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REVIEW

Routine HIV testing in men who have sex with men: from risk to prevention

Uso rotineiro do teste anti-HIV entre homens que fazem sexo com homens: do risco à prevenção

Uso rutinario del test del VIH entre hombres que practican sexo con hombres: del riesgo a la prevención

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Abstract

We conducted a critical review of the literature on recurrent use of HIV testing in men who have sex with men (MSM). We performed a narrative review of the literature in which we analyzed the various conceptions on frequent testing over time, the implications for health programs, and the main social markers that influence the incorporation of HIV testing as routine care. Although it has existed since the 1990s, recurrent testing among MSM was frequently interpreted as increased exposure to HIV due to lack of condom use, and therefore as "unnecessary" testing. Beginning in the 2000s, periodic testing has become a programmatic recommendation and has been interpreted as a goal. Individuals' perception of their use of the test has rarely been considered in order to characterize such use as routine care. On the social and cultural level, individual aspects associated with recent or routine testing were included in contexts of favorable norms for testing and less AIDS stigma. Differences in generation, schooling, and types of affective-sexual partnerships play an important part in testing. Such differences highlight that the epidemiological category "men who have sex with men" encompasses diverse relations, identities, and practices that result in specific uses of the test as a prevention strategy. Thus, dialogue between programs, health professionals, and the persons most affected by the epidemic is crucial for building responses with real potential to confront the HIV epidemic, based on respect for human rights.

AIDS Serodiagnosis; HIV; Male Homosexuality; Human Rights

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Introduction

The importance of periodic HIV testing as a preventive strategy in the programmatic response to the HIV/AIDS epidemic has been highlighted at the global level, especially in disproportionately affected segments in contexts of concentrated epidemic, notably men who have sex with men (MSM). This is a relatively new tendency, marked by optimism over the possibility of combining different prevention strategies (biomedical, behavioral, and structural) [1] and supported by technological advances that have facilitated the expansion of testing.

An example of this trend is the *90-90-90 Target* proposed by the Joint United Nations Programme on HIV/AIDS (UNAIDS) in 2014 [2], which consists of eradicating the HIV epidemic by 2030 through diagnosis of 90% of the persons infected with HIV, maintenance of 90% of the infected persons in antiretroviral therapy (ART), and viral suppression in 90% of these persons. Another expression of this trend is the recommendation by the World Health Organization (WHO) that persons at risk of HIV infection (defined as MSM, sex workers, injecting drug users, and persons with a seropositive stable partner) have an HIV test at least once a year [3]. Still, despite the higher prevalence of testing among MSM when compared to other affected segments, in recent years Brazil and other countries have witnessed a rising incidence of HIV among MSM, with worrisome rates of late diagnosis [4,5]. In this context, in which access to treatment and viral load suppression are the principal strategies for ending the HIV/AIDS epidemic, early serological diagnosis is fundamental for public health strategies. However, this central role of HIV testing in building programmatic responses to the epidemic is relatively new. Although MSM had been using HIV testing as a prevention strategy since the 1990s [6], this use of the test was not immediately acknowledged by those responsible for the production of public policies for prevention.

On the one hand, we have the development of the testing technologies themselves. Until the late 1990s, having an HIV test was not simple. ELISA (enzyme-linked immunosorbent assay) testing requires laboratory equipment, water and electricity, and experienced technicians that know how to operate the equipment, prepare reagents, and pipette correctly [7]. Although the first rapid tests date to 1992 [8], they were not incorporated immediately into the prevention programs, but were used initially in developing countries lacking the infrastructure for performing ELISA [9]. In the United States, the Centers for Disease Control and Prevention (CDC) only began to recommend the rapid test in 1998 (for high-risk populations), and the test was not effectively incorporated until 2003 [7]. In Brazil, the Ministry of Health, working in partnership with the CDC, also incorporated the rapid test at this time [10]. Australia, for example, only released use of the rapid test in 2012 [11].

Meanwhile, there have been advances in treatment. At the beginning of the epidemic the principal program strategy for prevention was counseling [12]. The benefits of serological diagnosis for persons with HIV were debatable. Besides the fact that it was a fatal disease for which no treatment existed, AIDS could lead to the isolation and stigmatization of groups and individuals [12]. The prevailing international position was that testing should be confidential, voluntary, and accompanied by counseling, meaning that it could only be performed with the individual's free and informed consent [12,13]. Brazil's experience with anonymous testing dates to this time.

However, with advances in treatment, including the availability of zidovudine (AZT) in 1987 and highly active antiretroviral therapy (HAART) in 1996, another place for the test began to be built at the programmatic level. Not only could the test bring individual benefits in places where HAART was available, but it could also potentially interfere in the HIV transmission chain [14], as observed in 1994 with the role of AZT in the mother-to-child transmission of HIV [12]. In the early 2000s, a new global discourse emerged on testing, with more flexibility towards counseling and encouragement for the expansion of testing [12,15]. This movement reached one of its high points in 2009 with publication of the article by Granich et al. [16] in *Lancet*, promoting treatment as prevention (TasP) as a strategy to eradicate HIV [1,12]. This required periodic, universal testing and access to HAART for all persons infected with HIV [1,12,16,17]. Expectations in relation to TasP provided the basis for strategies underlying the UNAIDS *90-90-90 Target* and the Brazilian Ministry of Health's current clinical protocol and treatment guidelines for management of HIV infection in adults [1]. In this sense, in the age of HAART and in the context of the growing HIV epidemic among MSM [4,5], annual repeat testing by MSM was incorporated into the program guidelines [3,18].

