

Identifying key elements to inform HIV-testing interventions for primary care in Belgium

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Summary

General practitioners (GPs) play a key role in reducing the hidden HIV-epidemic, but many diagnostic opportunities are missed in primary care. This study aimed at informing the development of an HIV-testing intervention for GPs in Flanders (Belgium) using formative research with a participatory approach. Through the active involvement of an advisory board and 16 group discussions with 122 Flemish GPs, GPs' current HIV-testing practices and perceived practical relevance of 2 distinct HIV-testing strategies (i.e. provider-initiated testing of key populations and indicator condition-based testing) were explored in terms of their relevance and feasibility in routine primary care. Self-reported HIV-testing practices revealed that most tests performed were patient-initiated, pretest counseling was rarely done, and post-test counseling was offered mainly for patients with an HIV-diagnosis. GPs reported multiple barriers to provider-initiated HIV-testing, i.e. personal discomfort, fear of offending their patient, limited knowledge of benefits of early HIV-diagnosis, misconceptions about HIV-risks, lack of guidelines and time. Difficulties to identify patient's sexual orientation or ethical concerns were mentioned as barriers for target group-based HIV testing. GPs assessed the current list of 64 indicator conditions as too difficult to integrate in routine care, deeming a reduced list of GP-relevant conditions as more feasible. Combined strategies (i.e. target group- and indicator-based testing) supported by official screening recommendations were perceived as successful strategies for provider-initiated HIV-testing in primary care. This formative research delivered qualitative evidence for the development of an HIV-testing intervention for primary care settings.

Key words: qualitative research, primary care, general practitioners, intervention, HIV-testing

INTRODUCTION

HIV-testing is an essential part of the HIV prevention and care continuum (McNairy and El-Sadr, 2014; UNAIDS, 2014). It focuses on identifying people who are HIV-infected but unaware of their HIV-positive status, preferably at an early stage. Regardless of extensive efforts, nearly half of all HIV patients in Europe continue to be diagnosed late, i.e. with a CD4-cell count below 350 cells/mm³ (May, 2017). In 2016, 48% of all people newly diagnosed in the European Union and European economic area whose CD4 cell count information was available, had CD4 levels under 350. A quarter (28%) were diagnosed at an advanced stage, i.e. CD4 cell counts <200 cells/mm³ (ECDC and WHO, 2017). Although HIV-testing rates in Belgium, where this study has been conducted, are relatively high and cost-effective (i.e. 1.26 new HIV diagnoses per 1000 tests) (Raben et al., 2015; Sasse et al., 2017), evidence shows that current testing offers do not sufficiently reach those at highest risk in a timely manner: 33% of new HIV-cases were diagnosed late in 2016 (Sasse et al., 2017). For the two most affected groups by HIV, i.e. men who have sex with men (MSM) and sub-Saharan African migrants (SAM), this ranged from 23 to 41%, respectively. Late diagnoses nurture hidden epidemics. According to the mathematical modeling of Belgian surveillance data from 1994 to 2015, an estimated 2805 (confidence interval: 2478–3186) people living with HIV remained undiagnosed in 2015, a substantial proportion of them MSM and SAM (Marty et al., 2017). This equals an estimated 55.6 per 10 000 Belgian MSM who are unaware of their HIV-infection; among non-Belgian MSM the estimated proportion is 258.8. For SAM, the estimation is highest among women: 172.7 per 10 000, while for men this is 92.6 (Marty et al., 2017).

Early diagnosis of HIV has multiple advantages on different levels. On the patient level, antiretroviral treatment can be initiated before severe immunosuppression occurs, dramatically improving life expectancy and quality of life (Nakagawa et al., 2013; Trickey et al., 2017). At population level, undiagnosed HIV poses an increased risk for onward transmission. People who do not know their HIV-status cannot benefit from HIV-treatment as prevention (Cohen et al., 2011) and have no access to counseling shown to modify risk behavior (Marks et al., 2005). Estimations of HIV transmissions along the HIV-continuum of care in the USA indicate that undiagnosed infections are responsible for 6.6 transmissions per 100 undiagnosed persons each year (Skarbinski et al., 2015). Lastly, late presentation results

in significantly higher medical costs. Hence, refocusing HIV-testing on earlier detection may result in a better cost-effectivity for public health expenditure (Krentz and Gill, 2012).

