

# BMJ Open 'Just another vial...': a qualitative study to explore the acceptability and feasibility of routine blood-borne virus testing in an emergency department setting in the UK

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## ABSTRACT

**Objectives** Increased test uptake for HIV and viral hepatitis is fast becoming a health priority at both national and global levels. Late diagnosis of these infections remains a critical public health concern in the UK. Recommendations have been issued to expand blood-borne virus (BBV) testing in alternative settings. Emergency departments (EDs) offer a potentially important point of testing. This paper presents findings from a qualitative study which aimed to explore the acceptability and feasibility of a routine opt-out combined BBV testing intervention implemented at an inner London ED.

**Methods** We conducted 22 semistructured interviews with patients and service providers in the ED over a 4-month period during the intervention pilot. A grounded analytical approach was employed to conduct thematic analysis of qualitative study data.

**Results** Core interrelating thematic areas, identified and analytically developed in relation to test intervention implementation and experience, included the following: the remaking of routine test procedure; notions of responsibility in relation to status knowledge and test engagement; the opportunity and constraints of the ED as a site for testing; and the renegotiation of testing cultures within and beyond the clinic space.

**Conclusion** Study findings demonstrate how relational and spatial dynamics specific to the ED setting shape test meaning and engagement. We found acceptability of the test practice was articulated through narratives of situated responsibility, with the value of the test offset by perceptions of health need and justification of the test expense. Participant accounts indicate that the nontargeted approach of the test affords a productive disruption to 'at-risk' identities, yet they also reveal limits to the test intervention's 'normalising' effect. Evaluation of the intervention must attend to the situated dynamics of the test practice if opportunities of an opt-out BBV test procedure are to be fully realised. Findings also highlight the critical need to further evaluate post-test intervention practices and experiences.

## Strengths and limitations of this study

- Employing qualitative research methods, we draw from 22 semistructured interviews to examine the acceptability and feasibility of a novel three-combined blood-borne virus (BBV) routine test intervention implemented in an emergency department (ED) setting in the UK.
- The study offers an enriched understanding of ED patient and provider perspectives and experiences of the intervention, that may inform and facilitate improved implementation of the initiative should the pilot be expanded.
- A key limitation to the study was interviewing participants at point of clinic contact only, and thus not being able to explore critical dimensions of the post-test experience, and more particularly the perceptions and experiences of those diagnosed through routine ED BBV testing.
- We are aware that the small sample size does not include individuals who felt themselves to be at risk of a positive result, which would likely affect test engagement and intervention experience.
- We acknowledge that qualitative data produced within and through this particular study context limit the generalisability of study findings beyond the primary setting.

## INTRODUCTION

Recent years have seen the continuing development of more effective and tolerable treatments for viral hepatitis and HIV. Yet, the late diagnosis of these infections, associated with poorer individual health outcomes and increased population transmission, remains a prominent health concern at both state<sup>1-4</sup> and global<sup>5-8</sup> levels. Delayed access to HIV treatment increases the risk of severe health complications and premature mortality,<sup>9-12</sup> as well as onward transmission.<sup>13-15</sup> Global estimates indicate that hepatitis B (HBV) and

hepatitis C (HCV) viral infection account for 47% and 48%, respectively, of the annual 1.4 million deaths from hepatitis-related liver cirrhosis and cancer.<sup>6</sup> Estimates further indicate HBV and HCV diagnosis to be critically low at 9% (HBV) and 20% (HCV).<sup>7</sup> Care cascade models demonstrate that low testing rates are a principal limitation to the 'success' of public health targets of treated viral hepatitis and HIV viral suppression. With blood-borne virus (BBV) testing and case diagnosis suboptimal, increased test uptake remains a critical national and global priority for treatment benefits to be fully realised.<sup>6 10 16</sup>

