Acta Biomed 2022; Vol. 93, N. 3: e2022164 DOI: 10.23750/abm.v93i3.12766

Review

The Italian PrEPventHIV challenge: a scoping systematic review on HIV pre-exposure prophylaxis monitoring in Italy

Pietro Ferrara[1,2], *Vincenza Gianfredi*[3,4]

[1] Department of Public Health, Experimental and Forensic Medicine, University of Pavia, Pavia, Italy; [2] Center for Public Health Research, University of Milan – Bicocca, Monza, Italy; [3] Department of Biomedical Sciences for Health, University of Milan, Milan, Italy; [4] CAPHRI Care and Public Health Research Institute, Maastricht University, Maastricht, The Netherlands

Abstract. *Background and aim:* In Italy, pre-exposure prophylaxis (PrEP) with emtricitabine and tenofovir disoproxil fumarate (FTC/TDF) was authorized for HIV prevention in 2017. This scoping systematic review summarizes current evidence on PrEP implementation in Italy since 2017. *Methods:* A systematic search was conducted in relevant databases, using a search strategy built upon controlled vocabulary, cross-referencing of the citation lists from included reports, and hand-searching of surveillance documents. Findings were summarized narratively according to key issues and themes. *Results:* A total of 106 reports were retrieved and six met criteria for inclusion in the review, being three journal articles and three surveillance report by the European Centre for Disease Prevention and Control (ECDC). In Italy, users can obtain in PrEP in specific hospital- or community-based PrEP services, under prescription by specialists. Due to drug costs, the access is limited to those who can afford it. Data and indicators on PrEP use and monitoring are limited. The vast majority of users were men who have sex with men. In this population, PrEP knowledge and attitudes were investigated across two reports, finding a medium to high level to knowledge and a scare use (mostly due to high costs). A health technology assessment on the adoption of PrEP in Italy advised that the most cost-containing strategy would be the use of PrEP as an "add-on" strategy. *Conclusions*: In conclusion, this scoping review found a relevant evidence gap on PrEP monitoring. Italy needs to implement specific policies and programs for effective and timely delivery of care. (www.actabiomedica.it)

Key words: HIV, scoping systematic review, pre-exposure prophylaxis, PrEP, Italy

Introduction

Recently, the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) published a new iteration on the burden and control of the Human Immunodeficiency Virus (HIV) epidemic from 1990 to 2019 (1). It found that the global HIV incidence and death toll declined by 16.1% (95% uncertainty interval (UI), -22.3 – -8.1) and 36.7% (95% UI, -39.9 – -32.6) from 2010, respectively. However, across the high-income countries – including Italy – the number of incident cases increased from an estimated 87,223.3 (95% UI, 56,106.7 – 12,2797.4) in 2010 to 118,319.4 (95% UI, 69,141.7 – 16,8843.7), with an overall 35.6% (95% UI, 3.4 – 55.9) percent change (1). More in detail, Italy registers around 4.2 new HIV infections and 0.9 acquired immunodeficiency syndrome (AIDS) cases diagnosed every 100,000 people yearly (2).

The use of antiretroviral medication by people who are uninfected – the strategy known as pre-exposure prophylaxis (PrEP) – has proved to be a powerful additional prevention tool for the reduction of HIV transmission. Actually, data shown an impressive decrease of new infections in at substantial risk people who use PrEP (1,3,4). However, despite its efficacy, the use of PrEP is still low since the medication cost

still considered a key barrier to the provision of PrEP by public health services (5). Some European countries currently provide PrEP free of charge, with some others planning to enhance PrEP programs in the next future (4,5). In Italy, the use of a fixed dose combination of tenofovir/emtricitabine (TDF/FTC) was authorized for non-reimbursed PrEP in 2017 (6).

Next to the viral spread control, study of epidemiological variations in HIV burden is another essential effort in the global and local fights against this epidemic (1). Additionally, epidemiology has an important role in healthcare program monitoring and evaluation. In a complex interventions like PrEP, routine collection of measurable targets should be periodically assessed with the aim of understanding its effectiveness and affordability from the perspectives of both National Health Service and users.