The current study aims to conduct a critical review of the literature on recurrent use of HIV testing among MSM in light of the technological and social developments that have repositioned the test in the program strategies for confronting the HIV/AIDS epidemic. We will specifically examine the views on recurrent HIV testing and the social markers of difference [19] implied in the incorporation of the test as routine care among MSM.

Methodological procedures

A narrative review of the literature was performed. We selected studies with original research on factors associated with repeat/routine testing among MSM, prioritizing those in which this was the central theme. The principal database used was the PubMed, and we did not limit the searches to any given period, in order to have a historical overview of this literature.

Given the exploratory nature of the narrative review, different search terms (not necessarily descriptors) were used as we proceeded with reading the articles, and we also included studies cited in the articles' reference lists and institutional sources. Our line of analysis focused on the different conceptions and positions on repeat testing/routine testing over time and the principal social markers (affective-sexual partnerships, age, schooling, living place, spaces of socialization, disclosure of homosexual orientation, knowing persons with HIV, symbolisms of AIDS, perception and knowledge of the test) involved in this use of HIV testing in men who have sex with men.

Table 1 and Figure 1, respectively, present the articles analyzed and a brief contextualization of these studies according to important references in the development of testing policies.

Results

Different views of repeat testing

Based on a view of prevention until the mid-1990s, centered on counseling for abstinence, fidelity, and condom use in 100% of sexual relations [6], the news that many people had tested more than once in life was received with concern by health researchers, professionals, and policymakers. There was the notion that repeated negative HIV tests would lead persons to underestimate their exposure to HIV and fail to adopt protection in their sexual relations. A review in 2002 on repeat HIV testing showed that persons who tested several times tended to resist counseling [20].

The clash over whether to repeat the test and the possible disadvantages of this practice were based mainly on the discussion of the "risk behaviors" of persons that repeated the test. Risk served as a measure of both the need to re-test and as the basis for discussions on the effectiveness of counseling. We emphasize that "risk" was defined in various ways. In some studies it was synonymous with belonging to a risk exposure category [21] or having had sex with other men [20]. Such understanding of recurrent testing is sustained by the notions of risk groups and behaviors that marked the epidemic in various countries until the early 1990s.

The lack of understanding on what led persons to test several times is reflected in the criteria used to define the so-called "repeat testers". Some studies defined a "repeat tester" as someone who had tested more than once [22,23], while others included in this category men who had had three or more tests in their lives [24,25,26,27,28,29]. Since the 2000s, the term "repeat testers" has been replaced by other notions of the frequency of repeat testing, more adequate for the new guidelines on frequent testing for MSM.

Some studies had already raised the issue of regular testing [24,25,28], but in some cases this regularity was still defined according to the number of lifetime tests [24,28]. Beginning in the early 2000s, the parameter was the time elapsed since the last test, in keeping with the expectation that MSM should test periodically [30,31,32,33,34,35,36,37].

Table 1

Original studies analyzed, listed by order of publication.

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
McFarland et al. [21]	1995 (1992-1993)	San Francisco, USA	Concentrated epidemic	Persons tested in public HIV testing services	"Repeat negative testers": tested negative ≥ 3 times	MSM, IDU, and persons with episode of exposure – more likely to have tested ≥ 3 times	Logistic regression
Phillips et al. [24]	1995 (1992)	Tucson and Portland, USA	Concentrated epidemic	Gay and bisexual men that attend gay bars or contacted by telephone or at home	Repeat test: 3 lifetime tests. Regular test: test in previous 6 months	Greater perception of risk in anal sex; partner HIV+; perception of favorable social norms for HIV treatment; frequent communication on the test; more schooling; not having health insurance	Logistic regression
Norton et al. [22]	1997 (1995-1996)	London, England	Concentrated epidemic	Men and women users of HIV testing centers	More than one lifetime test	Among homosexual men: unprotected anal sex with ≥ 2 partners (last 6 months); unprotected oral sex with ≥ 2 partners (last 6 months); history of STI; testing as part of routine health check; knowing other persons tested or infected	[we only had access to the abstract]

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Repeat HIV testing as reiteration of exposure

Phillips et al. [24] conducted one of the first studies on the theme, still in the pre-HAART era and prior to more widespread use of the rapid test. According to the authors, one-fourth of HIV tests in the United States in 1992 were done in persons that had already been tested; the CDC proposed that an effort be made to decrease "unnecessary" testing. At the time, the test did not have a preventive role, but a diagnostic one. It was thought that repeat testing was being used as a substitute for safe sex practices

Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
Kalichman et al. [25]	1997 (1996)	Atlanta, USA	Concentrated epidemic	Men that participated in Gay Pride Festival	Men tested ≥ 3 times – as repeat; Regular – test every 6 months	Repeat and regular: protected receptive anal sex; protected anal sex (insertive or receptive); multiple sex partners (protected anal sex – receptive and receptive or insertive)	ANOVA
Leaity et al. [26]	2000 (1997-1998)	London, England	Concentrated epidemic	Men and women that tested at the Royal Free Hampstead Clinic	Repeat test – seeks test after prior negative test, except when in immunological window	Higher among: gay men, history of STI, knowing someone with HIV, and as routine health check	Chi-square, Fisher's exact test, and Mann-Whitney
Fernyak et al. [23]	2002 (1995-1997)	San Francisco, USA	Concentrated epidemic	Men, women, and transgender persons, users of HIV testing centers	Number of tests performed (quantitative variable)	Most individuals tested more than once were MSM between 25-34 years of age	Logistic regression

(continues)

or that it could lead to a perception of invulnerability in the case of repeated negative results [24]. Some authors at the time questioned the effectiveness of counseling to reduce the risk of infection and repeat testing by persons with little risk of infection and who wanted to confirm a negative result [27].

