

# The added value of Web Listening Analysis to understand communication needs regarding HIV, AIDS, and STDs in Italy

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**Parole chiave:** Web listening; Comunicazione; Prevenzione; AIDS; Malattie Sessualmente Trasmesse; Persone che vivono con l'HIV; Giovani

## Abstract

**Background.** Institutional communication on human immunodeficiency virus, acquired immunodeficiency syndrome, and sexually transmitted diseases requires the knowledge of people's information needs and tools mainly used for information on health issues. To this goal, a web listening analysis was conducted by Istituto Superiore di Sanità jointly with the Ministry of Health and experts in the field.

**Methods.** Spontaneous listening on the web and on social channels, in relation to conversations referring to human immunodeficiency virus, acquired immunodeficiency syndrome or sexually transmitted diseases was recorded through an integrated Social Listening platform. A database of over 2 billion indexed documents was scanned and analyzed to extract documents containing at least one selected keyword on human immunodeficiency virus, acquired immunodeficiency syndrome, sexually transmitted diseases, published between October 1<sup>st</sup> 2021 and September 30<sup>th</sup> 2022.

**Results.** Web conversations on sexually transmitted diseases took place mainly on Facebook, which is the source of almost half of overall mentions and of the 66% of total messages. However, Instagram and TikTok were the sources where most users interacted. In the sexually transmitted infections corpus of documents, the mostly used terms on the web were human immunodeficiency virus and acquired immunodeficiency syndrome. People living with the human immunodeficiency virus expose themselves very scarcely

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*on the public web places. In the public sphere, human immunodeficiency virus and acquired immunodeficiency syndrome are faced impersonally, with opinion based on theoretical knowledge.*

**Conclusions.** *Data analysis shows how the perception and discussions on human immunodeficiency virus and acquired immunodeficiency syndrome are different among the general population compared to what occurs among people living with human immunodeficiency virus disease. For the general population, the recurring elements of the analysis are seasonality, attention to news events, knowledge of human immunodeficiency virus and acquired immunodeficiency syndrome linked to the past. People living with acquired immunodeficiency syndrome do not expose themselves publicly on the web, using more protected web places; consequently, stigma is certainly present.*

## Introduction

Since the identification of the virus causing the **Acquired ImmunoDeficiency Syndrome** (AIDS) in 1983, the Human Immunodeficiency Virus (HIV) pandemic has been one of the most impactful epidemics, influencing not only public health but also all areas of social life, across entire generations (1,2). Joint United Nations Program on HIV/AIDS (UNAIDS), identifying goals to be achieved by 2030 to combat the ongoing epidemic, has produced a document outlining the 95-95-95 targets (3). At present, these goals have not been completely achieved.

Anyway, over the years, significant milestones, such as the discovery of therapeutic and preventive treatments, have profoundly reshaped the landscape of HIV and AIDS. These discoveries have changed the natural history of the epidemic and have also influenced public perception of the infection and its consequences. The evolution of the epidemic has led to a growing awareness of the communication needs of different populations. These needs vary significantly between those who lived at the beginning of the spread of the virus and those who are currently facing it. In an era characterized by digital communication, which has proven crucial in shaping behaviors and filtering information, it becomes crucial to understand how this evolution has influenced the perception and management of HIV and AIDS. The proliferation of misinformation, including the spread of unverified information, further complicates matters, underscoring the need for meticulous analysis of communication channels and their effectiveness in disseminating accurate and relevant messages (4). The European Centre for Disease Prevention and Control (ECDC) has proposed monitoring social media as a new research tool to identify factors influencing vaccination perception among a population (5).

By listening, monitoring, and analyzing conversations on social media, it is possible to identify what type of information is being rapidly shared in

real-time, thus providing information that counteracts rumors or misinformation. Social listening, by monitoring social media conversations to identify the topics being discussed, allows to understand the mood of individuals posting on social media (qualitative analysis), while social monitoring focuses on gathering data and metrics, such as engagement rates or the number of mentions (quantitative analysis) (6).

More specifically, effective communication about HIV prevention and other sexually transmitted infections targeting young people must necessarily be based on the acquisition of informative data to understand the type of people being addressed, to identify their needs and to create targeted messages, adapting them to that specific population segment.

In this process, social media monitoring plays a fundamental role, as it allows the acquisition of both quantitative and qualitative data.

Social media data can thus help to design campaigns that truly reach different target groups, like young people, using their own language and a communication adapted to the environments (digital and otherwise), where they operate and interact. The aim is to promote protective behaviors such as condom use, vaccination and regular testing.

Furthermore, real-time observation of campaign results would make it possible to quickly adapt strategies, improving their impact.

In an increasingly digital and constantly evolving world, such as the one we are immersed in today, the integration of data in communication processes is therefore not only an opportunity but a necessity.

In the context of the overall public health goal of eradicating HIV and other sexually transmitted infections, it is essential that, similarly to the substantial evolution observed in digital communication, the examination of disease perception also acknowledges this transformation.

Consequently, the Istituto Superiore di Sanità, in collaboration with the Ministry of Health, conducted a web listening analysis, without any possibility of

tracing the sources of the message, to identify:

- the information needs and awareness of the population on the topic;
- the barriers that prevent changing risky behaviours;
- the difficulties (subjective and objective) of accessing and using the test.