It has been recognized that general practitioners (GP) play a pivotal role in facilitating early HIV diagnoses (Kall et al., 2012). Their typical long-term and holistic relationships with patients facilitate provision of personalized sexual health information and repeated testing opportunities (Kall et al., 2012). However, several studies have shown that diagnostic opportunities are still missed in primary care. In the Netherlands, 61.8% of HIV patients visited their GP in the year before their diagnosis, compared to 38.8% of their HIV-negative matched controls (Joore et al., 2015). In France, the number of patients who visited their GP at least once a year in the 3 years prior to diagnosis was 89% (Champenois et al., 2013). Patients' attitudes are generally positive towards HIV-testing in primary care settings (Hindocha et al., 2013; Mahendran et al., 2015), but GPs encounter multiple barriers to testing for HIV. These include, amongst others, unease to discuss sexual behavior (Vos et al., 2016), inaccurate knowledge of HIV risk (Manirankunda et al., 2012; Loos et al., 2014; Joore et al., 2016), unease to propose an HIV test without clear indications, lack of time (Manirankunda et al., 2012; Thornton et al., 2012; Agusti et al., 2013), lack of training (Rayment et al., 2012; Thornton et al., 2012; Agusti et al., 2013), complex counseling requirements (Thornton et al., 2012) and language and cultural barriers as well as fear of discriminating against patients (Manirankunda et al., 2012; Loos et al., 2014).

To enable GPs' full potential to reduce undiagnosed HIV, several interventions have been developed and evaluated (Deblonde et al., 2011) including target group-based testing (Loos et al., 2014; Joore et al., 2016), rapid testing (Gauthier et al., 2012; Gennotte et al., 2013), routine testing in high prevalence areas (Joore et al., 2017), offering a test to individuals presenting with an indicator condition (Menacho et al., 2013; Joore et al., 2017) and assessing the dissemination method and impact of guidelines (Hindocha et al., 2013). In Belgium, provider-initiated HIV-testing (Loos et al., 2014) and rapid testing (Gennotte et al., 2013) were evaluated on a small scale with a selected group of GPs for their potential of reducing late diagnosis among SAM. Although these strategies were shown to have some potential, their implementation was not sustainable due to the lack of continued technical support and training. To date, sustainable HIV-testing strategies for GPs across the Flemish region to reduce the hidden

epidemic are lacking. Collaborative, participatory approaches were shown to add relevance and value to primary health care research (Macaulay, 2007) and to increase the long-term sustainability of health programs (Macaulay *et al.*, 1999). The formative research presented here was conducted with active involvement of GPs and other relevant stakeholders to inform the development of an HIV-testing intervention suitable to GPs' needs and realities. The research objective was to gain in-depth understanding of current HIV-testing practices, perceived barriers and facilitators for HIV-testing, and to take decisions on content and practical strategies for the intervention to be developed.

METHODS

This formative research is part of a larger research endeavor to develop a provider-initiated HIV-testing intervention for primary care with the aim to reduce the hidden HIV-epidemic in Flanders. A collaborative participatory research approach was applied (Cornwall and Jewkes, 1995), involving experts and GPs throughout the entire process.

To ensure collaboration with all relevant stakeholders, a multidisciplinary AB of 22 experts, including GPs, representatives of GP umbrella organizations, policy makers, HIV-care-, public health-, prevention- and laboratory specialists was established. The formative research was conducted using an iterative approach, gathering input and feedback at each step of the research process. First, the AB reviewed existing European HIV-testing interventions for primary care settings in terms of their potential for upscaling and sustainability in Flanders (i.e. Belgium's Dutch speaking region). The AB selected two strategies for further qualitative assessment: i.e. provider-initiated HIV-testing of key populations, and indicator-based HIV-testing according to the HIV-indicator conditions set by European guidance (HIDES-study) (Raben *et al.*, 2015). A participatory formative study adopting group discussions was set up among a larger group of GPs to assess these strategies' practical relevance and feasibility for primary care. Because of our pragmatic approach to convenience sampling in Flemish regions (i.e. no possibility to compose homogeneous groups due to practical constraints) we prefer to use the term *group discussion* rather than focus group discussion.

