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Challenges facing HIV treatment as prevention in Brazil: an analysis drawing on literature on testing

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Abstract *According to current global AIDS guidelines, HIV testing is key to the success of the 'treatment as prevention' (TasP) strategy and the control of AIDS. In view of Brazil's commitment to these guidelines, this article characterizes the principles and justifications underpinning TasP and discusses implementation challenges. The analysis draws on a systematic review of the literature (2005 to 2015) on recruitment and testing strategies for men who have sex with men. This approach was adopted based on the assumption that current knowledge on HIV testing can offer valuable insights into the foundations of global AIDS policies and their uptake in local contexts. Based on the analysis of the 65 articles selected, we suggest that TasP represents a shift in the AIDS prevention paradigm. There is an overlap between prevention and care and the new approach places major emphasis on biomedical and psychological knowledge. The TasP approach fails to address the factors associated with HIV vulnerability and the stigma surrounding AIDS and undermines the participation of activists and PLWHA as autonomous producers of preventive of preventive practices. We argue that, to ensure the effective implementation of TasP in Brazil, it is necessary to discuss issues such as the protection of human rights and the structural problems facing Brazil's public health system.*

Key words *Systematic review, Testing, HIV/AIDS, Prevention, MSM*

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Introduction

In 2014, the United Nations launched UNAIDS, a strategy to end AIDS by 2030 based on achieving the 90–90–90 targets: 90% of all people living with HIV will know their HIV status;90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy; and 90% of all people receiving antiretroviral therapy will have durable viral suppression[1]. The Brazilian government has endorsed these targets and reiterated its commitment in 2015in Rio de Janeiro and in 2016 in Geneva[2].

'Treatment as prevention' (TasP) is key to meeting the 90-90-90 targets because this strategy makes it possible to reduce the circulation of HIV among the population, thus breaking the chain of transmission. For this to happen, the infection should be diagnosed as early as possible and followed by antiretroviral therapy (ART). The strategy was developed based on evidence indicating that antiretroviral drugs provide protection from HIV infection and that undetectable viral load greatly reduces the risk of HIV transmission[3,4]. It falls on the health sector to promote the expansion of testing, particularly for key populations at higher risk, identify HIV-positive individuals, and ensure treatment access and adherence.

New testing techniques (such as rapid tests and oral fluid-based testing) and strategies providing extended hours testing in non-medical settings have gained prominence within TasP. As a result, homes, nongovernmental organizations, places where homosexuals meet and socialize, and sex settings have become alternative testing locations. In this response to AIDS, individual treatment and the rationale behind prevention are governed by 'pharmaceuticalization'[5]. The primary focus of this approach is the identification and treatment of people who already have HIV, while reducing the viral load is both the aim of individual treatment and epidemic control.

Before the adoption of the TasP approach, HIV testing strategies such as Voluntary Counseling and Testing (VCT) and Provider-Initiated HIV Testing and Counseling (PICT)aimed to identify people with HIV. VCT is aimed at individuals seeking testing of their own accord and promotes dialogue and reflection on risk contexts and vulnerability. Dating back to the 1980s, this approach led to the creation of Voluntary Counseling and Testing Centers (VCTCs) for the general population across the country.

PICT is aimed at specific populations and patients are referred to HIV testingby a healthcare professional[6]. Introduced in the 2000s after research had shown the prevention and care benefits of timely diagnosis and early initiation of ART for certain population groups, such as pregnant women, tuberculosis patients, and people with sexually transmitted or opportunistic infections, this method coexists with VCT. This logic is illustrated by the introduction of HIV testing during antenatal care, labor, or shortly after childbirth to prevent mother-to-child HIV transmission.

By the middle of the 1990s, therefore, HIV/AIDS policy guidelines in Brazil already included the promotion of early diagnosis[7]. This theme gained prominence in the country's foreign policy and can be observed in the national strategic plan and loan agreement between the Brazilian Government and the World Bank (AIDS II).Testing campaigns were progressively launched and access to testing was expanded through the *Sistema* Único de Saúde (SUS), Brazil's public health system.