The results of the web listening analysis can be used, in the near future, to create more effective institutional communication on sexually transmitted diseases (STDs) and HIV, in order to achieve the 95-95-95 goals as well.

## Methods

### 1. Study Design

This observational study involved the research and analysis of a corpus of Italian social media conversations related to AIDS, HIV, serotypes, HIV testing, and STDs which were posted online from October 1<sup>st</sup>, 2021, to September 30<sup>th</sup>, 2022 and analyzed for the purpose of the study during October 2022. The research project used a mixed-methods approach integrating quantitative data and qualitative text analysis, following the four-phase framework outlined by Andreotta et al. (7).

This research method doesn't comprise a statistical sampling and is based on the Blogmeter Suite platform. This platform serves as an integrated social listening tool used for social media and web analysis. This platform leverages text data from a vast database. It facilitates both research design and analysis, offering an intuitive interface for database exploration using keyword sets, along with a suite of data visualization tools and a comprehensive repository of all monitored documents. The overall corpus of documents (a database of over 2 billion texts documents, collected through official social media Application Programming Interfaces - APIs or Blogmeter's proprietary crawlers) is considered as a large enough proxy of the entirety of content (not people) online; this database is then interrogated with keyword-based queries, creating a smaller dataset relevant to the topic which then is analyzed with a qualitative approach. This social listening research model follows the proposal of Caliandro & Gandini (8) and takes into account the peculiarities of qualitatively analyzing digital content over traditional data.

The dataset was then automatically classified by the Blogmeter Suite software into groups or classes based on specific keywords. The keywords were manually

selected by social listening experts from Blogmeter with the objective to isolate from the 2 billion documents database only the text that was pertinent to the topic of HIV and AIDS and STDs accounting for different natural language wordings.

In the following keyword list, when mentioning "relevant alternative wordings" we take into account that the Italian language has different spellings for grammatical gender and grammatical number which are always specified and taken into account when instructing the software to extract documents from the database.

The sets of keywords selected were:

- AIDS
- HIV
- HIV positive and relevant alternative wordings
- STDs (Syphilis, Gonorrhea, Chlamydia, Human Papilloma Virus, Genital Warts, Genital Herpes and Hepatitis) and misspellings and relevant alternative wordings
- HIV Test and relevant alternative wordings.

These classes were subsequently evaluated to identify relevant research topics, thus generating subsets of classes for a more targeted qualitative analysis. This activity is the result of a two-step combined manual and automatic process, where the software was instructed to automatically divide the resulting extracted dataset according to manually selected keyword-based topics which the researchers wanted to analyze in order to provide quantification and insight on already-known issues like prevention, sources of information, stigma, role of different healthcare professionals and so on. These already known issues were established from previous knowledge held by the Istituto Superiore di Sanità from previous research on the topic. Again, the keywords were manually selected by social listening experts from Blogmeter.

The topics and keywords selected were:

- Prevention (protected intercourse, promiscuous intercourse, risk perception, barrier methods)
- Diagnosis (diagnosis)
- Sexual relations (sexual intercourse)
- Therapies: Therapies, vaccines, Pre Exposure Prophylaxis (PrEP), Therapy as Prevention (TasP), complex Highly Active AntiRetroviral Therapy (cHAART), Post Exposure Prophylaxis (PEP)
- Sources of information ("Telefono Verde AIDS e IST" Helpline, ReTeAIDS Network, World AIDS Day, Testing Week, doctor, specialist, Ministry of Health)
- Screening and Testing issues (costs, hospital, pharmacies, self-test, anonymity, medical prescription,

associations, test timing)

- Stigma (social stigma, risk groups)
- People Living with HIV (PLHIV) (drugs therapies, parenting, travel, sports, school, work, friends, partners, pregnancy, disability, exemption)
- Health Personnel (dentist, gynecologist, doctor, psychologist, infectious disease specialist, nurse, volunteer) COVID-19.

The selection of keywords was finalized by Blogmeter researchers and the keyword-based classification was automatically conducted by the Blogmeter software.

The specific keywords that were used for each set can be found attached (in a supplementary file).

## 2. Social Media and Web Analysis

The platform was used to examine traceable and readable texts containing at least one selected keyword for analysis. Posts came from various online platforms, including but not limited to: Facebook, Twitter (currently 2023 known as X), Instagram, YouTube, TikTok, Twitch, forums, blogs, news outlets, and app review sites such as Google Play and the App Store. The decision to include online sources beyond social media was deliberate, with the aim of ensuring a holistic collection of relevant data derived from peer-to-peer exchanges, which are also prevalent on review platforms.

## 3. Definitions and Metric Calculation

Key Performance Indicator (KPI):

**Total Messages:** This metric includes the total number of posts referencing the keywords under examination written during the analysis period, along with the total count of comments on these posts (regardless of date). Specifically, not all comments are accessible via the Blogmeter Suite as a text document (e.g., Instagram API limits comment monitoring). This KPI measures the extent of discourse surrounding a set of keywords, representing its social “buzz”.

**Engagement:** Defined as the sum of all user interactions with a single post, including comments. It encompasses interactions on platforms such as Facebook, Twitter, Instagram, YouTube, TikTok, and news outlets. The KPI indicates the level of interest in a set of keywords.

**Mentions:** This indicator comprises the total count of posts mentioning the keywords under examination within the analysis timeframe, in addition to the count of comments referencing the keywords in question. This KPI exclusively captures cases where the set of keywords is mentioned.