According to some studies, MSM that tested repeatedly were also the ones with the highest risk of HIV infection [22,24,26,27]. According to this line of reasoning, while some authors justified repeat testing based on this high risk of infection, others were concerned about the possible negative effects of this practice. It was argued that successive negative results could reinforce risk behaviors for HIV infection [26,27]. This concern over repeat testing resulted in proposals for interventions and specific counseling strategies for those who had tested more often (more than once lifetime or three or more times), aimed at reducing the risk to these persons through more intense interventions [27].

In some of the studies that emphasized the relationship between higher-risk practices and repeat testing, the criteria used to define risky sexual relations were limited only to individual aspects. While acknowledging that the factors associated with repeat testing were multifaceted and that such repetition could be part of routine health precautions [22], repetition of HIV testing was often associated with and interpreted according to risk behaviors, i.e. unprotected anal and oral sex and higher number of sex partners [25,30,31,32,34,37,38]. Such studies also highlighted that having more lifetime partners or more partners in a given period was associated with repeat [22], recent, or regular testing [25,30,31,32,34,37,38] among white and black MSM, as well as in other ethnic groups like Hispanics [28].

Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
MacKellar et al. [27]	2002 (1994-1998)	USA (7 cities)	Concentrated epidemic	MSM	≥ 3 tests	Age (20-22 years, compared to 15-19); municipality of residence; more schooling; living alone or with friends (compared to living with parents); using public health service; first test less than 1 year after first sexual relations; comfortable in relation to attraction to men; higher odds of being seropositive; partnerships: 1 or more steady partners HIV+; paid sex	Logistic regression
Jin et al. [30]	2002 (1996 -2001)	Sidney, Australia	Concentrated epidemic	Homosexual men	Recent test: in previous year	Reduction of recent testing between the years observed, especially among younger individuals. Associations with recent testing: age 25-29 years; city of residence; having gay friends; having several regular partners; regular relationship with up to 1 year duration; agreement on safe sex inside and outside regular partnerships; knows the serology of regular partners; practice of unprotected anal sex	Logistic regression and Mantel- Haenszel

(continues)

Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
Fernández et al. [28]	2003 (1999-2001)	South Florida, USA	Concentrated epidemic	MSM	Regular test: at least twice a year; repeat: lifetime ≥ 3 tests	Repeat test: mean age 32 years; more schooling; thought he had STI; ≥ 2 partners. Regular test: first test requested spontaneously; does not believe he has odds of being infected with HIV (compared to low or some odds, no difference for high odds of infection); 100% condom use	Logistic regression
Ryder et al. [29]	2005 (1999-2001)	Ontario, Canada	Concentrated epidemic	Men and women	Having had more than 2 negative tests	-	Qualitative study – narrative analysis

(continues)

Although backed by different justifications, authors that analyzed repeat testing from a more biomedical perspective and those who considered the importance of community prevention strategies opposed programs that discouraged repeat HIV testing [22,24,25,26,27].

Repeat HIV testing as a prevention strategy

In the context of expanded testing and optimism regarding the substantial drop in AIDS mortality following the introduction of HAART in 1996 and thus the greater possibility of controlling new infections, beginning in 2002 we witnessed a new scenario of publications on routine repeat testing. Another view of HIV testing began to mark the analyses on repetition or frequency of the test. HIV testing began to be identified more clearly as a highly recommendable prevention strategy from the point of view both of governments and programs [30,39].

This notion of repeat testing as part of individuals' routine prevention was already present in some studies published before 2002. In 1995, Phillips et al. [24] defended the preventive role of the test in the sense of reinforcing safe practices and increasing safety for gays and bisexual men deeply impacted by the epidemic. For these authors, testing repeated times could be a rational solution for the uncertainties confronted by these men, e.g., in relation to the low probability of infection via oral sex, in addition to being fundamental for men in serodiscordant stable relationships and for those who wanted to treat early in case of having been infected. In 2000, Leaity et al. [26] reached similar conclusions, indicating that the test was incorporated as part of a personal risk reduction strategy. Along

Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
MacKellar et al. [31]	2006 (1998-2000)	Baltimore, Dallas, Los Angeles, Miami, New York, and Seattle, USA	Concentrated epidemic	Young MSM (subsample of larger study, recruitment in places of MSM sociability)	Recent test – last test in year prior to interview	Variables associated with having tested recently: annual income ≥ USD 10,000; believes it is important to receive HIV prevention services from a health professional; having discussed HIV testing with a health professional; knowing that HAART exists; having disclosed one's sexual orientation to several persons; lifetime ≥ 6 sex partners; history of some STI; use of illegal drugs in last 6 months; low perceived risk of HIV; talks about serological status with new partners	Logistic regression
Helms et al. [42]	2009 (2002-2006)	King County, San Francisco, Denver, and District of Columbia, USA	Concentrated epidemic	MSM that visited one of the four STI clinics with electronic patient record data	Works with inter-test interval	From 2002 to 2006, median interval between tests decreased significantly (from 302 to 243 days). Shorter interval between tests was associated with younger age, testing in King County, black individuals	General estimating equations model (GEE)

(continues)

Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
Holt et al. [32]	2009 (2002-2006)	King County, San Francisco, Denver, and District of Columbia, USA	Concentrated epidemic	MSM that visited one of the four STI clinics with electronic patient record data	Works with inter-test interval	From 2002 to 2006, median interval between tests decreased significantly (from 302 to 243 days). Shorter interval between tests was associated with younger age, testing in King County, black individuals	General estimating equations model (GEE)
Flowers et al. [33]	2009 (2002-2006)	King County, San Francisco, Denver, and District of Columbia, USA	Concentrated epidemic	MSM that visited one of the four STI clinics with electronic patient record data	Works with inter-test interval	From 2002 to 2006, median interval between tests decreased significantly (from 302 to 243 days). Shorter interval between tests was associated with younger age, testing in King County, black individuals	General estimating equations model (GEE)
Katz et al. [34]	2013 (2003-2010)	Seattle and King County, USA	Concentrated epidemic	MSM. Data from public surveillance system in Seattle and King County, of MSM tested in a public STI clinic and in the Gay City Health Project (GCHP)	Testing frequency: number of days between current test and last test (except tests done less than 30 days ago, considered follow-up)	Associations in GCHP and STI clinic: younger; sex with men only in previous year; 10 or more male partners in previous year. GCHP: use of inhalable nitrites; seen regularly by the same health professional; reported testing regularly for HIV. STI Clinic: history of STI	General estimating equations model (GEE)

(continues)

Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
Katz et al. [38]	2013 (2004-2011)	Seattle, USA	Concentrated epidemic	MSM tested in a community testing program	Regular test defined according to user's perception of the test as such	Seen regularly by the same health professional; sex with men only in previous year; 10 or more male partners in previous year; use of inhalable nitrites; does not use injecting drugs; has not had unprotected anal sex with HIV+ partner or with unknown serology	General estimating equations model (GEE)
Knussen et al. [35]	2014 (2010)	Glasgow, Scotland	Concentrated epidemic	MSM recruited in places of MSM sóciability	Recent test: test in previous year	Tested in last year (compared to longer ago): less fear of positive result; social norm favorable to test; protected or unprotected anal sex in previous year; less than 25 years old (in comparison with MSM tested longer ago)	Chi-square, ANOVA, and logistic regression
Rendina et al. [36]	2014 (2012)	New York, USA	Concentrated epidemic	MSM users of Grindr app	Recency of testing (groups): last test < 3 months; 3-6 months; 6-12 months; > 12 months; never tested	Recent unprotected anal sex (3 months)	Logistic regression

(continues)

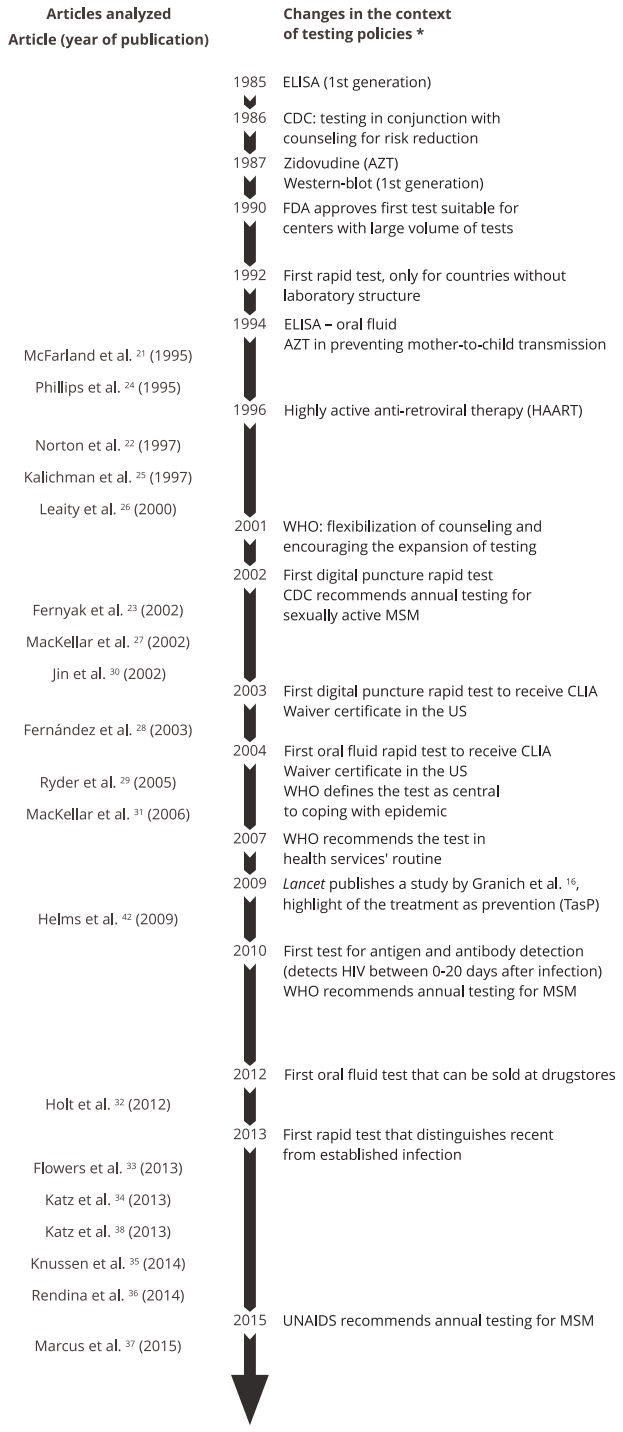
Table 1 (continued)