Study participants and setting

About 8600 GPs provide primary care for 6 million inhabitants across the Flemish region of Belgium. Of

them, 6293 (73%) are voluntarily affiliated with regional *GP circles*, i.e. umbrella organizations of GPs for collaboration and implementation of local primary care policies. Invitations were dispersed through the GP-circle coordinators to individual GPs, group practices or smaller training groups to recruit study participants. When interested, detailed information was given on the study's objectives and methods, and practical arrangements were made to organize a group discussion.

Study procedures

To reduce the threshold for participation, group discussions were held at planned routine GP meetings, such as team meetings or before/after training sessions. Written informed consent was obtained at the start of each group discussion. The study purpose, i.e. informing the development of an HIV-testing intervention for primary care, was explained. This included background information on the HIV-epidemic in Belgium, the number of late diagnoses and multiple advantages of HIV-testing.

Data collection method

A brief survey was used to collect information on participants' socio-demographic background, HIV-testing practices and HIV-care. The discussions offered the opportunity to exchange ideas, express opinions, and assert differences and commonalities. Their goal was not to reach consensus, but to promote awareness of shared experiences (Hennink, 2007).

Group discussions were conducted using an open-ended topic guide, developed based on available literature including epidemiological evidence on hidden epidemics and barriers for HIV testing in primary care (Manirankunda *et al.*, 2012; Loos *et al.*, 2014; Marty *et al.*, 2017). The first part consisted of questions to gain insights in GPs' perception of target group-based HIV-testing, GPs' current approaches to HIV-testing among MSM and SAM, and their awareness of patients' sexual orientation and behavior to conduct an adequate HIV-risk assessment. Next, the practicability of indicator conditions-based HIV-testing was discussed. The list of 64 indicator conditions developed by the HIDES-study (Raben *et al.*, 2015) was circulated and discussed. GPs were asked to indicate which of these conditions they had regularly diagnosed and which of them formed an indication for HIV-testing in their opinion. The second part of the topic guide obtained input on specific communication and counseling skills. Lastly, participants were asked about their opinion on the most feasible HIV-testing interventions for primary care.

After having conducted eight group discussions, data saturation on communication and counseling skills was

achieved and the topic guide was adapted with greater emphasis on suggested intervention methods. The general introduction was replaced by a PowerPoint presentation addressing multiple advantages of early HIV-diagnosis, GPs' potential contribution to timely HIV diagnoses, and commonly held misconceptions identified in the previous group discussions.

Data analysis

All group discussions were audiotaped and observed by an observer/note taker. Notes and audio-recordings were combined in 16 extensive summaries. Data were analysed inductively using Nvivo 8 according to principles of thematic analysis (Braun and Clarke, 2006). In a first phase, overarching themes consistent with the topic guide questions were outlined. Datasets responding to these themes were analysed by the first author establishing a data-driven code-book. In a second phase, all data were scrutinized once again for commonly recurring themes and additionally emerging codes were assigned. Table 1 shows themes and sub-themes and the respective typical as an illustrative extract of the codebook. The coding process and possible inconsistencies were resolved through discussions between the first and the last author.

The study obtained ethical approval from the institutional review board of the Institute of Tropical Medicine Antwerp.

RESULTS

Between August and November 2016, a total of 16 group discussions were held in ten places spread over all 5 Flemish provinces with a total of 122 participants. When feasible, large groups of GPs were divided into groups of five to eight participants. Each group discussion lasted between 60 and 90 min. As a result of the recruitment procedure, the groups were mixed according to age, gender, work experience and type of practice. Participants' sociodemographic characteristics and HIV-related expertise are described in Table 2.

Current self-reported HIV-testing practices

Homosexual patients ask for a test themselves. They are aware of their risk. (Group discussion 5, September 2016)

Qualitative and quantitative data (see Table 2) show that most HIV-tests in GP practices were patient-initiated. Participants reported that mostly MSM and young people requested an HIV test after occurrence of risk behavior, at the start of a new sexual relationship or

after traveling. According to the participants, patients' risk perception was not always correct: they tended to overestimate the risk.