## Results

### 1. Data on STDs and Hubs of influence

Web discussions have identified mentions of various sexually transmitted diseases, including AIDS, Syphilis, Gonorrhea, Chlamydia, HPV, Genital Warts, Genital Herpes and Hepatitis.

There were 609,180 conversations (Total Messages) recorded concerning STDs with an engagement of 16.95 million interactions and 180,680 mentions. These numbers regard posts that explicitly mention a STDs (AIDS, Papilloma, Chlamydia...) as well as posts that mention STDs without specifying one or more disease (i.e.: a text similar to “in my neighborhood there is a STD clinic”).

In order to identify the weight of specific diseases on the Internet on the appropriate KPIs we exclude these generic mentions of STDs; therefore, 603,420 Total Messages about specific STDs have been detected on the web in the analysis period. Within this scenario, AIDS is the most discussed disease, covering 48.6% of Total Messages about STDs, followed by Hepatitis (3.6% of Total Messages) and Papilloma (14% of Total Messages). The other diseases show residual percentage values. The share of the 185,490 Mentions collected about STDs is quite similar. However, if we look at the values of the 14.589 million Engagement, AIDS percentage is the most impactful one with 69.7% of the interactions about STDs, Papilloma follows (1.4% of Engagement), then Hepatitis (8.8% of Engagement) (Figure 1).

Most of the retrieved social media content had been posted on Facebook and regarded STDs, representing 66.3% of Total Messages and 55.6% of mentions. Engagement predominantly occurs on Instagram (39.7%) and TikTok (33.6%) (Figure 2).

As shown in Figure 3, 62.7% of Total Messages and 56% of Mentions regarding AIDS and HIV are found on Facebook; in second place, 20.5% of Total Messages on AIDS and HIV are found on Instagram and 21.4% of Mentions are found on Twitter. If we look at the Engagement KPI, TikTok and Instagram emerge as the platforms with the highest Engagement, at 35.9% and 34.7% respectively.

In the figure percentage differences are also being shown on the pie charts and they refer to the percentage difference between these values and the same KPIs calculated for the keywords related to STDs. This means that, where AIDS and HIV see 62.7% of Total Messages on Facebook, STDs see -3.6 percentage points less (the term refers to the comparison of two