In a preliminary scoping review, including studies published before the PrEP authorization in Italy, authors identified a substantial evidence gap on PrEP awareness and implementation in Italy, substantially related to paucity of evidence and surveillance data, as well as to overall scarce knowledge about PrEP (7). With the goal of updating that literature synthesis and offer novel indicators related to PrEP key issues, we present here the results of a scoping systematic review investigating the available evidence on the current level of implementation, utilization and monitoring of PrEP in Italy, also outlining data to inform policymakers.

Methods

Scoping systematic reviews are a useful tool to preliminarily assess the amount and scope of available research literature on practical topics, representing an essential strategy for highlighting evidence gap in fast moving health areas and prompting further research efforts (8).

This scoping systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (9). The target populations of this review were: i) non-HIV subjects who used, had ever used, or wanted to use PrEP, irrespectively of age; and ii) healthcare professionals (HCP) who manage PrEP prescription and evaluation.

Two main databases were consulted – PubMed/Medline and Embase – searching for publication from 2017 – when TDF/FTC was authorized for PrEP in Italy – to January 4, 2022. Results included reports in English and Italian. The search strategy developed for this review included three main aspects – namely HIV infection, data on PrEP data, and Italian context – combined as: ((“HIV Infections”(MeSH) OR “human immunodeficiency virus” OR HIV) AND (“Pre-exposure prophylaxis” OR PrEP) AND Italy)). Following strategies from previous similar reviews, the search string was primarily used for PubMed and then adapted for the other electronic database (10,11). Cross-referencing of the citation lists from included articles was also carried out to incorporate all potentially relevant studies and grey literature. In order to identify eligible documents and surveillance reports, the webpages of the European Centre for Disease Prevention and Control (ECDC), Italian Ministry of Health, National Institute of Health, and Italian Medicines Agency (Agenzia Italiana del Farmaco—AIFA) were also trawled. Selection criteria for screening titles and abstracts were as follows: (i) primary reports accessible in full-text, (ii) reporting population-based data/information on PrEP implementation and utilization in Italy (including prescription, adherence, adverse effects and tolerance). Records that met the following criteria were excluded: (i) published before 2017; (ii) including antiretrovirals administrated not for prevention purposes in uninfected subjects; (iii) pharmacology study on TDF/FTC; (iv) published as review, congress abstract, editorial, or commentary. Since the TDF/FTC combination was authorized for non-reimbursed PrEP by the AIFA in 2017, records reporting data before 2017 were excluded in order to avoid possible bias attributable to not availability of PrEP in the country.

The authors independently screened the titles and abstracts to identify relevant reports. Possible disagreements were resolved through group discussion. Data extraction was performed using a pre-piloted spreadsheet elaborated in Microsoft Excel® for Windows (Microsoft Corporation, Redmond, WA, USA).

Results

The search yielded a total of 106 reports and, after the selection process illustrated in Figure 1, six articles met criteria for inclusion in this qualitative synthesis.

These included three journal articles and three reports by the ECDC (a surveillance report, a country-case study, and the results from the European men who have sex with men (MSM) Internet Survey 2017—EMIS-2017).

In the country-case study, the ECDC analyzed HIV PrEP implementation, standards and monitoring in the European Union and European Economic Area Member States, including the UK. In Italy, users can obtain in PrEP in specific hospital- or community-based PrEP services, under prescription by an infectious disease consultant. Due to the drug costs (approximately €60,00 for 30 TDF/FTC tables) and, in certain cases, also those of the specialist visit and HIV testing, access to PrEP is limited to those who can afford it (5). According to ECDC surveillance report, the only available indicator of PrEP uptake in Italy was the numbers of people using PrEP for the first time in the previous 12 months (data for 2018), who were calculated in 532. However, the report also underlined that Italy was unable to provide an estimate for the number of people receiving PrEP at least once in the last 12 months (12). Again, the vast majority of users were men who have sex with men (MSM), and 29% of all users reported to had had online/informal access to PrEP.

The EMIS-2017 survey conducted in 47 countries in Europe and Central Asia between October 2017 and January 2018, surveyed 128,000 MSM on their level of knowledge about HIV, viral hepatitis and sexually transmitted diseases (STD), sexual behaviors, prevention needs and testing habits. Results also examined data on self-reported PrEP use and expressed need for PrEP. For Italy, 11,025 participants were enrolled: of those, excluding HIV-diagnosed men, 43.9% were unaware of PrEP and 25.5% uncertain whether would use PrEP or not, 2.6% had ever spoken to about PrEP at a health service among non-HIV-diagnosed, 12.2% had used U=U (Undetectable equals Untransmittable, using antiretroviral treatment as prevention) or PrEP for prevention of HIV transmission on last encounter, and only 0.4% were currently taking PrEP (13).