We do see a lot of people fearing an HIV-infection, because they had unprotected sex for example. While the sexual contact they had was without any risk. (Group discussion 12, October 2016)

GPs usually initiated an HIV test complying to existing prenatal testing guidelines, for administrative reasons (e.g. insurances), as part of a sexually transmitted infection (STI)-screening or contraceptive consultation. In the absence of HIV/STI testing guidelines, GPs found it difficult to proactively suggest an HIV test, especially when clinical reasons were lacking. If they considered testing necessary, most GPs rather proposed to collect a general blood sample to avoid communication discomfort:

You can say 'it's been long since you had a blood test, let's check everything'. (Group discussion 10, September 2016)

When GPs described their current HIV-testing practices, the majority stressed they always obtained patients' consent because of 'HIV-exceptional legal requirements':

I once had a positive test and the lab called me to ask if I had obtained consent. If not, I would be in trouble legally. How will you explain a positive test result, if the patient didn't give consent? (Group discussion 7, September 2016)

Pretest counseling was not widely applied, many GPs just mentioned that an HIV test was included among other medical procedures. Participants attributed this to personal discomfort, fear of offending the patient and limited time not allowing for extensive provision of information. Result communication was highly dependent on GPs' individual approach, mostly by phone or mail. Sometimes patients were informed that 'no news, is good news' thus not communicating HIV-negative results. HIV-positive test results were always personally conveyed. GPs mentioned that their knowledge of HIV was limited due to little training on HIV. They acknowledged the need for more information on HIV-treatment, advantages of HIV-testing, who to test and how to practically perform testing, i.e. tips for communication and obtaining informed consent. Regarding lack of epidemiological knowledge, especially GPs from rural areas considered HIV to be only occurring in large cities.

Table 1: Thematic analysis: data-driven codebook extract, translated from original language (Dutch)

Phase 1: thematic analysis: data-driven codebook	
Themes	Example
Subthemes	
Descriptive codes	
Provider-initiated HIV-testing	
Facilitators	
General check-up/blood tests	I would embed it in a more general consult, 'a health check-up'
Medical file	When you are updating their medical file, asking after their medical history, stating that it is part of the anamnesis to run some preventive tests
(...)	
Barriers	
Fear of damaging relation GP-patient	I think you should know your patient already longer, because if you suggest that in the first or second consult... I think that's offensive
HIV-stigma	HIV is still associated with drugs and sex, multiple partners, or prostitution
Trust patient	With someone in a stable relationship that's difficult; they might assume I suspect them or their partner to be cheating.
(...)	
Need for a valuable reason	When they have a simple cold, you can't offer someone an HIV test.
Financial barriers	We have to do already so many preventive tests, you shouldn't increase the healthcare-costs more
Preference HIV-testing strategy	
Combination of target groups- and indicator-based screening	I would prefer both strategies combined, because they are complementary and with this approach no-one is excluded.
Target group screening	
Easier to recall	Those groups are easy to remember
Efficiency dependent on location	It depends on the population and practice; if you screen target groups in Brussels, it will be more efficient
General screening	It is difficult to assess who is at risk, it's easier to screen everyone
Gradual screening	You could screen following a 'scoring system' with check points, as soon as a certain level is reached, an HIV- test is indicated
(...)	
Phase 2: further scrutinizing for recurring themes: data-driven additional codes	
Assumptions and knowledge HIV-epidemic	
HIV is urbanized	Here in our little town, we don't see HIV. In big cities like Antwerp it's a kind of trend
Ignorance target groups	Do SAM who live in our country since long, also have a higher risk?
Ignorance HIV (course, treatment etc)	There are few people who have knowledge on HIV, its treatment, its symptoms, ... For instance, I've never heard about this PEP-pill
Focus on patient's consent for HIV-testing	
Obliged to ask for consent (assumed guideline)	Ethically, we have to ask for consent. At least, that's how I've been thought, but well, I'm older of age (<i>smiles</i>)
Questioning HIV-exceptionalism	I think there shouldn't be a legal difference between testing for HIV or Hepatitis B
Generalized question for consent	I ask the consent to test for all infectious diseases, not specifically for HIV

Perceptions on target group-based HIV-testing

Most GPs recognized that the high HIV prevalence and advantages of early HIV-diagnosis justified the implementation of target group-based testing, but saw multiple barriers for its implementation. Firstly, identifying the target group was perceived to be difficult. Although most GPs were confident that they knew their patients'

sexual orientation and sexual partners, they recognized that this was rather based on assumptions than on proper sexual history taking. Many held misconceptions on target group-specific risk factors.