Article	Year of publication (year of data collection)	Place	Type of epidemic	Study population	Criteria for defining routine test/repeat test	Principal associations with routine test/repeat test among MSM	Analysis [observations]
Marcus et al. [37]	2015 (2013-2014)	Germany (national sample)	Concentrated epidemic	MSM recruited in places of MSM meetings and socialization	Recent testing: last test performed in previous 12 months	Main motivation for the test: routine associations (compared to never tested): older; living in cities with > 100,000 inhabitants; disclose sexual orientation to classmates, coworkers, or a health professional; more time spent at spaces for gay sociability; less internalized homophobia; less HIV-related stigma associations (compared to tested more than 12 months previously): younger; less disclosure of sexual orientation to classmates, coworkers, or a health professional; more time spent at spaces for gay sociability	Logistic regression

ANOVA: analysis of variance; HAART: highly active anti-retroviral therapy; IDU: injection drug user; MSM: men who have sex with men; STI: sexually transmitted infections.

Figure 1

Timeline: articles analyzed, contextualized according to advances in treatment, technologies, and testing policies.



CDC: Centers for Disease Control and Prevention; CLIA: Clinical Laboratory Improvement Amendments; ELISA: Enzyme-Linked Immunosorbent Assay; FDA: U.S. Food and Drug Administration; MSM: men who have sex with men; UNAIDS: Joint United Nations Programme on HIV/AIDS; WHO: World Health Organization.

* Source: The Henry J. Kaiser Family Foundation [8]; NAM [9]; Bayer & Edington [12]; Centers for Disease Control and Prevention [53]; Wolffenbüttel & Carneiro Junior [54]; AIDS.gov [55]; U.S. Food and Drug Administration [56].

the same line, in 1997 Kalichman et al. [25] had stated that recurrent use of HIV testing was associated with higher rates of condom use and positive attitudes towards one's own health, so that it could function as a prevention strategy for some MSM. According to the authors, the test had been incorporated by MSM as a self-care resource, like condoms.

However, the studies published since 2002 show concerted efforts at establishing program guidelines on routine repeat testing. The issue was no longer whether repeat testing should be discouraged, but rather to identify who should be encouraged to test [23,31]. Although some authors suggested different counseling strategies for different groups of MSM [23], no mention was made of restricting access to HIV testing.

Recent test as an indicator of current individual care

In this context, in 2002 the CDC began to recommend that sexually active MSM be tested for HIV at least once a year [39], a policy that was maintained in subsequent publications [40,41]. Adherence to this recommendation also became the object of analysis [31,35,36,42]. While repeat testing had initially raised concern, in this new context the "problem" became those who had not tested in the previous year (e.g., Katz et al. [38], Knussen et al. [35]).

At this moment, based on both a reading that acknowledged the importance of community HIV prevention strategies and another that prioritized a biomedical perspective, many studies began to detect the preventive potential of periodic HIV testing. According to community strategies, repeat testing was seen as resulting from a rational and informed decision, especially by men in the gay community [30]. The studies also highlighted the importance of knowledge of serological status in establishing sexual agreements with partners [37]. From a biomedical perspective, some studies contextualized the importance of routine testing to avoid late detection of HIV, the resulting high costs, and greater risk of HIV transmission [31,34,36,37]. Others claimed TasP as the justification for routine use of HIV testing in prevention [33,35].

Test regularity became central in these analyses. Some authors began to establish approximations in this sense, constructing categories of "regular" or "repeat testers" as a function of the lifetime number of tests [28]. Other studies aimed to understand the differences between MSM who had never tested or had tested longer ago versus those who had tested recently [31,32,37].

Although annual testing became a recommendation, the debates continued on the risk of HIV infection among those that tested repeatedly. Unprotected oral sex was no longer mentioned in these studies or was relegated to a secondary level as a lower-risk practice [23]. The practice of anal sex continued to interest researchers.

Some authors sought to contextualize unprotected sex, identifying the type of partnership and/or partner's seroconcordance (e.g., Jin et al. [30]). Other studies adopted a biomedical perspective whereby sexual risk was evaluated according to seroconversion rates [23]. The same was done with risk perception: MacKellar et al. [31] found that seroconverted MSM who did not disclose episodes of exposure made an inadequate assessment of their risk.

Along this line of inquiry, some authors continued to treat protected or unprotected anal sex independently of the partner, making it difficult to understand whether the risk mentioned in their studies was "actual risk" from the men's point of view, or risk reduction [28,36]. Although some of these studies acknowledged this limitation and even the multiplicity of different practices that were potentially being treated as the same phenomenon (e.g., Rendina et al. [36]), nearly all of them concluded that persons that tested repeatedly or recently were exposed to greater risk of HIV infection [28,36].

The potential danger of successive negative results, frequently mentioned in the first studies on repeat HIV testing, began to be cited less frequently. The theme of disinhibition/relaxation of sexual practices became less debated. However, some authors still interpreted the association between recent testing and unprotected anal sex as influenced by a feeling of invulnerability resulting from successive negative results [36]. A qualitative study on this theme revealed a broad mosaic of possible situations in the presence of repeated negative results [29]. The authors concluded that their data were worrisome, since for some individuals the negative results signaled immunity, while for others they reinforced the maintenance of practices that were not "100% safe"; meanwhile, in light of the risk reduction strategies, the interviewees' discourse gained another dimension. HIV testing appeared to be grasped

according to each individual's needs and histories, and there was more than one way of using the test, with a considerable share of these ways consisting of creating sustainable risk reduction practices or seeking care in case of exposure to risk of infection.