Within the UK, of the estimated 101 200 people living with HIV in 2015, as many as 13 500 were unaware of their status.<sup>17</sup> While the first United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 target (90% of people living with HIV being aware of their status) was reached in London in 2016, nation-wide figures fell short at 88%.<sup>2</sup> In that year, 42% of HIV diagnoses were made during later stages of infection.<sup>4</sup> Late diagnosis and low treatment rates for HBV and HCV are reflected in UK hospital admissions and mortality from HCV-related end-stage liver disease, and HCV or HBV-related liver cancer.<sup>3 18 19</sup> Undiagnosed HCV cases among people who inject drugs, the group most at risk of HCV infection in the UK, are estimated to be high.<sup>20</sup> The British HIV Association and National Institute for Health and Care Excellence (2008 and 2013, respectively) have issued recommendations to increase uptake for BBV testing in alternative settings.<sup>21 22</sup> Ongoing efforts to reduce late HIV diagnosis (defined as a CD4 count of less than 350 mm),<sup>23</sup> alongside shifts in policy towards HIV prevention, have sought to expand HIV testing initiatives both within and beyond the clinic environment.<sup>24-29</sup> This has included opt-out testing procedures where individuals are informed that a test will be conducted unless they indicate they do not want to be tested.

Emergency departments (ED) offer a potentially important point of testing.<sup>30</sup> It has been estimated that around one in four of the population in the UK and the Republic of Ireland attend EDs in any 1 year.<sup>31</sup> For individuals not registered with general practitioners (GPs), including migrant populations disproportionately affected by HIV and chronic HBV and HCV infection,<sup>17 32</sup> EDs can present a primary point of health service contact. Routine opt-out testing in the ED setting may also offer case finding potential for individuals no longer identified as 'at risk'—such as people who used to inject drugs—who remain undiagnosed through GP or other health service contact until an advanced disease stage.<sup>33 34</sup>

Much of the global literature on routine HIV testing in EDs has emerged from the USA in response to the 2006 Centre for Disease Control and Prevention guideline revisions.<sup>35</sup> International evaluation of service provider perspectives has identified resource cost and the efficacy of routine test approaches as critical concerns.<sup>36-38</sup> While conscious of the potential public health benefits, some view routine HIV testing to sit beyond the remit of

emergency medical practice.<sup>39 40</sup> US-based examinations of patient perceptions and experiences have revealed levels of confusion around opt-out testing procedures.<sup>41</sup> Yet, studies have also identified an acceptability of ED-based routine testing grounded in status curiosity and routes of reassurance, alongside the convenience of the test opportunity while accessing clinic services.<sup>42 43</sup> Patient concerns about routine testing procedures have centred on issues of confidentiality and the social implications of a positive result.<sup>42</sup> HIV test practice and engagement thus remains both an individually and socially negotiated process.<sup>44 45</sup>

Aspirations that routine BBV testing in more generalised clinic environments could help normalise HIV test practices, and lessen illness-related stigma, speak to the enduring concern that negative attitudes around HIV continue to impede test uptake and diagnosis across high-income settings. Despite improved medical realities of hepatitis cure,<sup>3</sup> and near-normal life expectancy for those diagnosed early and able to access HIV treatment,<sup>9</sup> the social meaning of an illness and related test practices are less easily reconfigured. Test practices and engagement, situated in sociocultural systems of meaning, may also confer risk association.<sup>46</sup> Continued misconceptions of hepatitis infection and transmission, alongside the stigmatisation of associated 'risk behaviours', negatively impact hepatitis case identification and diagnosis across the UK.<sup>33 34 47</sup> While shifts in HIV testing norms have been witnessed among some communities within the UK, perceptions of the social risk attached to both test engagement and a potential positive result continue to limit test uptake and frequency of testing.<sup>44 45</sup> Debate concerning the value of nontargeted versus targeted test approaches in the HIV field remains ongoing.<sup>38 48 49</sup> Some have argued that targeted HIV testing, centring on risk assessment, is necessary in the ED setting to ensure that patient interests and ethics of practice are protected.<sup>49</sup> Others have voiced concerns that continued medical segregation and targeted test practices perpetuate an HIV exceptionalism, illness stigma and subsequent test anxiety.<sup>38 39</sup> How test meaning is configured and negotiated through a routine practice in the ED setting, and the implication for test engagement and uptake, is an important dimension of intervention potential.