In our practice, we have a gay-couple that has been together for years now. Should we screen them regularly as well? (Group discussion 2, September 2016)

Table 2: Sociodemographic characteristics of all participants

	Women		Men		Total	
	N	%	n	%	n	%
Participants	64	52.50%	58	47.50%	122	100%
Age (in years)						
Median [range]	44 [25–65]		57 [25–73]		51 [25–73]	
Years of experience ^a						
Median [range]	16.5 [0–38]		30 [0–47]		25 [0–47]	
Type of practice						
Solo practice, fee for service	18	28.10%	29	50.00%	47	38.50%
Group practice, fee for service	36	56.30%	23	39.70%	59	48.40%
Health center, capitation fee	5	7.80%	3	5.20%	8	6.60%
Other	5	7.80%	3	5.20%	8	6.60%
Number of patients/week ^b						
Median [range]	85 [35–160]		120 [20–300]		100 [20–300]	
Number of HIV patients in follow-up ^c						
Median [range]	1 [0–20]		1 [0–15]		1 [0–20]	
HIV tests/month ^d						
Median [range]	4 [0–80]		4 [0–80]		4 [0–80]	
Last HIV test performed ^e						
Provider-initiated	17	30.40%	12	20.70%	29	25.40%
Patient-initiated	39	69.60%	46	79.30%	85	74.60%

^aReported data, *n*=120.

^bReported data, *n*=114.

^cReported data, *n*=121.

^dReported data, *n*=116.

^eReported data, *n*=114.

It depends on how long they have been in Europe. If they just came from Africa, then we test. (Group discussion 4, September 2016)

GPs feared to appear judgmental when addressing such ‘sensitive issues’. GPs working in smaller communities found it more difficult to openly discuss patients’ sexual relationships than those working in urban areas.

I think, here, in our village, we know who is with whom, but this makes it even harder to ask if there are other partners. (Group discussion 8, September 2016)

GPs’ gender and own sexual orientation also played a role when discussing sexual orientation or behavior.

Being homosexual myself, I notice that patients tend to express their orientation spontaneously. I know many ‘heterosexual’ men leading a double life, asking to send the results of HIV-tests to my practice instead of their home address. (Group discussion 3, September 2016)

In general, a good patient-physician relationship and open attitude facilitated the conversation on HIV-testing, but GPs still preferred specific entry points for

provider-initiated testing: a standard question in the medical file, a defined sexual health consultation or an incident of sexual risk behavior were proposed.

Secondly, some GPs struggled with ethical aspects of offering an HIV test based on sexual orientation or origin. They felt this may discriminate against some patients, and thus harm the patient-physician trust relationship. Especially sub-Saharan African patients were assumed to be unwilling to be tested because of culturally grounded taboos on sexuality, HIV-stigma and fear of blood taking. Some GPs proposed to screen on general population level in order to include people at highest risk, others referred to the governments’ responsibility to screen incoming migrants. Overall, GPs felt that it was more feasible to offer provider-initiated testing to MSM than to African patients.

Additional practical barriers were mentioned such as time constraints, language problems (i.e. mostly for African patients) and incompatibility of HIV-testing with family consultations. Some GPs also questioned whether public health policies were in favor of increased HIV-testing, given the increasing pressure to reduce health care costs.

Table 3: Ten most diagnosed indicator conditions (left column) and ten most reported conditions indicative for offering an HIV test (right column) in GP practices

Indicator conditions regularly diagnosed in GP practice	Indicator conditions which indicate GPs to test for HIV
1. Sexually transmitted infections (STI)	1. Sexually transmitted infection (STI)
2. Herpes zoster	2. Salmonella septicemia, recurrent
3. Mononucleosis-like illness	3. Unexplained leukocytopenia
4. Seborrheic dermatitis/exanthema	4. Hepatitis B or C
5. Candidemia	5. Unexplained lymphadenopathy
6. Cervical dysplasia	6. Malignant lymphoma
7. Unexplained weight loss	7. Peripheral neuropathy
8. Peripheral neuropathy	8. Mononucleosis-like illness
9. Unexplained fever	9. Coccidioidomycosis
10. Unexplained chronic diarrhea	10. Cytomegalovirus

Perceptions on indicator condition-based testing

Discussing the list of indicator conditions (Raben *et al.*, 2015) showed that all GPs perceived the entire list of 64 indicator conditions as too extensive, complicated and specialized for use in routine primary practice. However, the list raised awareness of the association between HIV and a number of pathologies commonly seen in GP practices.