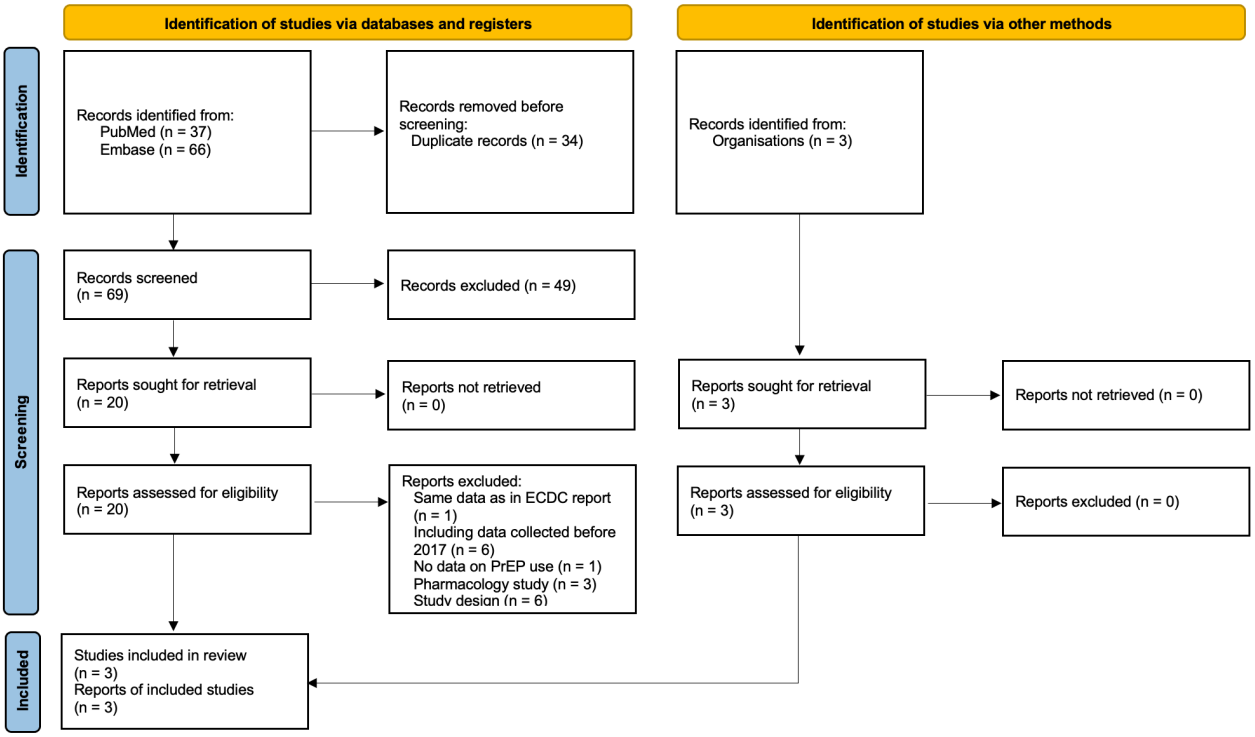

Figure 1. PRISMA flow chart of the included reports selection process.

A recently published nation-wide cross-sectional study among MSM investigated knowledge, attitudes and practices towards PrEP, and found that the vast majority of the participants (87.2%) knew what PrEP is. Internet was the main source of information, and regular screening for HIV was significantly associated with this knowledge; as regards PrEP use, only 7.5% were ever user and the main reason for not using PrEP was the drug cost (26.9%) (14). Another survey conducted among gay couples in some European countries (including Italy, but without stratification of country data) found that less than a quarter of serodiscordant couples used PrEP or post-exposure prophylaxis (PEP) (15). In 2020, a health technology assessment (HTA) on the adoption of PrEP in Italy advised that the most cost-containing strategy would be the use of PrEP as an "add-on" strategy, which also would improve quality of life and safety of users, although PrEP implementation would demand higher costs from the perspectives of both National Health Service (NHS) and society, reduced by off-patent TDF/FTC (16). Main conclusions of studies included in the systematic review are presented in Table 1.