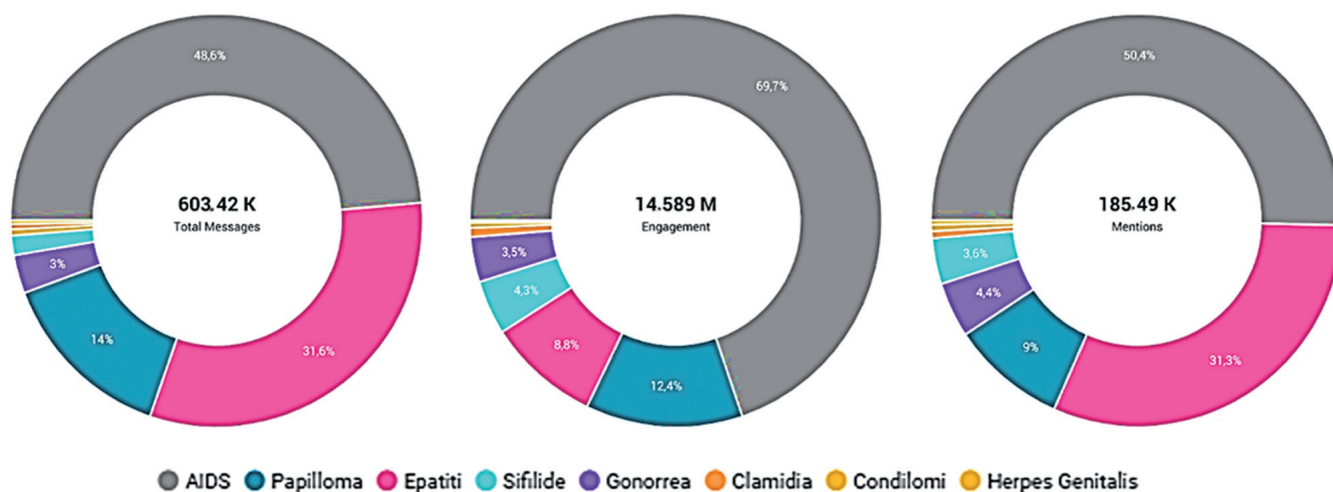


Figure 1 - Representation of the share of STDs across KPIs

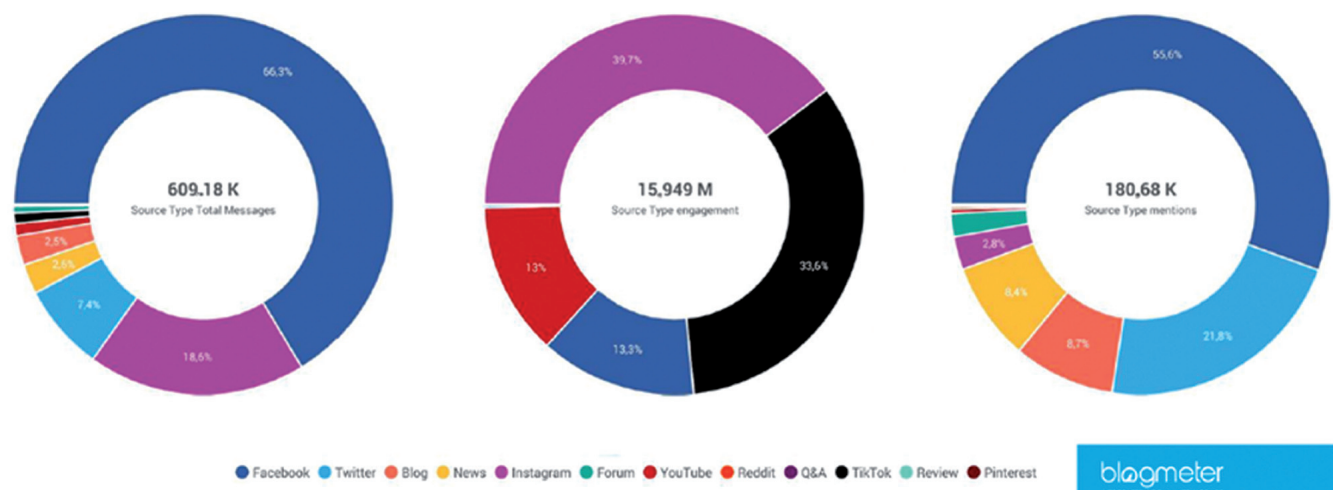
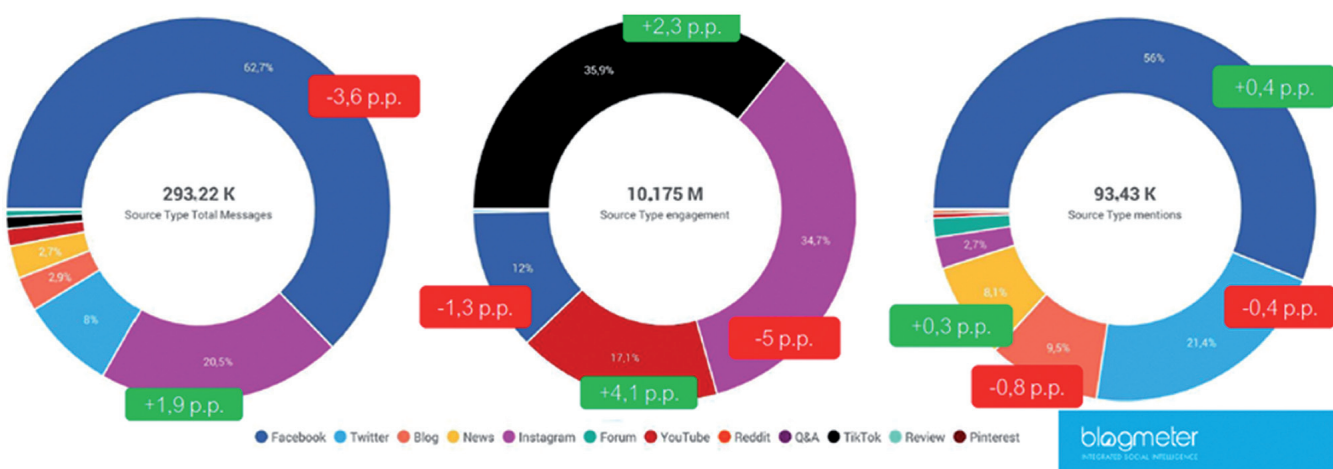


Figure 2 - Representation of source distribution in KPIs concerning STDs

Figure 3 – Representation of sources distribution across KPIs - Total Messages, Engagement and Mentions (for more details about definitions of those metrics, see Methods - 3. *Definitions and Metric Calculation* concerning AIDS and HIV with the difference in percentage points compared to STDs sources distribution scenario)

different percentages and will be abbreviated from now on as p.p.). If we look at the Mention KPI, proportions are similar between AIDS, HIV and STDs given that Facebook sees a +0.4p.p. difference and Twitter sees a -0.4p.p. difference. When looking at the Engagement chart, we find that AIDS and HIV collect percentually a little more engagement on TikTok (+2.3p.p.) compared with STDs, in contrast to Instagram which sees a -5 p.p. difference (Figure 3).

## 2. AIDS

Compared with other STDs, AIDS in particular stands out as the sexually transmitted disease with the highest key performance indicators: we collected 293,000 conversations specifically focusing on AIDS and HIV (representing 48.6% of Total Messages regarding STDs), 10.18 million Engagement (69.7% of the total Engagement on STDs), and 93,430 Mentions (50.4% of the total Mentions on STDs). These percentages refers to KPIs of AIDS and HIV compared to specific mentions of other STDs (e.g.: gonorrhea, chlamydia...), and to unspecified mentions of sexually transmitted infections (e.g.: posts mentioning “venereal diseases”...). Upon analyzing the most notable conversation peaks, it becomes evident that news and current events exert a significant influence, with some news stories generating roughly half of the conversations in the month of their publication.

Content featuring users’ personal experience with the disease, whether direct or indirect (relatives, friends...), often references the past, particularly the 1980s and 1990s, perpetuating the notion that AIDS management has remained static over time. Additionally, comments on past experience account for an average of 0.50% of interactions, whereas comments on present-day decrease to 0.04%.

## 3. Prevention

Mentions related to prevention amount to 11,360 thousands, with 63.2% focusing on generic prevention, while 28% of mentions specifically address barrier methods.