Critical also to the evaluation of emergent test technologies across the clinical, community—and more recently domestic—spheres, is an understanding of how 'responsibilisation' discourses shape health-seeking norms and practices. The concept of 'biological citizenship', which conveys an individualised responsibility to act in keeping with both private and collective health,<sup>50-52</sup> can be used to explore how test technologies and practices function as enactments of health citizenship.<sup>44 53</sup> The dynamics of social, political and biomedical expectation that emerge, as novel test technologies are encountered and negotiated relative to existing test practices and clinical procedures, warrants critical reflection. Attending to the 'behavioural domain' and psychosocial complexity of

test practice and engagement, amidst broader 'normalisation' processes,<sup>54 55</sup> remains critical in evaluating the efficacy and value of an intervening test technology.

UK-based qualitative research specific to opt-out BBV testing in the ED setting remains limited. To our knowledge, there has been no patient-focused analysis of opt-out HIV testing in UK EDs to date, nor any qualitative inquiry of ED-based routine opt-out testing for HCV and HBV. This study aimed to explore the acceptability and feasibility of a combined HIV, HCV and HBV routine opt-out testing initiative delivered to adult patients receiving routine bloods as part of their emergency care, from the perspectives of ED patients and staff. The work offers a theoretically driven examination of intervention practice and experience alongside an applied value to inform any potential expansion of the test initiative. The study looks at both the immediate responses to the intervention components and test event but also at how these experiences are shaped by, and potentially renegotiate, broader social norms and forms of test practice and engagement.

## METHODS

This paper draws on findings from a pilot qualitative study conducted to explore patient and provider responses to a combined BBV testing intervention implemented at an ED in inner London, UK.<sup>56</sup> In all, 22 semistructured interviews were conducted with ED patients (n=18) and service providers (n=4) between May and August 2016.

Under the BBV test initiative, all ED patients over the age of 18 years who have blood samples taken as part of their emergency care are routinely tested for HIV, HCV and HBV, unless they specifically opt out of the test. Health professionals taking the blood sample verbally explain to ED attendees that all patients are being routinely tested for the three viruses, unless they indicate they do not want to be tested. Tests are offered to all adult patients having bloods taken, except those individuals who do not have the capacity to consent (eg, on account of a psychotic illness or cognitive impairment) and those where the test offer cannot be verbally communicated and agreed to (eg, across language barriers). Where tests are accepted, an extra vial of blood is drawn. Information relating to the testing intervention was made available through leaflets in the department (English language only), with posters displayed within ED waiting areas and assessment cubicles where bloods are taken. Test results operated on a 'no news is good news' policy. Those patients returning a positive serological result for any of the tested viruses were contacted within 14 days and specialist consultation arranged.

We sought to recruit both patients and staff participants in the ED, so as to explore the multiple dimensions of test expectation and experience that frame the intervention. Patient participants were sampled from individuals accessing ED services who had bloods taken as part of their emergency care and included individuals who were offered and accepted the BBV test (n=10); individuals

offered the test but who opted out (n=1) and individuals who did not recall being offered the intervention, assumed not tested (n=7). Insofar as was possible, we sought to include patients across a range of ages, genders and ethnic backgrounds to capture the diversity of the ED population. We interviewed nine female and nine male patients in the ED, between 23 and 82 years in age, of varying ethnicities (see [table 1](#) for information relating to patient participants). Patient and staff participants were recruited across different times of the day/evening, both during the week and at weekends to reflect variations in patient populations and department workloads. Health professionals were sampled from staff members directly involved in taking bloods and implementing the test intervention. Staff participants included women and men of different staff grades, who had worked at the department for between 3 and 8 years.