Although this shift in emphasis towards HIV testing occurred prior to the introduction of TasP, each strategy attaches different meaning to testing. VCT is based on the principles of the "exceptionality" of testing, autonomy, prevention, and counseling, while PICT and TasP are characterized by the normalization of testing, which values the collective benefits of treatment over and above the right to individual autonomy. In the latter, priority is given to testing, particularly among high-risk groups, given that knowledge of HIV status is vital for preventing and controlling the epidemic, making it possible to target interventions to break the chain of transmission. This perspective embodies a new prevention logic centered on the identification and treatment of infected people.

In Brazil, the concept of TasP was introduced by the government in December 2013,with the approval of the *Protocol and treatment guidelines for the management of HIV infection in adults*[8]. This Protocol recommends early initiation of ART in adults with HIV, regardless of the stage of HIV infection or CD4 count and subject to patient consent[9].

In addition to maintaining HIV testing during antenatal care, labor, or shortly after childbirth and testing of people with tuberculosis or sexually transmitted infections (STIs)such as syphilis and hepatitis, the Ministry of Health stepped up efforts to expand testing on the public health system, introducing oral fluid-based rapid testing in health centers across the country. Also in

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2014, as part of the project *Viva Melhor Sabendo* (Live Better Knowing), the government issued a call for proposals to enable nongovernmental organizations to carry out oral fluid-based testing of gays, MSM, transvestites, transsexual people, sex workers, and drug users. In 2015, 47 civil society organizations from different regions of the country received funding via this call from this source. In parallel with this initiative, the government launched campaigns to promote testing for young people with the slogan *#partiu teste.*

Geared towards the expansion of HIV testing locations, between 2008 and 2014, the Ministry of Health and USAID supported the implementation and evaluation of the project *Quero fazer*(I want to) in Rio de Janeiro, Brasília, Fortaleza, São Paulo, and Recife. Targeting MSM, gays, and transvestites, the project compared testing provision across three settings: VCTCs, NGOs, and mobile testing units (MTUs)[11].

Currently, international organizations such as AIDS Health Care Foundation provide support for state and local governments and NGOs to provide mobile testing services targeting high-prevalence groups. An example is the *Ahora é agora* (the time is now) initiative in Curitiba, a partnership between UNAIDS, the Ministry of Health, Oswaldo Cruz Foundation, and local NGOs. This project, supported by the Centers for Disease Control, provided testing in MTUs and HIV self-test kits to MSM (https://www.ahoraeagora.org/). In Rio de Janeiro, the state government's HIV/AIDS agency (*Gerência Estadual de DST/Aids*)and Laboratory for Clinical Research on STDs and AIDS of the INI/Oswaldo Cruz Foundation coordinates a MTU in Madureira, a low-middle class neighborhood.

To contribute to the discussion of the challenges to delivering Tas Pin Brazil, this work analyzes the principles and justifications underpinning this strategy drawing on a systematic review of literature on recruitment strategies and the provision of HIV testingto MSMpublished between 2005 and 2015. The review focuses on MSMbecause thisgroup is considered unique from a research point of viewgiven the central role it playsin shaping national and global responses to the AIDS epidemic.

The choice of a literature review assumes that the development of global guidelines on HIV/AIDS prevention involves a broad range of organizations and individuals, including specialists, professionals, and researchers from a variety of areas. In this sense, the analysis of current knowledge on HIV testing can offer valuable insights into the foundations and uptake of AIDS policies such as TasP in so far as it helps to unveil underlying philosophical assumptions. In their description of the complex processes and multidimensional factors involved in the historical shift from medicalization to biomedicalization of HIV/AIDS, Clarke et al.[12] emphasize the contribution made by the social sciences to understanding the emergence of new discourses, such as current global guidelines on the control of the epidemic.

Methodology

A systematic literature review was conducted consisting of the following steps: database selection, definition of descriptors, definition of inclusion and exclusion criteria, and blind review of the articles by two researchers[13,14] Articles published in English, Spanish, and Portuguese between 2005 and July 2015 were searched using the following databases: PubMed, Sociological Abstracts, Lilacs, Cochrane, and SciELO. The following combination of descriptors was used (Chart 1).

The following inclusion criteria were used to select the articles: voluntary testing in different locations; use of rapid HIV testing; recruitment strategies for testing; effects of testing and counseling; prevention linked to testing; cost-effectiveness; evaluation; effects of stigma on testing services and MSM population. The exclusion criteria were studies on laboratory techniques and diseases that are not sexually transmitted and those that did not address access to or frequency of testing among MSM.