By including community prevention strategies in their analyses, other authors felt it was expected that men who incorporated the test into their lives would have higher odds of reporting unprotected anal sex than men who had never tested [32]. Test-seeking was thus not viewed as the result of failure in prevention or increased risk, but as a conscious strategy by MSM.

Some authors observed that men who had tested recently reported fewer practices considered risky, e.g., unprotected anal sex with a partner with unknown serology [35,38]. Unprotected anal sex was not associated with recent HIV testing without taking into account knowledge of the partner's serology and type of partnership [35]. Men tested recently appeared to adopt condom use in anal sex or other risk-reduction strategies [35].

In addition to the debate on the association between unprotected sex and repeat testing, the literature points to other factors associated with testing more than once that reinforce the use of the test as a preventive strategy and self-care. Routine testing was frequently associated with greater concern and/or care with one's own health [22,24,25,26]. More recently, Katz et al. [34,38] showed that shorter interval between HIV tests was associated with having regular access to health services and taking routine care for one's health. According to this logic, Marcus et al. [37] found that "routine" was the most frequent reason for testing in the previous year among MSM.

Lorenc et al. [43], in a review of qualitative studies in England, United States, Scotland, and Canada found that habit could lead to seeking the test, regardless of any specific trigger. Routine testing was associated with a sense of responsibility for one's own health and commitment to prevention, an aspect not always emphasized in studies on HIV testing.

Along this line, some studies showed that perceiving the importance of receiving information on HIV/AIDS prevention from a health professional and discussing the test with a professional were predictors of recent testing (≤ 1 year) [31]. Holt et al. [32] observed that it was more likely for men who had tested recently to seek information/counseling from a health professional when compared to those who had tested more than a year previously, and that they had sought help more frequently than MSM who had never tested.

Other studies found an association between repeat testing and having acquired or thinking that one had acquired an STI at least once in life [22,28]. Fernández et al. [28] interpreted that believing that one had acquired an STI increased the perception of risk of HIV infection. This association was also observed in MSM that had tested recently (time since last test ≤ 1 year) [31].

Social markers of difference in testing – how to interpret the epidemiology of risk beyond individual behavior?

As highlighted by Aggleton & Parker [44], when we use the term "MSM" we are including very different experiences, subjectivities, and positions within a single category. Thus, it is not possible to affirm a hegemonic practice or a collective MSM identity that be fully encompassed by prevention programs. It is thus essential to understand how the dimension of individual practices and behaviors discussed above is inscribed in diverse intersubjective contexts informed by symbolic relations and social norms that operate as modulators of repeat testing. Along this line, we will present social markers of difference that act as facilitators or barriers for MSM to incorporate the test into their routine health care. Analyzing social markers of difference allows understanding how the varied cultural and discursive normative productions on difference (type of partnership, age, socioeconomic status, skin color, and others) can result in inequality and oppression, as well as diversity and agency [19].

- **Affective-sexual partnerships**

Affective-sexual partnerships and relationships are central to understanding how MSM incorporate the test into their preventive practices for managing their sexual risk. Responsibility for their own health and that of others can be decisive for an individual to seek the test [43]. The test can also play a part in the relationships as proof of serological status for a potential partner, for example, to be able to

have sex without condoms or to reduce risks in sexual interactions [26,43]. Meanwhile, in relationships involving trust and commitment with the partner, the test will not necessarily be incorporated, since the partners do not feel exposed to the risk of infection [43].

Monogamous relationships or ones that have lasted at least two years were associated with a decrease in recent testing in Australia [30]. In Germany, MSM not in stable partnerships showed higher odds of recent testing (versus having been tested longer ago) when compared to those in open relationships [37].

Having a seropositive partner was also associated with having tested recently, which means a rational use of HIV testing [30]. In addition, disclosing one's serology to the partner was more common among MSM that had tested recently [31,32]. Being unaware of the partner's serology was more common among young MSM who were testing for the first time, according to MacKellar et al. [27]. Holt et al. [32] showed that the expectation that HIV-negative partners would disclose their serology before having sex was greater among MSM who had tested recently and MSM who had never tested than among those who had tested longer ago. Living up to their expectations, men who had tested recently discussed their serological status more frequently with casual partners [32]. Meanwhile, men never tested were perhaps counting on disclosure from tested partners, since they themselves had never tested [32].

- **Age**

Age was frequently associated with repeat or regular testing. However, the effect of age on inclusion of the test in the strategies to deal with HIV is not homogeneous and depends on the contexts in which the analyses are performed. Some studies showed that younger MSM tested more often than older MSM [25] or had tested more recently [35]. In Australia, at two different moments, diverse associations were observed between recent testing and age. In 2002, recent testing was more frequent among younger men [32]. In 2012, recently tested MSM were older than those who had tested longer ago, who in turn were older than those who had never tested [30].

According to other authors, the most frequent age bracket of men who had tested more than once was 25 to 34 years [23], which coincided with the age bracket with the highest HIV incidence in San Francisco (USA). In Germany, this was also the age bracket with the highest recent test rate [37].

- **Schooling and place of residence**

In relation to schooling, Holt et al. [32] observed some differences, e.g., MSM with more schooling were more likely to have tested more than a year previously (compared to those who had never tested), but there was no difference in relation to those who had tested recently.

Place of residence was associated with testing in some studies [32,37], and repeat testing was more likely in residents of State capitals and other large cities [32,37]. Myers et al. [45] pointed out that it is common for MSM to be attracted to large cities. Historically, large cities provide a more favorable setting both for anonymity and for social interaction and the development of a gay culture [46].