The study shows that in 40% of cases the speech is related to associations that provide information on the topic, while other sources of information are blogs and news in 35% of cases.

Within the specific environments dedicated to HIV, the section most frequently discussed pertains to transmission and testing. Individuals primarily seek information for reassurance, as the discourse predominantly revolves around risk behaviors,

causing fear among many who require support and guidance.

## 4. Diagnosis and treatment

In terms of content analysis regarding HIV testing, a total of 8,490 messages (comprising 2.9% of conversations about AIDS and HIV), 338,840 thousand interactions (representing 3.3% of interactions about AIDS and HIV), and 4,730 thousand mentions (accounting for 5% of conversations about AIDS and HIV) are highlighted.

HIV testing draws the most attention on World AIDS Day, with over one-fifth of the discussions occurring on 1<sup>st</sup> December 2022, amounting to 1,800 thousands total messages about HIV testing.

Facebook hosts 45.3% of mentions about the test, followed by Twitter with 19.7%, blogs and news platforms with 13%, and Instagram with 11.6%.

The cost of the test emerges as the most discussed topic, with users engaging in 2,440 thousand discussions and 105,620 thousand interactions. However, not all users are aware of free hospital testing, as evidenced by some who donate blood periodically to avoid paying for tests such as HIV tests. This highlights a lack of awareness regarding the availability of free hospital testing. Additionally, there is confusion surrounding the cost of self-testing kits purchased at pharmacies, given that hospital testing is provided free of charge. The informative content on self-tests surprises users: not everyone knew about their existence, which they evaluate positively for several factors: the benefit of self-service due to the anonymity and speed of the test, but also the accessibility of purchasing in the pharmacy.

Among the questions, users talk about the reliability of the results (compared to the test in the hospital) and ask if a doctor’s prescription is necessary for the purchase.

Mentions regarding therapy amount to 2,520 thousand, with 58.8% concerning generic therapies, 12% focusing on vaccines, and 10.6% addressing cHAART.

## 5. Relationship with healthcare operators and healthcare realities

Newly PLHIV often find themselves at a loss regarding what steps to take and whom to turn to for guidance. Many report a lack of support and explanation from medical professionals, relying instead on online communities for guidance. The most frequently discussed topics, in decreasing order of frequency, highlight the challenges of accessing and

comprehending the process of obtaining therapies or PrEP, which varies significantly across regions. This generates a discussion surrounding the “fragmented” process that patients go through in their diagnosis journey, defined here and by some patients as “fragmented” because it is characterized by a lack of communication among general practitioners, infectious disease specialists, and treatment centers.

Mentions of online health figures total 6,770 thousand, with general practitioners comprising 69.6% of mentions. Nurses account for 11.4%, with mentions generally portraying their role as an initial point of contact rather than providing ongoing support. Psychologists make up 6.1% of mentions, highlighting a dual narrative: acknowledging the importance of mental health care following diagnosis, yet also drawing parallels between the stigma associated with HIV and that of mental illness, underscoring the significant impact of the former to emphasize the severity of the latter.

#### 6. *Young people*

The study underscores a prevalent belief within the general public that younger individuals possess significantly lower awareness of the virus. This perception is attributed to a decline in widespread information dissemination in schools and on television compared to the 1980s or 1990s.

Observations from online forums reveal that young people predominantly seek information and support during moments of fear after engaging in risky behaviors. These interactions further demonstrate a lack of clarity among young individuals regarding which behaviors are considered risky and which are not.

#### 7. *Stigma*

The issue of stigma is closely intertwined with the occupational sphere, as individuals operating online express fear that the loss of anonymity could lead to repercussions on their professional prospects.

On social media, testimonials regarding HIV and AIDS that are left in a “public” space, like a public profile on a social media platform, are predominantly provided by individuals within the LGBTQ+ community. This trend aligns with the stigma associated with the disease, often perceived as affecting only individuals with specific sexual orientations, not accurately representing the broader population.

Furthermore, there is minimal engagement with current user testimonials, except for instances involving a well-known TV commentator in which the

comments are critical of his experience at a TV show. This suggests a tendency among individuals to avoid discussing matters related to the disease, potentially to distance themselves from AIDS-related issues. However, among those who do engage, discriminatory behavior is evident.

### Discussion

The web listening analysis was conducted to investigate the communicative needs of the Italian population regarding prevention, testing, diagnosis, and therapy for HIV and STDs, aiming to develop more effective institutional communication strategies that increase public awareness by delivering tailored messages to specific target characteristics.

The use of web listening analysis is based on the premise that adopting a one-size-fits-all approach is untenable today. Therefore, it is essential to recognize the peculiarities of each individual by identifying his needs.

Identifying specific information needs highlights the role of institutional communication, whose effective action would significantly impact the satisfaction of the objectives set by the international community.

There have been previous studies on web listening conducted in Italy, particularly focusing on the topic of vaccination (9-12). However, this study represents the first attempt to explore, through web listening, the population’s knowledge regarding HIV and STDs in Italy.

The considerable volume of discussions observed on the web, notably on platforms like Facebook, underscores the ongoing relevance and interest in the subject.

It was noted that discussions among the population concerning AIDS and STDs tend to occur at specific moments coinciding with news events, lacking continuity over time. This suggests that attention to these issues is sporadic rather than sustained. Additionally, since these discussions often coincide with events such as World AIDS Day (December 1st), they tend to follow a seasonal pattern, surging in importance at certain times before waning.