Interview discussions were semistructured, shaped by a topic guide developed by the research team but also guided by participants' responses. Interviews commenced after participants gave written informed consent and, with their permission, were audio-recorded. While interpretation services had been identified if required, all interviews were conducted in English. Data were collected by LC who was not known to participants prior to the study, with all interviews conducted on the ED site. Interviews lasted between 20 and 50 minutes, as determined by patient and staff availability. Interviews were immediately stopped in the event of the patient receiving further medical care. While interviews were resumed wherever possible, in cases where patient participants were transferred to other hospital departments or discharged, interviews could not always be concluded. Interview participants were asked about their views and (where applicable) direct experiences of the test intervention; previous test experiences and current test practices; knowledge and awareness of HIV, HCV and HBV viruses, transmission risks and treatments; felt and perceived barriers and facilitators to BBV testing; and the felt appropriateness of the ED as a site for testing.

All interview data were transcribed verbatim, with personal identifying details removed. In keeping with a grounded analytical approach to inform thematic development,<sup>57 58</sup> preliminary data coding and analysis commenced early in data collection, informing later interviews and allowing for emerging themes to be further explored across patient and staff accounts. Initial coding examined both *a priori* interests as well as inductive codes grounded in the study data. Secondary-level thematic coding was later conducted across the full dataset to further fracture the data and allow for the development of conceptually driven categories, drawing on relevant theoretical literature, particularly in relation to responsabilisation and biological/health citizenship.<sup>50–53</sup> Points of tension and convergence in relation to emerging thematic areas were explored both between patient accounts and across patient and provider responses. Core thematic areas that emerged included the following: the

**Table 1** Patient participant information

Pseudonym	Gender	Age (years)	Region of origin	BBV test intervention response
Ryan	Male	18–29	North America	BBV test offer declined
Sofiya	Female	30–49	East Europe	BBV test offer not recalled, assumed not tested
Carlotta	Female	18–29	West Europe (excluding the UK)	BBV test offer accepted
Malcom	Male	30–49	UK	BBV test offer not recalled, assumed not tested
Karen	Female	(30–49*)	UK	BBV test offer accepted
Ramisa	Female	(30–49*)	South Asia	BBV test offer accepted
Phil	Male	30–49	UK	BBV test offer accepted
Ehsan	Male	(50+*)	Middle East	BBV test offer not recalled, assumed not tested
Sten	Male	30–49	West Europe	BBV test offer not recalled, assumed not tested
Dennis	Male	50+	UK	BBV test offer accepted
Hana	Female	18–29	South Europe	BBV test offer not recalled, assumed not tested
Julia	Female	(18–29*)	West Europe	BBV test offer not recalled, assumed not tested
Matas	Male	30–49	East Europe	BBV test offer not recalled, assumed not tested
Dan	Male	30–49	UK	BBV test offer accepted
Imogen	Female	50+	UK	BBV test offer accepted
Ishani	Female	30–49	UK	BBV test offer accepted
Lena	Female	18–29	East Europe	BBV test offer accepted
Khaled	Male	(30–49*)	Middle East	BBV test offer not recalled, assumed not tested

\*A number of patient interviews were interrupted due to patient care pathways. In cases where interviews were not able to be resumed (eg, where patients were transferred/discharged), patient information has insofar as is possible been extracted from interview data. Where patient ages were not available, an age-range estimate has been given based on biographical information given by patients during the interview.

renegotiating of routine procedure; felt and perceived testing responsibilities; the opportunity and limitations of the ED as a site for testing; and the interplay of testing cultures within and beyond the clinic. All names used in the analysis are pseudonyms.

This study was undertaken as part of the National Institute for Health Research Health Protection Research Unit in Blood Borne and Sexually Transmitted Infections at University College London in partnership with Public Health England and in collaboration with the London School of Hygiene and Tropical Medicine.

*Patient and Public Involvement:* Pre-study consultations were conducted with community organisation representatives working in the HIV, HCV and HBV fields to inform the design of the study. Patients in the ED were not involved in the study design phase of the research. All study outputs and publications will be disseminated to those study participants who opted to give contact details for this purpose.