The relationship between these markers and the incorporation of HIV testing into routine care for one's health should be analyzed in its specific context, based on a reading that includes networks of sociability, access to information, and prevention services.

- **Spaces for socialization and disclosure of homosexual orientation**

Some contextual conditions were considered more favorable for repetition or regularity of HIV testing. Socialization in the gay community, coming out as gay, and exposure of one's sexual orientation to others were analyzed as factors that favored test-seeking. These differences may mark greater socialization in cultures of prevention incorporating HIV testing as a strategy.

Belonging to the gay community was positively associated with recent testing in Australia in 2002 [30]. Ten years later this association was observed again: having more gay friends was associated with recent testing (≤ 1 year) [32]. As observed in Australia, in Germany, MSM who visited spaces of MSM sociability showed higher odds of having tested recently as compared to never having tested or having tested longer ago [37].

As for online socialization, Holt et al. [32] showed that MSM that had never tested spent more time on social networks on the internet, a space suggested by the authors for circulating HIV prevention campaigns [32]. The culture of using the test as a preventive strategy may not have taken hold in this virtual space of MSM sociability.

Belonging to a gay community can favor sharing and experiencing community prevention practices, and facilitate access to culturally adequate information on prevention. MSM that had tested recently did not differ from those who had tested more than a year before, but they had higher odds of having sought information in the gay community through HIV/AIDS organizations, compared to those who had never tested [32].

With a similar effect to the occupation of spaces of MSM sociability, the acceptance of one's own sexual orientation appears to act as a facilitator for the incorporation of HIV testing into HIV prevention practices. Marcus et al. [37] stated that it was more likely for MSM with lower levels of internalized homophobia to have tested recently, compared to never having tested. In addition, MacKellar et al. [31] showed that MSM who had disclosed their sexual orientation to others had higher odds of recent testing (compared to those who had never tested or had tested longer ago). In the case of friends and coworkers, according to Marcus et al. [37], MSM who had tested recently revealed their sexual orientation more to coworkers than those who had never tested, but they revealed their orientation less than those who had tested longer ago. Having disclosed one's sexual orientation to a health professional was more frequent among MSM tested recently than among those never tested and those tested longer ago [37], which could be an important marker of access to services and adequate information on prevention according to sexual orientation.

Another relevant element for prevention is drug use in spaces of MSM sociability. An association can be seen between recent HIV testing and illegal drug use in the previous six months [31], as well as regular testing and the use of inhalable nitrites in the previous year [38].

- **Knowing persons with HIV and symbolisms of AIDS**

Further in relation to the context favoring test-seeking among MSM, we highlight the association between knowing seropositive persons and repeat testing [25,26]. Some of these studies suggest that repeat testing can be encouraged by experiences with seropositive friends and relatives, e.g., experiences with illness and deaths.

More favorable attitudes and norms towards HIV/AIDS and HIV testing also helped build a more favorable context for frequent testing. When compared to MSM that had never tested, those tested in the previous year had fewer negative attitudes towards sex with seropositive partners [33] and were less prone to stigmatize them [37]. MSM that had tested recently (≤ 1 year) were less likely to report fear of the test result than MSM who had never tested [33,35] and MSM tested longer ago [35]. Meanwhile, in relation to fear of the result, MSM that had tested more than a year previously did not differ from those who had never tested [35].

- **Perception and knowledge of the test**

Social norms favoring HIV testing, communication of the test result, and perception of benefits in obtaining medical care in case of infection were associated with repeat testing in the study by Phillips et al. [24]. More recently, Knussen et al. [35] also observed this association: MSM tested in the previous year were more likely to perceive HIV testing among gays as a norm ("almost all of my gay friends have tested") when compared to MSM tested longer ago or never tested. No difference was seen between MSM that had tested more than a year previously and those never tested [35]. Flowers et al. [33] showed that perceiving the test as a benefit was associated with having tested recently (compared to never having tested). Along this line, one study showed that knowing of the existence of HAART was also associated with recent testing [31]. According to Lorenc et al. [43], in the presence of more negative social norms towards HIV, it may be easier to deal with uncertainty than with a potentially positive test result. Not knowing one's own serology is as if the person continues on the same level as all the untested persons, whereas having the test would require taking stances and making changes [43].

Final remarks

In the studies analyzed here, the criteria used to classify frequency of HIV testing in the literature were the number of tests or time elapsed since the last test, except for two studies [25,38] in which the categorization was based on the individuals' perception of how they relate to HIV testing. In the semantic field, "repetition" of the test, a characteristic of the literature in the 1990s, appears to represent the "amount" of tests and is linked to behaviors interpreted predominantly on the individual level. Meanwhile, "routine" testing appears to emphasize the incorporation of a measure of care with the individual's own health, and in this sense the social markers that influence individual behavior allow a broader understanding of the different testing contexts for men who have sex with men.

In this sense, it is essential to integrate epidemiological knowledge with other approaches (e.g., qualitative) in order to take the men's own perspective into account on routine use of HIV testing. In order for the programmatic response to be adequate and effective, it is crucial to have a better understanding of the motivations and contexts of those that have adopted the test as routine.

On the social and cultural levels, individual aspects associated with repeat or recent testing are part of a context marked primarily by favorable norms for the test and less stigmatization of persons living with HIV/AIDS. This context may have been built in spaces of homosexual sociability in which individuals find acceptance and support for disclosing their sexual orientation. Thus, the intersection of these different social markers allows glimpsing test-seeking trajectories as routine care in which MSM gradually emancipated themselves as subjects of the right to health, by confronting processes of stigmatization and discrimination that impacted this population and substantially shaped the social response to the AIDS epidemic. It is also possible that generational differences constitute an important element in the incorporation of routine testing. Such differences are not homogeneous and need to be carefully contextualized in order to understand how they affect the incorporation of HIV testing in the lives of younger or older MSM.