Consequently, the study highlights a deficiency in consistent year-round communication on topics specifically chosen by institutions.

Continued communication over time can significantly impact individuals’ adoption of good practices and enhance disease awareness in the general

population. Supporting this notion, the iMPPACS (an acronym for the sites of the project: in Macon, GA; Philadelphia, PA; Providence, RI; Atlanta, GA; Columbia, SC; and Syracuse, NY) program demonstrates that the influence of mass media, sustained over an extended period, persists even after the conclusion of the media campaign, particularly during adolescents' formative stages of learning about sex-associated behaviors (13).

Our study highlights the lack of awareness among some individuals regarding free HIV testing available in hospitals. This is evidenced by reports from users who resort to periodic blood donations to avoid the costs associated with tests such as HIV testing.

Additionally, there is a notable lack of awareness regarding the availability and benefits of self-testing. These benefits include self-service, which ensures anonymity, as well as the speed and accessibility of tests obtained through pharmacy purchase.

In light of these findings, a study conducted by the Division of Adolescent and School Health at the Centers for Disease Control and Prevention, in collaboration with ICF and the Chicago Public Schools (14) explores strategies to adapt and implement the "GYT: Get Yourself Tested" health marketing campaign in high schools, aiming to increase students' rates of STD testing.

The survey revealed that, after the communication campaign, more students in the GYT school (92.7%) were aware of where to receive free or low-cost testing for human immunodeficiency virus and STDs than students in the comparison school (76.0 %;  $p < 0.01$ ). As a consequence of increased awareness, data from medical records showed that the number of tests increased significantly in the school where there was the intervention in comparison to control school.

The dearth of comprehensive information in educational institutions and on television has fostered a prevalent perception, among the general public, that younger generations possess significantly lower awareness of the virus. This perception is substantiated by the observation that young individuals primarily seek information and support online, particularly after engaging in risky behaviours, experiencing moments of fear due to their limited awareness.

Research has demonstrated that targeted communication campaigns aimed at young audiences can effectively drive changes in both STDs testing and condom use. Increased exposure to communication messages has been associated with a rise in these behaviors (15,17).

Moreover, studies on health communication

campaigns focused on preventing and controlling STDs, affirm that mass media messages, when adapted and consistently disseminated over time, are successful in reaching large adolescent audiences. These campaigns have shown the ability to influence changes in beliefs regarding HIV prevention and reduce HIV-associated risk behaviors (16,17).

In online spaces dedicated to HIV, web listening reveals that individuals are not only seeking information but reassurance. Following risky behaviors, many express fears and require support and advocacy. Newly diagnosed individuals often struggle to find guidance and commonly report, receiving support and explanations primarily from online communities rather than from appropriate medical professionals.

This result underscores the ongoing lack of reliable support networks, particularly during the crucial period following diagnosis. Therefore, it becomes imperative for institutions to support individuals by directing them towards the correct pathway to access treatment promptly.

Although the results of this pilot study are promising, there are intrinsic limitations that require broader implementation and evaluation. Specifically, due to its uniqueness, this study cannot be directly compared with similar studies on the same topic.

The representativeness of the sample is limited, as the data cannot be generalized to the entire Italian population, and certain groups (e.g., the elderly, those with low digital literacy) may be excluded because they do not use the internet and are therefore entirely absent from the analysis.

Additionally, the risk of polarization and noise is always present, as online conversations tend to reflect strong or distorted positions that do not always represent the average citizen. Moreover, some platforms (Instagram in particular) restrict access to comments, reducing the depth of the analysis.

Nevertheless, the study has strengths, primarily related to methodological innovation. The use of web listening and a platform like Blogmeter allows for extensive and real-time data collection, based on both quantitative and qualitative indicators. Combining metrics (engagement, mentions, total messages) with content analysis provides a comprehensive view of the communicative phenomenon. The results can be used to build communication strategies aligned with national and international objectives (95-95-95). In fact, they address current and sensitive issues (e.g., stigma, test accessibility, youth and misinformation) using tools suited to the digital age, which are undoubtedly useful for improving institutional communication in order to



promote awareness and protective behaviors.

Future endeavors in this field may involve conducting longer-term evaluations. Nevertheless, the comprehensive coverage of topics and sources of information, along with the consistency of findings with existing literature, enables the study results to be pertinent beyond the confines of the study's context, making them applicable in the context of health policy formulation.

## Conclusions

Institutional communication campaigns can boost public awareness of AIDS and other STDs, promoting testing and treatment uptake. Leveraging mass media like television, radio, and newspapers, these campaigns can induce positive behavioral changes on a broad scale (18). Global recommendations stress the importance of AIDS and STDs testing, especially amid rising infection rates (19).

Our study pinpoints areas needing further exploration to develop effective communication strategies. These include addressing low risk awareness, enhancing testing adherence, and ensuring therapy uptake. Tailored communication should target specific demographics, offering information on free hospital testing, self-testing options for anonymity, and providing support for those lacking access to services or treatments.

Sustained financial backing for communication campaigns is vital to ensure widespread exposure and should be prolonged to mitigate seasonal variations. By tackling disparities and stigma and focusing on individual needs, we can align with national and international objectives to end the global AIDS epidemic by 2030.