I had this patient who wanted an HIV test because he visited a prostitute. Now that I think of it... he also had severe dermatitis. (Group discussion 10, September 2016)

GPs were asked to indicate the pathologies regularly diagnosed in primary care included in the list, and to highlight which conditions currently served as an indication for HIV-testing. Table 3 shows these results ranked according to the frequency of being mentioned. For example, GPs would offer an HIV test when they diagnose an ‘STI’, which happens regularly (STI can be found in both columns). ‘Unexplained weight loss’ was reported to be commonly diagnosed, however, GPs would not consider offering an HIV test. On the contrary, GPs would offer an HIV test when diagnosing a recurrent salmonella septicemia infection, but this indicator condition was not often seen in their daily practice.

GPs agreed that a reduced list tailored to their routine practice would be a practicable tool offering an objective, non-offensive framework for HIV-testing. It was felt that indicator conditions associated with sexual risk behavior or suppressed immunodeficiency constituted a good opportunity to introduce HIV-testing. Most GPs mentioned they would use the list in combination with assessment of patients’ risk behavior, characteristics (e.g. age, origin), and clinical aspects (e.g. recurrent pathology, stage of pathology).

It will always be difficult to compile a definite list. It will remain the GP’s personal assessment whom to test. We should think more in terms of statistics, but stay patient-orientated. (Group discussion 6, September 2016)

HIV-testing intervention preferred by GPs

The combination of both is preferable: you can easily remember the target groups, while the indicator conditions can ring a bell. (Group discussion 11, September 2016)

When asked which HIV-testing intervention would be most feasible in routine GP practices, many GPs mentioned the need for an ‘official recommendation to screen both target groups and patients presenting with an indicator condition’. They argued that combining both strategies would be complementary and comprehensive. Focusing on groups with high HIV risk was considered easy to remember, logical and effective, but at the same time potentially stigmatizing. Indicator conditions were perceived as neutral and inclusive as they allowed for diagnosing individuals not belonging to the prioritized target groups. However, some participants felt that the list was hard to remember and that it could lead to late diagnoses because most indicator diseases only occur at a later stage of HIV. In terms of the ‘official recommendation’, GPs felt that it should be issued for instance by the GP umbrella organization and supported by the government.

In that case you don’t have to explain yourself anymore. You don’t have to accuse the patient of risk behavior, you can say ‘it is officially asked that I offer you this test’. So that you don’t have to say ‘I suspect that you have AIDS, but that’s the list, these are the conditions, when we have to test’. (Group discussion 4, September 2016)

In terms of effective delivery channels, GPs preferred to be informed through personal training. Compared to written information alone, a face-to-face training would ask their active involvement, allow them to understand the rationale of the recommendations, potentially increasing their motivation them to test at a greater extent.

DISCUSSION

This formative research provided important insights into GPs' current HIV-testing practices, barriers encountered, and the practical relevance of existing HIV-testing interventions. Main findings point to the fact that current HIV-testing in GP practices in Flanders happened mostly on patients' initiative. GPs experienced barriers to provider-initiated testing, which are in line with those described in literature. Targeting specific at-risk populations is often perceived as discriminatory, and as potentially harming the relationship with patients (Hindocha *et al.*, 2013; Loos *et al.*, 2014). The combination of non-judgmental attitudes and existing misconceptions about sexual risks in specific relationship types, e.g. MSM or established migrants with main partners, may lead to missed opportunities to diagnose HIV in primary care.

Moreover, GPs in our study did not feel capable to proactively offer an HIV test as their knowledge on HIV and its treatment is poor, as found in earlier studies (Manirankunda *et al.*, 2012; Deblonde *et al.*, 2018). Knowledge gaps on current evolutions in the HIV-field nurture prejudice and misconceptions. Most GPs in our study still assumed HIV to be uniquely linked with sexual promiscuity. Therefore, risk assessments were rather based on personal assumptions than on evidence-based criteria. Not knowing how to collect sexual health information thus formed an additional barrier (Vos *et al.*, 2016; Joore *et al.*, 2017) in our study. Due to these assumptions and GPs' limited knowledge, we conclude that many GPs were unaware of additional vulnerability factors, such as socio-economic vulnerability (Desgrées-du-Loû *et al.*, 2016), drug and alcohol abuse or vulnerable mental health (Vanden Berghe *et al.*, 2014). In addition, GPs have limited knowledge of recent achievements in HIV-medication described in literature, e.g. prolonged quality of life and reduced side effects (Trickey *et al.*, 2017), treatment as prevention (UNAIDS, 2014) and the added importance of early diagnosis (Hoffmann and Gallant, 2014). For some, their focus on opt-in strategies with a 'legally required' informed consent stems from the early days of the HIV-epidemic when no treatment was available. The lack of official guidance specific for Flemish primary care