The searches resulted in 167 abstracts. Duplicate articles were excluded, resulting in a total of 133 abstracts. These abstracts were then read to select articles addressing ways of recruiting MSM for testing and testing provision strategies. The selection process resulted in the 65 articles listed in Chart 2, three of which were concerned with Brazil[15-17]. Although small in number, the studies conducted in Brazil highlight the importance of improving living standards and access to health services among the most vulnerable populations and the lack of research into TasP in Brazil.

The following categories of analysis emerged from the 65 articles: rationale behind global HIV testing policies; importance of the condom; diversification of testing locations and recruitment methods; participation of NGOs and community movements in the implementation of prevention and testing policies.

Chart 1. Terms identified in MeSH (Medical Subject Headings) and DeCS (Health Sciences Descriptors).

Testing	testeo	Testagem
anonymous testing	pruebas anónimas	testes anônimos
Serologic test	pruebas serológicas	testes sorológicos, sorodiagnóstico
Aids serodiagnosis	serodiagnóstico del sida	Não identificado no DECS
Prevention	prevención	Prevenção
Aids	Sida	Aids
Counseling	consejería	Aconselhamento
testing strategies	estrategias de testeo	Não identificado no DECS
Terms present in the indexed literature, but NOT recognized in the MeSH and DeCS		
testing methods	Métodos de testeo	Métodos de testagem
mobile HIV testing	_____	_____
mobile testing	_____	_____
mobile unit	_____	_____
treatment as prevention	_____	_____
combination HIV prevention	_____	_____
HIV prevention	Prevención del VIH	Prevenção do HIV
HIV prevention strategies	_____	_____
POC Point of Care	_____	_____
home-based	_____	_____
self-testing		
community-based		
community mobilization		
MSM	HSH	HSH
Homosexual	homosexual	homossexual
Bisexual	bisexual	bissexual
assessment	acceso	acesso
Barriers	barreras	barreiras
willingness	aceptabilidad	aceitabilidade

Results

Rationale behind global HIV testing policies

In the early years of the AIDS epidemic, with the absence of effective treatments, the predominant strategy was VCT and knowing his/her HIV status was the patient's right. The link between testing and counseling spawns from the assumption that reflections brought about by counselor-patient dialogue can prompt changes in attitudes and the adoption of safe-sex practices. Combining testing and counseling provides an opportunity to inform patients and encourage prevention practices, demystifying myths and prejudice and providing support to HIV-positive individuals. Centered around voluntary testing rather than routine testing, VCT is rooted in the principle of AIDS "exceptionality". VCT and other similar AIDS responses fall within the human rights-based approach to health[18,19] endorsed by Brasil[20].

VCT was described by18 of the articles as an exclusive strategy characterized by pre and post-test counseling, the provision of emotional support, and the principles of informed consent andconfidentiality[21].There was a predominance of nonclinical testing locations, including NGO and community-based settings[24-27] and saunas[22,23]. The articles also address patient-health staff interaction, the quality of pre and post-test counseling, and the meanings assigned to repeat testing[22,24]. The review also found studies highlighting the importance of the right to information and the positive effects of diagnosis for individuals and their partners.

Under TasP, testing is linked to treatment as a prevention tool. It is therefore the point of departure and one of the pillars of success of the

Chart 2. Table with the 65 references analyzed by this study.

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90-90-90 strategy, which envisages the sequence "testing-treatment-undetectable viral load – nontransmission"[3]. Within this approach, from a social and program point of view, testing is no longer seen as exceptional[6] and the aim is to make testing routine. The normalization principle assumes prominence and counseling loses its importance. While VCT testing is viewed as an opportunity to promote "awareness" of risks and protection against HIV, TasP testing is essentially a health measure used to identify cases, where by counseling gains a different meaning.

Nineteen articles specifically addressed the foundations of and strategies for TasP, including studies regarding viral load beliefs, risk management and interest in accessing testing[28], and the relationship between routine testing and disclosure of sexual orientation[29].Other studies identified associations between self-testing and individual risk factors[30] and the effectiveness of testing recruitment strategies for specific groups. In this respect, studies discussed individual and structural barriers to testing among MSM and testing provision in alternative locations, social networks, and conventional testing services[31].

Under the TasP approach, it is argued that testing opportunities can be maximized through the establishment of stable partnerships[32] and using special testing units run by activists or NGOs[33]. From this perspective, knowledge of HIV status and monitoring viral load bring benefits to both patients and their partners, provided there is consistent adherence to ART.