## Complementary file

List of availability and limitations for the sources related to the project:

### FACEBOOK:

*Included:* public pages and comments on public page content

*Excluded:* groups (of any type), private profiles (even with “everyone” or “public” privacy settings), events and posts related to events, keyword-based post search, stories, and reels

*Limitations:* user comments are anonymized

### INSTAGRAM:

*Included:* business profiles (pages and creators), hashtag-based searches (with Instagram's authorization; results are anonymized as “Instagram - unknown author”) for posts and reels

*Excluded:* “private” or non-business profiles (pages and creators),

### Instagram Stories

*Limitations:* comment texts for any type of profile are not available or traceable via the Instagram API and therefore are not present in the Blogmeter Suite. However, their quantitative count is available in the Total Messages metric

### X (TWITTER):

*Included:* non-private profiles and keyword-based searches

*Excluded:* comments and retweets unless published by a profile already present in the database

### YOUTUBE:

*Included:* non-private channels with video and shorts comments

*Excluded:* private profiles, YouTube Shorts

### TIKTOK:

*Included:* non-private profiles

*Escluso:* profili privati, commenti

*Excluded:* private profiles, comments

**BLOG, NEWS:** textual content attributable to blogs and journalistic outlets with active RSS feeds; textual content attributable to the “comment sections” of certain specialized outlets

**FORUM:** content provided via RSS feeds from some forums, content obtained through dedicated ad-hoc software developments for specific forums of interest

**REDDIT:** mapping of Italian and English-language subreddits, keyword-based search

**REVIEW:** Google Play, iTunes Store, TripAdvisor (individual venues/attractions or keyword-based search), TrustPilot reviews claimed by brands, Brands listed on Opinioni.it (search by individual keywords), Products listed on Amazon (keyword-based search in multiple selectable languages), Change.org petitions (URLs of individual petitions)

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## Riassunto

### *Il valore aggiunto dell'analisi di Web Listening per comprendere i bisogni informativi riguardanti HIV, AIDS e MST in Italia*

**Introduzione.** La comunicazione istituzionale sul virus dell'immunodeficienza umana, sulla sindrome dell'immunodeficienza acquisita e sulle malattie sessualmente trasmissibili richiede la conoscenza dei bisogni informativi delle persone e degli strumenti utilizzati principalmente per l'informazione sui temi della salute. A tal fine, l'Istituto Superiore di Sanità ha condotto un'analisi di web listening in collaborazione con il Ministero della Salute e con esperti del settore.

**Metodi.** L'ascolto spontaneo sul web e sui canali social, in relazione a conversazioni riferite al virus dell'immunodeficienza umana, alla sindrome dell'immunodeficienza acquisita o alle malattie sessualmente trasmissibili, è stato registrato attraverso una piattaforma integrata di Social Listening. Un database di oltre 2 miliardi di documenti indicizzati è stato scansionato ed analizzato per estrarre documenti contenenti almeno una parola chiave selezionata su virus dell'immunodeficienza umana, sindrome dell'immunodeficienza acquisita, malattie sessualmente trasmissibili pubblicati tra il 1°

ottobre 2021 e il 30 settembre 2022.

**Risultati.** La conversazione web sulle malattie sessualmente trasmissibili si è svolta principalmente su Facebook, che è la fonte di quasi la metà delle menzioni complessive e del 66% dei messaggi totali. Tuttavia, Instagram e TikTok sono state le fonti in cui la maggior parte degli utenti ha interagito. Nel corpus dei documenti sulle infezioni sessualmente trasmissibili, i termini più usati sul web erano virus dell'immunodeficienza umana e sindrome dell'immunodeficienza acquisita. Le persone che vivono con il virus dell'immunodeficienza umana si espongono molto raramente nei luoghi web pubblici. Nella sfera pubblica il virus dell'immunodeficienza umana e la sindrome dell'immunodeficienza acquisita sono affrontati in modo impersonale, con opinioni basate su conoscenze teoriche.

**Conclusioni.** L'analisi dei dati mostra come la percezione e le discussioni su virus dell'immunodeficienza umana e AIDS siano diverse tra la popolazione generale rispetto alle persone che vivono con il virus dell'immunodeficienza umana. Per la popolazione generale, gli elementi ricorrenti dell'analisi sono la stagionalità, l'attenzione agli eventi di cronaca, la conoscenza del virus dell'immunodeficienza umana e della sindrome dell'immunodeficienza acquisita legati al passato. Le persone che vivono con il virus dell'immunodeficienza umana non si espongono pubblicamente, utilizzando luoghi web più protetti; e quindi lo stigma è certamente presente.