Table 1. **Main conclusions of studies included in the systematic review**

First author (and year)	Study design and Research topic(s)	Main Findings
ECDC (2021) (5)	Case study developed to capture practical details about the implementation of PrEP programs in EU/EEA Member States and the United Kingdom.	PrEP is delivered in some infectious disease clinics and in few community-based centers, under prescription by an infectious disease consultant. Costs related to outpatient visit and drugs may reach up to €40-50 per test every 3 months and €60 for a 30-pills box), so access to PrEP is limited only to those who can afford it. No national PrEP program and campaign.
ECDC (2019*a*) (12)	Surveillance report on the use of PrEP for HIV prevention in EU/EEA Member States and the United Kingdom.	In Italy, the only available indicator of PrEP uptake was the numbers of people using PrEP for the first time in the previous 12 months (data for 2018), who were calculated in 532, and the vast majority of users were MSM. Among users, 29% had online/informal access to PrEP.
ECDC (2019*b*) (13)	A survey conducted among 128 000 MSM participants in Europe, about knowledge of HIV, viral hepatitis and sexually transmitted infections (STI), sexual behaviors, prevention needs and testing habits, including data on self-reported PrEP use and expressed need for PrEP.	For Italy, 11,025 participants were enrolled: of those, excluding HIV-diagnosed men, 0.4% were currently taking PrEP, 43.9% were unaware of PrEP and 25.5% uncertain whether would use PrEP or not, 2.6% had ever spoken to about PrEP at a health service among non-HIV-diagnosed, 12.2% had used U=U or PrEP for prevention of HIV transmission on last encounter (excluding MSM without anal intercourse).
Voglino (2021) (14)	Cross-sectional study on knowledge, attitudes and practices towards PrEP in a sample of MSM.	87.2% of the surveyees knew what PrEP is, with the Internet reported as the main source of information (68.4%), followed by friends, relatives and acquaintances (47.7%); while only 10.3% gained information from institutional channels, 7.5% from specialized physicians, and just one participant (0.6%) from the general practitioner. Regular screening for HIV was significantly associated with PrEP knowledge. 7.5% MSM had ever used PrEP and the main reason for not using PrEP was the drug cost (26.9%).
Rogder (2019) (15)	Multicenter, prospective, observational study investigating sexual behaviors in serodifferent couples.	24% gay serodifferent couples in some European countries (including Italy, but without stratification of country data) had ever used PrEP or PEP.
Ferrario (2020) (16)	Multicenter Health Technology Assessment evaluating the implications related to TDF/FTC PrEP introduction in Italy.	PrEP would lead to significant economic investments both for the NHS, and for citizens (40% and 2,377% respectively) if used as an add-on strategy, assuming FTC/TDF patent cost. With the off-patent drug, the NHS would benefit from a 37% advantage and a shrink of the patients' expenditure emerged (+682%). More economic resources are required if PrEP is applied as a substitute strategy, considering both the patent (NHS: 212%; citizens: 3,423%) and the off-patent drug (NHS: 73%; citizens: 1,077%).

Abbreviations: *HIV*, human immunodeficiency virus; *PrEP*, pre-exposure prophylaxis; *PEP*, post-exposure prophylaxis; *ECDC*, European Centre for Disease Prevention and Control; *MSM*, men who have sex with men; *U=U*, Undetectable equals Untransmittable; *TDF/FTC*, tenofovir/emtricitabine; *NHS*, National Health Service.

Discussion

The scoping systematic review here presented identified a relevant evidence gap on the monitoring of PrEP in Italy, which virtually reflects a sub-optimal level of its implementation in the country.