Importance of the condom

Recognizing the condom as the key preventive tool in the fight against AIDS is one of the most notable aspects of thought collective[34] during the first three decades of the epidemic. However, there is little mention of the condom in the literature analyzed by this study, suggesting that this tool is losing its importance in prevention actions associated with testing.

Some of the articles raise questions about condom effectiveness, while at the same time presenting testing as an alternative tool for HIV prevention. One study argues that using the rapid test before sexual interactions is likely to have a more beneficial effect on HIV transmission rates than the use of acondom[32].

Other articles seek to empirically demonstrate the relationship between knowledge of HIV status and practicing safe sex, confirming that one of the positive effects of testing is condom use[35]. This relationship is also highlighted in studies on serosorting (selection of partners according to their HIV status) and uses of rapid testing. With respect to negotiations related to sex without condom, researchers suggest that home testing is a more effective form of prevention than a partner simply stating his/her HIV status. From this perspective, the test result can be a risk management tool, justifying the nonuse of a condom[36]. Other researchers suggest that testing leads to changes in sexual practices and that treatment reduces the likelihood of infection, even with exposure to the virus. Non testing has gradually become a problem and testing has become the solution, diminishing the importance of the condom.

Promoting condom use as a prevention method assumes the recognition of the individual agency. In this respect, prevention has been debated in light of the capacity of individuals to make their own free choices in relation to the management of prevention resources[37]. Although a number of studies explore factors influencing the willingness and readiness of individuals to take the test, a more in-depth discussion of the role of rationalization and reflexivity in the adoption of safe-sex practices is lacking in the articles reviewed by this study.

Emergence of routine testing

The articles show that testing seems to be detached from encouraging condom use. In the specialist discourse, driven by the promotion of routine testing, the importance of condom use, repeated ad nauseam in the not-too-distant past, is giving way to self-monitoring of HIV status. Some of the articles underline that health policies are progressively introducing routine testing for specific groups in emergency services and health centers, as proposed under PICT. Thus, the promotion of informed and voluntary decision-making now coexists on a permanent basis with the prescription of HIV testing.

The articles show gays and other MSM have become the preferred target of discussions surrounding the appropriateness of periodic testing. In the studies addressing TasP, routine testing is proposed based on a risk evaluation of a specific population rather than individuals. Various studies highlight that the ideal re-testing interval for gay men and other MSM has steadily declined[28,31,32,38-40]. Studies with African-American gays, bisexuals, and MSM, show that the lowest testing rates are found in people with the greatest risk of exposure to HIV[31,41,42] and that this association is particularly pronounced among those who do not identify themselves as gay[43].

Diversification of testing

The expansion of HIV testing services through TasP has brought about a proliferation of programs aimed at diversifying HIV testing in private and public settings outside conventional health services. As such, studies have begun to problematize the implications and challenges in expanding HIV testing, focusing on recruitment strategies, program outreach, and integration with conventional health services.

The rationale for the TasP approach is illustrated by studies examining different testing methods, which include issues such as the willingness to useself-testing[28,30,44,45] and the use of this method as a prevention strategy[36,46]. These studies view testing as a tool for promoting the adoption of safe-sex practices. MSM networks and places of sex interaction, previously studied to understand vulnerability to HIV and inform social responses, make a comeback in the articles on testing. However, places for socializing and sex interaction are now looked at from a different angle, where they are seen as potential alternative HIV testing locations.

In this vein, authors describe methods for mapping locations and interaction flows to define potential testing settings[22,23,47]. It is interesting to note the variety of methods used to recruit individuals for testing, such as web tracking and the provision of tests in pharmacies[48,49]. However, little is discussed about the human rights of the person being tested and the social determinants of vulnerability to HIV, even when dealing with populations who are more likely to suffer prejudice, violence, and social exclusion. The focus on risk prevails, centered only on behavioral factors.

The participation of NGOs

The diversification of testing brings to light the resignification of the role of civil society in AIDS responses. The mention of activists as legitimate and autonomous creators of the preventive discourse was found in only a few articles that conform to the logic of VCT. This is the case of an article about a community-based HIV testing and counseling intervention highlighting that the presence of peers and non-clinical staff members can offset cultural barriers and stigma and stimulate awareness of HIV status[25]. Another study conducted in Thailand highlighted that involving NGOs, owners of places where homosexuals meet and socialize, and community leaders facilitated dialogue between the researchers and target population[50]. We also found studies in which NGOs collaborated in research design and coordination[25,41,43,51]. Furthermore, in some cases members of NGOs were co-authors of the article[22,43,51].