## RESULTS

Our study findings report on the perceptions and experiences of ED patients and service providers in response to the implementation of a routine BBV test intervention in a UK ED setting. While not all patient participants were offered the intervention, in being eligible for intervention practice they contributed valuable insight into the acceptability, feasibility and limitations of the ED as a site

for routine BBV testing. Our analysis explores the intervention's potential and practical negotiation through four interrelating thematic areas: the remaking of routine test procedure; notions of responsibility in relation to status knowledge and test engagement; the opportunity and constraints of the ED as a site for testing; and the renegotiation of testing cultures within and beyond the space of the clinic.

### A remaking of routine

Processes of integrating an additional test into standard ED practice were shaped by staff and patient interactions with, and responses to, the various intervention components. A number of patient participants described themselves as having been too preoccupied and distracted to register the intervention posters—a 'background' not properly taken in. Staff, in contrast, depicted the posters as an aid to intervention procedure; a visual reminder and point of reference in the assessment cubicle where blood samples are taken. Both patient and staff participants stressed the importance of how the verbal explanation was delivered; 'the way you say it', keeping it simple. Patient accounts make positive reference to the 'straight-forward', 'low-key', 'casual' and nonintrusive communication that presented the test as just another part of routine procedure; no fuss:

The guy yesterday when he took it, he was so laid back about the one sentence that he made, that you almost

didn't want to say no. It wasn't a big deal, do you see what I mean? Like, there was no negativity attached to the way he was talking. (Ishani)

Adapting the test procedure to the demands of an ED workflow appears to support a more neutral and accessible practice, where the *less* of the event helps bypass the potential 'negativity' of the test idea. Staff indicated that the presence of friends and relatives during blood procedures was common, but that communication surrounding the test did not typically sit apart from 'normal history taking' and the established confidentiality of the room. While the intervention would at times be conducted in the presence of others, it was avoided in situations where those others were translating. The 'no news is good news' results system, while not infringing on patient decisions to test, was seen as less acceptable. The majority of patient participants indicated a preference to receive the test result, aware that 'mistakes happen'. The 'no news' window could potentially be anxiety provoking, particularly if status was a point of concern—a 'what if' that would benefit from a more definite confirmation: 'it would be nice to *know* so, you know' (Phil).

For some ED staff, the extra vial has, over time, become habit. Increasingly 'more of a reflex action', the test offer was less something remembered or forgotten but rather just done, affording staff the opportunity to see how the test practice both could and does fit with existing procedures:

I think it's just, kind of like, there was an, 'Oh, for goodness sake, yet another thing for us to do in our assessment cubicle,' and then actually like, 'Oh, no, this is, this is easy, this is not a problem'. (Clinic staff)

Yet, complex clinic situations can render the intervention procedure more difficult to navigate. Ascertaining the extent to which the test had been effectively communicated across language barriers was a widely discussed concern. Staff also spoke of the difficulties of assessing capacity to consent for patients in more critical health conditions and particularly under the pressure of meeting immediate treatment demands:

It [conducting intervention] just depends on the sickness, I guess, how sick the patient is and how focused you are at trying to get all the treatment for the patient right in, done, and gauging are they actually understanding what you're saying at this point. (Clinic staff)

Staff accounts indicated that efforts to integrate the test into routine practice would often require a judgement call—individual assessments on whether or not the intervention should be offered, and then how well it had been understood and consented to. Ambiguities of intervention procedure exposed through complex, pressurised clinic situations—for example, whether to take blood samples from trauma patients in critical conditions and the extent to which other family members may become

involved in this process—can give rise to divergent test practices with broader ethical implications, where the appropriateness of the test offer and delivery, and critically processes of patient consent, may become less apparent and acceptable to both staff and patients. Intervention implementation also meets ongoing resistance in the ED 'working environment', with high patient volume, intense workloads and rapid staff turnover impeding attempts to 'remember' the still 'extra' blood vial. The volume of patients that underscores both the opportunity and advantage of ED-based testing is the same 'mass volume' that makes an altered routine more difficult to establish. In the context of a department 'struggling to do the basic things' while attending large numbers of acutely ill patients, the extra vial is still felt to be an 'extra element' (clinic staff).