The sustainable development goals of the United Nations fixed the ending of HIV/AIDS as a public health threat by 2030 (1). Understanding the current state and changes over time of country-level implementation of the PrEP is essential for this goal. Indeed, it has been recognized has an essential approach in the fighting against HIV, being associated with impressive incidence reductions; however, the effectiveness of this strategy strongly depends on the reaching of the entirety of the target population (1). In this regard, the ECDC remarked the importance of enhanced surveillance on PrEP uptake and outcomes, and sharing of best practices (particularly regarding feasibility and) to support the roll-out of PrEP (12). Indeed, there is a need for stronger PrEP programming, monitoring, and surveillance, with the introduction of national policies and programs. The absence of the latter is also the root of lack of awareness towards and limited access to PrEP amongst general population and possible users. The World Health Organization advocates access to PrEP for people at high risk for HIV infection, regardless of the use of HIV risk scoring systems (17). Indeed, PrEP is recommended for HIV-negative individuals who have casual sexual relationships and are inconsistent in the use of condoms, or serodiscordant couples (as possible additional intervention for the uninfected partner) (18,19). For instance, a bio-behavioral survey conducted in 13 European cities (including Verona, in the north-eastern Italy) during 2013 and 2014 (and thus not fulfilling the entering criteria for this review) estimated the proportion of MSM eligible for PrEP. This bio-behavioral survey was built on the basis of validated indices commonly used to weigh PrEP indication at individual level. Results indicated that up to around 30% MSM should be offered PrEP to have an impact on HIV epidemic (17). Another group who belongs to a high HIV incidence population is constituted by injective drug users, in which PrEP should be considered in wider harm reduction practical programs aimed at reducing negative consequences of drug use (20).

The achievement of HIV prevention through PrEP use is characterized by several challenges, and strategies to align PrEP use with risks must therefore consider all possible current barriers to its implementation and adherence. The first of which is the need for informative and educative approaches that would specifically target potential user populations and healthcare professionals (7,19). Other obstacles concern the PrEP accessibility and affordability (14), with the need of actions to facilitate access to drugs and their prescription. Of note, since TDF/FTC is not reimbursed when prescribed for HIV prevention, the high costs of the drugs limit the access to PrEP utilization. In fact, it has been estimated that users should pay up to €50,00 for specialist visits and tests every 3 months, to which is added €60,00 for 30-tables box of TDF/FTC (5). In many European and non-European countries, the smooth accessibility of PrEP – including low costs – has improved its correct use and avoided purchases from uncontrolled channels (like the Internet) (1,5,12,14). Additional HTA and cost-effectiveness analyses based on updated programs, and epidemiological data may also help to inform policymakers for assessing PrEP feasibility, in particular by virtue of off-patent formulations of TDF/FTC (21). In this context, it worth also noting that emerging economic evaluations have indeed emphasized that the introduction PrEP programs would result in a total cost saving, by averting infections and leading to a gain in quality adjusted life years over a horizon in country related to the cost of antiretroviral drugs (22,23). On the contrary, as mentioned before, going to hospital or infectious disease clinics can be perceived as an impediment by many, also due to a possible perceived stigma which has been recognized a social structural barrier to HIV testing (24), and might exert a differential influence also on the access to HIV clinic for PrEP prescription and to PrEP itself. Community care services and general practitioners could play an important role in solving this issue, in particular for HIV testing, renewing PrEP prescriptions (initiate under control of infectious disease specialist), and monitoring safety of long-term use of TDF-based PrEP (i.e., periodic testing of the renal function and systemic TDF levels) (5,21), as well as gathered field evidence on possible impact of this strategy on other STDs and antiretroviral resistance (16,25-27).

In brief, while the current level of PrEP implementation and monitoring in Italy remains unclear, PrEP use should be scaled up in settings where it is most beneficial. There is national requirement for a continuous focus on HIV prevention, in particular with the sustained inclusion of PrEP in standard healthcare models, health promotion initiatives, and public health and economic analyses. This is of utmost importance during the coronavirus disease 2019 (COVID-19) pandemic, which has negatively impacted on many issues surrounding the HIV and AIDS *syndemic* burden, and calls for more resilient actions in order to guarantee access to quality care during the world's evolving health needs (28, 29).

Some limitations should be addressed before considering the results from this review. Evidence on PrEP implementation and monitoring in Italy is still poor and relatively sparse, allowing to only reach preliminary conclusions. Furthermore, the literature search was limited in the number of databases surfed. However, this was based on methodological standards and in line with the minimum requirements (at least two) set by the PRISMA guidelines (9). Moreover, grey literature was also consulted in order to be more extensive.