However, in other studies NGOs only played an auxiliary role in prevention strategies, helping to recruit individuals for testing in view of their experience with and access to MSM and people living with HIV/AIDS (PLWHA)[22,24,30,49]. The articles show that community-based settings have become alternatives for extended hours testing outside conventional health services. In other articles NGOs play only a supporting role, focusing on the review and adjustment of instruments and recruitment[30,51-54]. From this perspective, know-how is concentrated in health professionals and NGOs are assigned a secondary role restricted to their ability to access key subjects such as MSM and black and Latin men. NGOs are therefore given a lower status in the treatment as prevention approach, where they are valued more for their closeness to specific groups and ability to recruit individuals than for what they have to say about prevention and sexuality.

Fan[55] criticizes the role of community organizations in HIV testing in a study that examines the hiring of NGOs by the Chinese government to expand testing among MSM. The study illustrates the commodification of HIV testing, driving the emergence of new forms of government health surveillance and a new type of community action. Via outsourcing, testing conducted by NGOs promotes a type of coming out, revealing the homosexual practices of individuals previously counted as heterosexual transmissions.

From a critical perspective, the participation of NGOs simply as support for government testing programs jeopardizes the role of activism in shaping prevention responses and public participation[56]. In a context where testing is informed by technological advances and technical and economic rhetoric, it will be interesting to observe how NGOs will tackle this challenge without detracting from their advocacy role. As can be seen in Brazil, recently, allocation of public funding to NGOs/AIDS has been centered on expanding the testing provision. In a scenario of scarce international resources, this fact has contributed to a shift away from their role as facilitators of public participation and advocacy[57] towards that of collaborators in HIV testing.

Discussion

The main differences between the VCT and TasP strategies identified in the literature systematized in Chart 3 illustrate the emergence of a new prevention paradigm centered on TasP. This approach is characterized by the expansion and diversification of testing provision aimed at improving diagnosis, whereby routine testing is touted as a strategy to encourage preventive practices. In the literature, sociological or psychosocial considerations regarding prevention are reduced to a specific discussion of the motivations for and barriers to testing and treatment. Counseling associated with testing focused on reflection and dialogue between counselor and patient, central to the VCT approach[58-61], takes on a less important role; while repeat testing, no longer seen as a sign of failure of individual prevention practices and prevention programs, has now become a goal.

Given the adoption of TasP in Brazil, it is important to reflect on the potential implications of this approach, bearing in mind that the main aspects of this strategy run counter to many of the historical guiding principles of the national response to HIV/AIDS, such as condom promotion, PLWHA rights, and tackling stigma around AIDS and social, gender, and sexual inequalities.

The 90-90-90 strategy clashes with the tradition of Brazil's HIV/AIDS response since it suggests that there is an overlap between prevention and care, placing greater emphasis on biomedical and psychological knowledge and practices over social knowledge. Prevention ceases to be a commitment of everyone involved based on creating the conditions to allow people to choose their form of protection, shifting towards the identification and treatment of infected people. Precedence is given to routine testing, since knowledge of HIV status has become a prerequisite for prevention based on timely treatment. This approach goes against voluntary counseling and testing, focused on information provision, dialogue, and reflection on contexts of vulnerability, which has guided policies aimed at tackling AIDS since the beginnings of the epidemic[6,58-60].

Although based on mathematical models which supposedly give this approach internal coherence, TasP has been the object of criticism, either due to the lack of support provided to patients, or because testing positive does not necessarily ensure the immediate initiation of treatment and treatment adherence[62]. Furthermore, TasP requires an effectively functioning health system to receive and retain patients, manage the adverse effects of medication, and actively search for patients who miss appointments. The backdrop of crisis in the SUS, characterized by high staff turnover, dismantling of services, and eventual medication shortages, poses a major challenge for the effectiveness of TasP in Brazil[63]. Other obstacles include flaws in the notification system, under-recording of cases, and underestimation of the trends of the HIV/AIDS epidemic in the country[7].