### A responsibility to know

A prominent feature of participant accounts was the view that 'it's better to know'. Described as a 'good' and 'important' thing to do, patient accounts indicate a generalised expectation not only to test but also to want to test—a route to 'feel[ing] healthier' and 'clean':

If these things are curable, then fine, they've heard something that they need to know. If they're not, then it gives them time to get themselves in order. I think it's always better to know than not know. Do I believe that? Yes, I do, yeah. (Imogen)

Expectations to test are further reinforced when treatment is known to be available. For Ehsan, the 'treatability' of HIV renders the phobia of testing less legitimate, a fear that should not still be there. Matas' deferral of interferon treatment when diagnosed with hepatitis C 4 years previously, waiting to see if 'science comes up with anything better' contends the assumed linearity of a 'test and treat' ethic. Yet, managing the knowledge of a health condition was implied by Matas and others as something that just has to be done; 'a bit unexpected but you know what can you do? It is like it is' (Matas); '... it's not going to be easy to take, you know, but that's, that's life' (Malcom).

Patient participants also voiced a public responsibility to know. This was positioned in relation to population health—to ensure against onward transmission—but also direct to the state. For Imogen, expectations of state support are reciprocated in expectations of individual health monitoring and management:

We're adults, we're responsible for our actions [...] we need to check these things [...] that's, kind of, part of my psyche, you look after yourself and you do not expect the health service to look after you. Well, you do, but you have to have played your part. (Imogen)

Engaging with the 'free opportunity' of the test is implied to constitute an act of health citizenship; a demonstration of meeting expectations, being responsible, playing one's part. For the majority of participants,

the right of the patient to choose was critical. Yet, a small number felt the test should be 'obligatory'. Insofar as infection poses a risk beyond the individual, the 'safeguard' of the test should be engaged with 'for the good of society' (Ehsan). For Ehsan, the right to choose is a privilege of 'out there' that changes when you enter the 'here' of the ED clinic space. The act of accessing the service denotes a responsibility to the clinic network—the people, place and resources that you have sought help from—that forgoes the right to decline.

All patient participants, irrespective of whether the test had been offered, indicated confidence in a negative result. Those who accepted the test engaged with the practice either as a form of opportunistic assurance—a 'might as well'—or indifference—'I'm not concerned about any of those things'. Tests actively sought in the past were linked either to changes in relationship status or increased sense of risk. While participants indicated they would initiate a test if they felt cause to do so, few said it would be something they would consider otherwise. Without an explicit need, test engagement remains predominantly passive; 'it's on my to do list'—thought about, but not a priority. In the absence of status anxiety, acceding to new routine procedures is easily done. How the test offer and practice would be received by those who feel more at risk is less apparent. A potential reluctance to test was speculated in 'others' who might be more anxious about a positive result: 'the thought of having something wrong with you, some people would rather not know' (Karen). Felt responsibilities to know therefore sit relative to an anticipated reality of knowing, and the irreversible knowledge process enacted through the test event; 'once you know that's it, you know, you've got it' (Dan).

### A time and place

The appropriateness of the ED as a site for testing was questioned by a small number of patient participants. Ryan, though supportive of the offer, did not feel he had the mental capacity for it that day: 'I don't really want to pile on the bad news [...] I don't want a double-whammy—that would be an unpleasant day' (Ryan). For Khaled, the test conflicts with the principal tenet of the 'emergency' remit:

Emergency services is always full with emergencies so they have to deal with priorities [...] But that one is not that kind of priority because if you have it you have it, you cannot cure it by emergency services, you have to take a long term treatment. (Khaled)

Unless directly 'applicable' to a patient's differential diagnosis, the test should be conducted at some other time and some other place; 'emergency is for emergency' (Khaled). In tension with the overriding acceptability of the intervention was the less articulated counter narrative of *this isn't the time*.