In conclusion, this scoping review found a relevant evidence gap on PrEP monitoring, although the evidence of acceptability for the intended populations. Italy needs to examine the care model for the HIV prevention and consider how to improve appropriate access to PrEP. Implementation of specific policies and programs for effective and timely delivery of care, as well as interventions to educate and inform both target population and HCW are some examples of initiatives aimed at reducing HIV incidence, also in agreement with international health authorities.

Conflict of Interest: The authors declare no conflict of interest.

Funding: None.

References

1. GBD 2019 HIV Collaborators. Global, regional, and national sex-specific burden and control of the HIV epidemic, 1990–2019, for 204 countries and territories: the Global Burden of Diseases Study 2019. Lancet HIV 2021;8(10):633-51. doi: 10.1016/S2352-3018(21)00152-1
2. Istituto Superiore di Sanità. Infezione da HIV e AIDS – Aspetti epidemiologici. Available at: https://www.epicentro.iss.it/aids/epidemiologia-italia (Accessed on November 14, 2021)
3. Adams JL, Shelley K, Nicol MR. Review of real-world implementation data on emtricitabine-tenofovir disoproxil fumarate as HIV preexposure prophylaxis in the United States. Pharmacotherapy 2019; 39:486–500.
4. European Centre for Disease Prevention and Control. HIV Pre-Exposure Prophylaxis in the EU/EEA and the UK: implementation, standards and monitoring. Operational guidance. Stockholm: ECDC; 2021. Available at: https://www.ecdc.europa.eu/en/publications-data/HIV-PrEP-eueea-and-uk-implementation-standards-monitoring-guidance
5. European Centre for Disease Prevention and Control. Country case studies: ECDC operational guidance on Pre-Exposure Prophylaxis (PrEP) in the EU/EEA and the UK. Stockholm: ECDC; 2021. Available at: https://www.ecdc.europa.eu/en/publications-data/country-case-studies-ecdc-operational-guidance-prep
6. Agenzia Italiana del Farmaco. Determina 10 agosto 2017, n. 1483- Nuove indicazioni terapeutiche del medicinale per uso umano «Truvada» non rimborsate dal Servizio sanitario nazionale. Gazzetta Ufficiale Serie Generale n. 203/2017
7. Ferrara P, Antonazzo IC, Mantovani LG. The PrEPventHIV gap: a systematic scoping review on HIV pre-exposure prophylaxis implementation in Italy. Giornate della ricerca scientifica e delle esperienze professionali dei giovani, 17-18 dicembre 2020. J Prev Med Hyg 2021;62(1S2):E31-2. doi: 10.15167/2421-4248/jpmh2021.62.1s2
8. Munn Z., Peters M.D.J., Stern C. et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. BMC Med Res Methodol 2018;18, 143 https://doi.org/10.1186/s12874-018-0611-x
9. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. BMJ 2021;372:n71
10. Del Prete V, Mateo-Urdiales A, Bueno-Cavanillas A, Ferrara P. Malaria prevention in the older traveller: a systematic review. J Travel Med 2019;26(7):taz067. doi: 10.1093/jtm/taz067
11. Gianfredi V, Albano L, Basnyat B, Ferrara P. Does age have an impact on acute mountain sickness? A systematic review. J Travel Med 2020;27(6):taz104. doi: 10.1093/jtm/taz104
12. European Centre for Disease Prevention and Control. Pre-exposure prophylaxis for HIV prevention in Europe and Central Asia. Monitoring implementation of the Dublin Declaration on partnership to fight HIV/AIDS in Europe and Central Asia – 2018/19 progress report. Stockholm: ECDC; 2019. Available at: https://www.ecdc.europa.eu/sites/default/files/documents/HIV-pre-exposure-prophylaxis-evidence-2019.pdf
13. European Centre for Disease Prevention and Control. EMIS-2017 – The European Men-Who-Have-Sex-With-