Studies have also questioned the failure to incorporate various actors in the construction of a multifaceted prevention response capable of coping with the sociocultural and human complexities of the epidemic[64]. In our view, the reconfiguration of prevention actions towards diagnosis and treatment should be met with caution. Give current funding shortfalls, the focus on TasP poses a significant threat to the elements that characterize Brazil's response to HIV/AIDS, such as the promotion of dialogue between partners for condom use, political mobilization of affected groups, tackling stigma and social and gender inequalities, and the fight for PLWHA rights.

Questions regarding the operational, ethical, and political implications of the new approach

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Chart 3. Differences between VCT and TasP strategies.

Counseling and Voluntary Testing	Treatment as Prevention
Prevention focused on voluntary testing and counseling, guided by raising awareness of vulnerability to HIV and the promotion of preventions, mainly by counseling and encouraging condom use	**Prevention** focused on routine testing, aimed at the initiation of treatment in order to reduce the viral loadand break the chain of transmission of HIV; counseling takes on a less important role and condom loses its importance
Principle of exceptionality of testing to detect HIV, rooted in the principal of informed and voluntary consent	**Principle of normalization** of testing, valuing the collective benefits of access to treatment over the right to individual autonomy
Provision of voluntarytestingin health services (e.g.: VCTCs) and **activities in nonmedical settings**	**Provision of testing in private and public settings** outside conventional health services and emphasis on outreach strategies for the most vulnerable groups
Participation of NGOs and social movements in advocacy efforts andpolicy formulation	**NGOs and social movements** work to support outreach strategies for testing of so called key-populations

have also been raised at international level. According to researchers and activists, the promotion of preventive practices tends to be restricted to care services, thus failing to tackle the underlying factors influencing vulnerability to HIV infection in specific groups[56,62,63].

Final considerations

The shift in the role of testing in the TasP approach reveals the prominence of a technocratic and biomedical logic centered on overcoming barriers to access to diagnostic testing and treatment and the belief that testing promotes the adoption of safe-sex practices. This approach fails to address the factors influencing an individual's vulnerability to HIV or tackle stigma surrounding AIDS, thus undermining human rights, the participation of activists and PLWHA as autonomous producers of preventive actions and discourses, and efforts to combat discrimination and social and gender inequalities. The lack of critical reflection on the negative implications of the biomedicalization processes that characterize current responses to Aids[12,56,66] tends to undermine the historic achievements of Brazil's world-renowned Aids program.

With respect to the formulation and implementation of policies to promote the expansion of access to testing and treatment, we argue that decision-makers should consider the potential synergies between present and past prevention strategies and the valuable contribution that civil society can make to this process[67]. In this way, it will be possible to develop more powerful and innovative approaches to health service provision, including HIV testing, and to tackling stigma and the vulnerability of specific social groups. As has been clearly shown in the past, community mobilization and social activism are equally vital to the success of biomedical prevention responses[66].

The present reflection seeks to outline the limitations and problems of the new prevention logic centered on diagnostic testing and treatment, aiming to highlight distortions, misconceptions, and gaps. Along these lines, it is important to problematize the use of the term 'key populations' instead of groups most vulnerable to HIV, centered on the social determinants affecting susceptibility to HIV infection. Its resemblance to the widely criticized term 'risk group', brings us to the negative effects of associating HIV with marginalized groups and of the limited reach of the hegemony of biomedicine in defining prevention and PLWHA care.

The active participation of people and communities affected by HIV/AIDS in defining and implementing care and prevention policy and interventions is key to the success of social responses to the AIDS epidemic in Brazil[68]. Against a backdrop of expanding access to diversified diagnostic technologies, it is necessary to consider the structural problems faced by the public health system affecting the provision of health care to patients diagnosed with HIV, weakening of social movements, and social and gender inequalities. This critical analysis helps to recognize

both the positive aspects of on HIV testing, such as the expansion of access to diagnostic testing among the most vulnerable populations, and the adverse effects that need to be overcome. Given the leading role that Brazil plays in defining international policies and the fact that TasP is a recent intervention, future updates of this review will provide the basis for analyzing the impacts of this global strategy in this country.

Collaborations

SS Monteiro was responsible for the coordination of the study, working on methodological design, discussion of results and writing and review of the article. M Brigeiro and C Mora were responsible for the methodological design, for the search, organization and analysis of the data and for the writing and revision of the article. WV Villela and R Parker acted in the discussion of the results and review of the article.

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