settings reinforces low accountability: many GPs did not perceive that they had a role in HIV prevention. A study conducted 6 years ago in Flanders found similar results, showing that many physicians referred to the patients' responsibility for demanding an HIV test (Manirankunda *et al.*, 2012), implying that provider-initiated HIV-testing has not progressed much.

Once aware of the importance of early HIV-testing, our participants were willing to adopt provider-initiated HIV-testing, but needed guidance. They articulated the need for concise official guidelines, which should be easy to implement in their day-to-day practice. Guidelines were perceived as a much-needed entry-point to introduce HIV-testing and as a practical tool to overcome ethical barriers. Previous research in Flanders has shown that equipping GPs with an evidence-based tool for testing can facilitate integration of HIV-testing in routine primary care, resulting in patients' acceptance and improvement of their skills during implementation (Loos *et al.*, 2014).

Our study delivered concrete suggestions on both content and delivery strategies of an HIV-testing intervention tailored for primary care. The study's next steps in developing the intervention include further validation of the proposed reduced list of indicator condition through the study's advisory board. According to our study participants, the list should be recommended in combination with target group-based HIV testing and delivered as part of an official recommendation to promote provider-initiated HIV testing in primary care. Based on our study's results, other core elements to be included pertain to informing on hidden HIV-epidemics among MSM and SAM, updated general epidemiological and clinical information on HIV. In addition, specific evidence-based elements to improve communication skills for routinely offering an HIV test in primary care should be included. Guidelines should be disseminated through a personal training, considered as the most effective method to inform and engage GPs in applying the guidelines. Only distributing guidelines through professional delivery channels was not seen as sufficient, as also demonstrated in an earlier study (Hindocha *et al.*, 2013).

We recognize certain study limitations. This study was carried out among GPs throughout entire Flanders, however, some aspects described are context-specific and therefore not generalizable to the GPs in other regions of Belgium or Europe. Socially desirable answers can never be excluded in self-reported data collection, but our rich and diverse data indicate that this may have been minimal. A selection bias may have occurred, because participation was voluntary based on the initial

invitation to the group discussions. Nevertheless, agreement to participate was often given by a local coordinator, implying that GPs with no initial interest in participation were included as well in the group discussion. In line with our research interest to inform the development of a generalized intervention, we employed a relative low level of data interpretation (Vaismoradi *et al.*, 2013), and therefore did not structurally analyse data according to specific individual characteristics of the participants such as gender, sort of practice etc. However, since our findings were largely consistent with the literature, the group discussions approach allowed for establishing solid findings valuable for a future HIV-testing intervention.

CONCLUSION

The HIV-field needs to invest in closer collaboration with primary care. Many new evolutions in HIV-research apparently did not yet reach primary care, while GPs' role is key in the success of treatment as prevention, and reaching the first step of the 90–90–90 targets (UNAIDS, 2014). Normalized HIV-testing strategies in GP practices are crucial to curb the epidemic (Joore *et al.*, 2016) and to detect more HIV-infections at an earlier stage (Kall *et al.*, 2012), constituting an opportunity to improve the first step of the HIV-care cascade (Nakagawa *et al.*, 2014). The Flemish policy stressing prevention as a key-task for GPs (Aerts *et al.*, 2019) is an important prerequisite in this respect.

Our participatory formative research resulted in rich insights into current practices, needs and barriers to enhance HIV-testing. Through the active involvement of a multidisciplinary advisory board and the inclusion of GPs from across Flanders, the study delivered a qualitative evidence base for the further development of a primary care HIV-screening intervention in Flanders. Integrating GPs in the full cycle of formative research, intervention development, implementation and evaluation is an essential requirement prerequisite to make future interventions sustainable.

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