Men Internet Survey. Stockholm: ECDC; 2019 Available at: https://www.ecdc.europa.eu/en/publications-data/emis-2017-european-men-who-have-sex-men-internet-survey
14. Voglino G, Gualano MR, Rousset S, et al. Knowledge, Attitudes and Practices Regarding Pre-Exposure Prophylaxis (PrEP) in a Sample of Italian Men Who Have SEX with MEN (MSM). Int J Environ Res Public Health. 2021;18(9):4772. doi: 10.3390/ijerph18094772.
15. Rodger AJ, Cambiano V, Bruun T, et al. Risk of HIV transmission through condomless sex in serodifferent gay couples with the HIV-positive partner taking suppressive antiretroviral therapy (PARTNER): final results of a multicentre, prospective, observational study. Lancet 2019; 393: 2428-38
16. Ferrario L, Foglia E, Garagiola E, et al. The impact of PrEP: results from a multicenter Health Technology Assessment into the Italian setting. J Prev Med Hyg 2020; 61(3): E451-E463
17. Cordioli M, Gios L, Huber JW, et al. Estimating the percentage of European MSM eligible for PrEP: insights from a bio-behavioural survey in thirteen cities. Sex Transm Infect 2021;97:534–540.
18. Franconi, I., Guaraldi, G. Pre-exposure Prophylaxis for HIV Infection in the Older Patient: What can be Recommended?. Drugs Aging 2018;35, 485–491
19. World Health Organization. Guidance on oral pre-exposure prophylaxis (PrEP) for serodiscordant couples, men and transgender women who have sex with men at high risk of HIV: recommendations for use in the context of demonstration projects. 2012. http://www.who.int/hiv/pub/guidance_prep/en/. Accessed on December 28, 2021
20. Hershow RB, Gonzalez M, Costenbader E, et al. Medical Providers and Harm Reduction Views on Pre-Exposure Prophylaxis for HIV Prevention Among People Who Inject Drugs. AIDS Educ Prev 2019;31(4). https://doi.org/10.1521/aeap.2019.31.4.363
21. Cattaneo D, Vinti P, Baldelli S, et al. Differences in tenofovir trough concentrations between branded and generic formulations in people taking PrEP. AIDS 2021;35 (3), 522-524. doi: 10.1097/QAD.0000000000002758.
22. Cambiano V, Miners A, Dunn D, et al.Cost-effectiveness of pre-exposure prophylaxis for HIV prevention in men who have sex with men in the UK: a modelling study and health economic evaluation. Lancet Infect Dis 2018;18:85-94
23. Shen, M., Xiao, Y., Rong, L. et al. The cost-effectiveness of oral HIV pre-exposure prophylaxis and early antiretroviral therapy in the presence of drug resistance among men who have sex with men in San Francisco. BMC Med 16, 58 (2018). https://doi.org/10.1186/s12916-018-1047-1
24. Mambanga P, Sirwali RN, Tshitangano T. Factors contributing to men's reluctance to seek HIV counselling and testing at Primary Health Care facilities in Vhembe District of South Africa. Afr J Prim Health Care Fam Med 2016; 8: e1–7.
25. Puro V, Palummieri A, De Carli G, et al. Attitude towards antiretroviral pre-exposure prophylaxis (PrEP) prescription among HIV specialists. BMC Infect Dis 2013;13:217
26. Taramasso L, Riccardi N, Del Puente F, et al. Short Communication: Tenofovir Disoproxil Fumarate/Emtricitabine Fits for All as Appropriate HIV-1 Pre-Exposure Prophylaxis? AIDS Res Hum Retroviruses.Feb 2018.168-170.
27. Rossotti R, Borghi V, Callegaro AP, et al. Impact of Circulating Resistance-Associated Mutations on HIV Pre-Exposure Prophylaxis (PrEP) efficacy: Modeling from Antiretroviral Resistance Cohort Analysis (ARCA) National Database. Virol J 2016; 83: 48-53
28. Signorelli C, Odone A, Gianfredi V, et al. Epidemiological assessment of the first COVID-19 epidemic wave in Lombardy. A systematic review. Acta Biomed 2021 Oct 7;92(S6):e2021462. doi: 10.23750/abm.v92iS6.12340.
29. Balasco N, d'Alessandro V, Ferrara P, et al. Analysis of the time evolution of COVID-19 lethality during the first epidemic wave in Italy. Acta Biomed 2021;92(2): e2021171. doi: 10.23750/abm.v92i2.11149

Received: 9 January 2022
Accepted: 2 February 2022
Correspondence:
Vincenza Gianfredi, MD
Department of Biomedical Sciences for Health,
University of Milan, Milan, Italy
vincenza.gianfredi@unimi.it