As an expression of the right to health, information on HIV testing should be spread widely, and access should be free of financial, geographic, or discriminatory constraints [47]. From the point of view of prevention that includes persons as protagonists of their own daily lives, as subjects of the right to health [48], it is essential that the spontaneous search for the test be incorporated into the routine of persons potentially exposed to HIV, as best adjusted to their wishes and needs for care. It is thus necessary to remember that the epidemiological category "men who have sex with men" always includes a wide diversity of settings, identities, and practices that result in specific uses and strategies of the test as prevention for each person and in each territory.

Equally important is to qualify and expand the supply of HIV testing among MSM as part of a routine that includes other forms of care, as recommended by the WHO since 2007 [49]. Although testing initiated by health professionals has led to an important increase in testing among women in prenatal care in various countries [50], such testing is frequently associated with late diagnosis of HIV [51]. Therefore, overcoming organizational barriers in services to prioritize care for persons with greater vulnerability to HIV infection, organizing testing in the intense flow of care, and training professionals not to feel embarrassed when addressing questions on sexual practices with users [52] are central tasks for more active routine testing in health services.

We also emphasize the late response by public health when compared to the community response. Long before the programmatic recommendation of routine testing for MSM, in the mid-1990s gay men were already using repeat HIV testing as a strategy for dealing with the epidemic [6]. As we have seen, this use of the test was not always interpreted the same way by health professionals, policymakers, and researchers, but as a possible failure of counseling programs, lack of knowledge, or even resistance to the incorporation of safe sex practices. A history of routine use of HIV testing shows that dialogue between programs, health professionals, and the persons most affected by the epidemic, who have accumulated knowledge from managing their sexual risk on a daily basis, is central to building responses with real potential to deal with the HIV epidemic and ensure respect for human rights.

Contributors

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Resumo

Desenvolvemos uma revisão crítica da literatura sobre o uso recorrente do teste anti-HIV entre homens que fazem sexo com homens (HSH). Procedemos a uma revisão narrativa da literatura, em que analisamos as diversas concepções sobre testagem frequente ao longo do tempo, suas implicações para os programas de saúde e os principais marcadores sociais que influenciam a incorporação do teste anti-HIV como rotina de cuidado. Embora exista desde os anos 1990, a testagem recorrente entre HSH era frequentemente interpretada como exposição aumentada ao HIV em razão da ausência de uso do preservativo e, consequentemente, uma testagem "desnecessária". A partir dos anos 2000, a testagem periódica passou a ser uma recomendação programática e, sua realização, interpretada como meta a ser atingida. A percepção dos indivíduos sobre o uso que faziam do teste foi raramente considerada para caracterizar este uso como rotina de cuidado. No plano social e cultural, aspectos individuais associados ao teste recente ou de rotina estiveram inscritos em contextos de normas favoráveis ao teste e de menor estigma da AIDS. Diferenças geracionais, de escolarização e relacionadas ao tipo de parceria afetivo-sexual desempenham importantes papéis para o teste. Tais diferenças realçam que a categoria epidemiológica "homens que fazem sexo com homens" abrange diversas relações, identidades e práticas que resultam em usos específicos do teste como estratégia de prevenção. Assim, o diálogo entre programas, profissionais de saúde e as pessoas mais afetadas pela epidemia é central à construção de respostas com efetivo potencial de enfrentamento à epidemia de HIV, e pautadas no respeito aos direitos humanos.

Sorodiagnóstico da AIDS; HIV; Homossexualidade Masculina; Direitos Humanos

Resumen

Realizamos una revisión crítica de la literatura sobre el uso recurrente del test del VIH en hombres que practican sexo con hombres (HSH). Se realizó una revisión narrativa de la literatura analizando las diversas concepciones sobre los testes frecuentes a lo largo del tiempo, las implicaciones para los programas de salud y los principales marcadores sociales que influyen en la incorporación del test como atención de rutina. Aunque ha existido desde los años 1990, testes recurrentes entre HSH fueron frecuentemente interpretados como una mayor exposición al VIH debido a la falta de uso del condón, y por lo tanto como testes "innecesarios". A partir de los años 2000, lo testes periódicos se han convertido en una recomendación y han sido interpretadas como una meta. La percepción de las personas sobre el uso que hicieron del test raramente fue considerada para caracterizar este uso como rutina de la atención. En el plano social y cultural, los aspectos individuales relacionados con los testes recientes o de rutina se incluyeron en contextos de normas favorables para las pruebas y disminución del estigma del SIDA. Las diferencias en la generación, la escolarización y los tipos de parejas afectivo-sexuales desempeñan un papel importante en las pruebas. Estas diferencias destacan que la categoría epidemiológica "hombres que tienen relaciones sexuales con hombres" abarca diversas relaciones, identidades y prácticas que resultan en usos específicos del test como estrategia preventiva. Por lo tanto, el diálogo entre los programas, los profesionales de la salud y las personas más afectadas por la epidemia del VIH es crucial para construir respuestas con el verdadero potencial para enfrentar la epidemia, sobre la base del respeto a los derechos humanos.

Serodiagnóstico del SIDA; VIH; Homosexualidad Masculina; Derechos Humanos

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