular follow-ups with certified instructors are recommended. The only element that can be costly is time, which requires commitment, discipline and a change in lifestyle.

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