## References

- Shaw GM, Hunter E. HIV transmission. *Cold Spring Harb Perspect Med.* 2012 Nov 1;**2**(11):a006965. doi: 10.1101/cshperspect.a006965. PMID: 23043157; PMCID: PMC3543106.
- Barré-Sinoussi F, Chermann JC, Rey F, Nugeyre MT, Chamaret S, Gruest J, et al. Isolation of a T-lymphotropic retrovirus from a patient at risk for acquired immune deficiency syndrome (AIDS). *Science.* 1983 May 20;**220**(4599):868-71. PMID: 6189183. doi: 10.1126/science.6189183.
- Joint United Nations Programme on HIV/AIDS (UNAIDS). Prevailing against pandemics by putting people at the centre. 2020. Available from: [https://www.unaids.org/sites/default/files/media\\_asset/prevailing-against-pandemics\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/prevailing-against-pandemics_en.pdf) [Last accessed: 2025 Jun 22].
- Borges do Nascimento IJ, Pizarro AB, Almeida JM, Azzopardi-Muscat N, Gonçalves MA, Björklund M et al. Infodemics and health misinformation: a systematic review of reviews. *Bull World Health Organ.* 2022 Sep 1;**100**(9):544-561. doi: 10.2471/BLT.21.287654. Epub 2022 Jun 30. PMID: 36062247; PMCID: PMC9421549.
- European Centre for Disease Prevention and Control (ECDC). Systematic scoping review on social media monitoring methods and interventions relating to vaccine hesitancy. Stockholm: ECDC; 2020. doi: 10.2900/260624.
- European Centre for Disease Prevention and Control (ECDC). Social media strategy development – A guide to using social media for public health communication. Stockholm: ECDC; 2016. doi: 10.2900/481659.
- Andreotta M, Nugroho R, Hurlstone MJ, Boschetti F, Walker I, Paris C. Analyzing social media data: A mixed-methods framework combining computational and qualitative text analysis. *Behav Res.* 2019 Aug;**51**:766-1781. <https://doi.org/10.3758/s13428-019-01202-8>. PMID: 30941697.
- Caliandro A, Gandini A. *Qualitative Research in Digital Environments: A Research Toolkit (Preview - Introduction)*. New York, NY: Routledge; 2017.
- Donzelli G, Palomba G, Federigi I, Aquino F, Cioni L, Verani M, et al. Misinformation on vaccination: a quantitative analysis of YouTube videos. *Hum Vaccines Immunother.* 2018 Jul 3;**14**(7):1654-59. doi:10.1080/21645515.2018.1454572. Epub 2018 May 10. PMID: 29553872; PMCID: PMC6067837.
- Covolo L, Ceretti E, Passeri C, Boletti M, Gelatti U. What arguments on vaccinations run through YouTube videos in Italy? A content analysis. *Hum Vaccines Immunother.* 2017 Jul 3;**13**(7):1693-99. PMID: 28362544. doi: 10.1080/21645515.2017.1306159. Epub 2017 Mar 31. PMID: 28362544; PMCID: PMC5512771.
- Aquino F, Donzelli G, De Franco E, Privitera G, Lopalco PL, Carducci A. The web and public confidence in MMR vaccination in Italy. *Vaccine.* 2017 Aug 16;**35**(35Pt B):4494-98. doi: 10.1016/j.vaccine.2017.07.029.29. Epub 2017 Jul 20. PMID: 28736200.
- Mahroum N, Watad A, Rosselli R, Brigo F, Chiesa V, Siri A, et al. An infodemiological investigation of the so-called “Fluad effect” during the 2014/2015 influenza vaccination campaign in Italy: ethical and historical implications. *Hum Vaccines Immunother.* 2018 Mar 4;**14**(3):712-18. doi:10.1080/21645515.2017.1420448. Epub 2018 Feb 15. PMID: 29293392; PMCID: PMC5861810.
- Hennessy M, Romer D, Valois RF, Vanable P, Carey MP, Stanton B, et al. Safer Sex Media Messages and Adolescent Sexual Behavior: 3-Year Follow-Up Results From Project iMPPACS. *Am J Public Health.* 2023 Jan;**113**(1):134-140. doi: 10.2105/AJPH.2012.300856. Epub 2012 Nov 15. PMID: 23153149; PMCID: PMC3518371.
- Liddon N, Carver LH, Robin L, Harper CR, Murray CC, Habel MA, et al. Get Yourself Tested Goes to High School: Adapted Sexually Transmitted Disease Prevention Campaign and Associated Student Use of Clinic Sexually Transmitted Disease Testing Services. *Sex Transm Dis.* 2019 Jun;**46**(6):383-388. doi: 10.1097/OLQ.0000000000000983. PMID: 31095101.
- Kim YM, Kols A, Nyakauru R, Marangwanda C, Chibatamoto P. Promoting Sexual Responsibility among Young People in Zimbabwe. *Int Fam Plan Perspect.* 2001 Mar;**27**(1):11-19. <https://doi.org/10.2307/2673800>.
- Noar SM, Palmgreen P, Chabot M, Dobransky N, Zimmerman RS. A 10-year systematic review of HIV/AIDS mass communication campaigns: Have we made progress? *J Health Commun.* 2009 Jan-Feb;**14**(1):15-42. doi: 10.1080/10810730802592239. PMID: 19180369.
- Friedman AL, Kachur RE, Noar SM, McFarlane M. Health Communication and Social Marketing Campaigns for Sexually Transmitted Disease Prevention and Control: What Is the Evidence of their Effectiveness? *Sex Transm Dis* 2016 Feb;**43**(2 Suppl 1):S83-S101. doi: 10.1097/

OLQ.0000000000000286. PMID: 26779691.

18. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *Lancet*. 2010 Oct 9;**376**(9748):1261-71. doi: 10.1016/S0140-6736-(10)60809-4. PMID: 20933263; PMCID: PMC4248563.
19. Branson BM, Handsfield HH, Lampe MA, Janssen RS, Taylor AW, Lyss SB, et al; Centers for Disease Control

and Prevention (CDC). Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Recomm Rep*. 2006 Sep 22;**55**(RR14):1-17; quiz CE1-4. PMID: 16988643. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm> [Last accessed: 2025 June 22].

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