Yet, the more dominant narrative was one of an opportunity presented. Participants who accepted the intervention commonly constructed the test offer as a

well-situated add-on, 'they're taking bloods anyway'. The ease and convenience of an extra vial were thought to encourage people to test who otherwise would not have sought to do so:

A person won't just go out there to have a HIV test, like on an ordinary day, they wouldn't even think about it [...] just imagine you spend your day and would I just go, 'I'm going to go and have a HIV test today,' they wouldn't [...] because you think, 'Oh, I haven't got it, you know, I don't need to,' you wouldn't do it in a million years. (Ramisa)

Despite taking time to integrate into pre-established blood routines, staff indicated that the drawing of another vial from someone already having bloods taken was both minimal but also practical: 'we are already putting a needle into somebody's vein, we are already taking blood' (clinic staff). The ED site offers a point of contact with individuals who, in the absence of felt risk, are neither testing nor thinking about testing. Opportunities of *re*-contact also present with individuals who have—as in the case of Matas—disengaged from care services. Unregistered with a GP, Matas has had minimal service contact beyond intermittent visits to emergency care, remaining unaware of recent advances in HCV treatment options.

The ED setting also offers an alternative point of contact for HIV testing with individuals less able, or willing, to access sexual health services. For some participants, the anonymity of a sexual health clinic afforded a heightened sense of privacy—'there are no questions, no nothing' (Sten). For others, the visibility of the sexual health clinic presented complications, with service access potentially compromised in light of what being seen in the clinic might imply:

I will take an example of Muslim people like me. You will see loads of girls wearing scarf but doing things that you're not supposed to do, then in the end case she thinks she has something, how she will go to sexual health clinic? Just example of people who are like me. (Hana)

For Ehsan, the sexual health clinic constitutes a space of heightened anxiety and concern; a difficult space to enter that concedes both to the self and others not only that there is a problem but also that it is *this* type of problem:

If you enter that building I think it's this [...] Not phobia, it's [...] it's that there is something seriously wrong with you [...] it takes you to totally different atmosphere and you can feel it when you see people sitting down [...] there is a stigma attached to that building. (Ehsan)

In contrast to the known specificity of the sexual health clinic, Ehsan positions the ED setting as a place where you do not feel that difference, there are 'too many different types of illnesses'. The ED supports a protective anonymity and neutrality of space; accessed by all, where

everyone has something going on but no one knows what exactly.

### Cultivating a 'culture of testing'

Processes of test implementation simultaneously enable and demand a renegotiated 'culture of testing' within the ED setting. Intervention efforts point towards a standardising of staff practice and patient expectation—one that would see 'testing everyone', and thus getting tested, made the norm. The test-all precedent was seen to alleviate the sense of an implied, or felt, target:

... and the fact that it's on the wall and it's saying that it's a, you know, 'we're asking everybody if you want to be tested' then it's kind of 'oh OK, you know, you probably asked the guy that was in before, I'm no different'. (Phil)

Helping dispel initial anxieties of *why are you testing me?*, the routinising of the test practice was seen to improve the test experience. The test 'standard', easier to deliver and more readily received, contrasts with a differential test that 'puts the fear of god into that one person, that we're testing you for it' (clinic staff). Staff participants' reflections on the intervention in practice suggest that a standardised test approach both facilitates greater diagnostic opportunity and helps diffuse prevailing preconceptions of those 'affected', within and beyond the clinic environment.

I think we're missing out on a massive group of people by, by targeting it and I think here we're kind of getting people from every spectrum, every walk of life and [...] there are people who are having positive results that you kind of don't, [...] it's not someone that, and this is going to sound awful but it's not someone that you expect to have had a positive test. I think there's still, even for us [clinic staff] there's still kind of like a little bit of stigma around it and you attach it to certain groups of people. (clinic staff)

As patients' accounts reiterated, public misconceptions relating to HIV—though 'changing'—were still felt to be present and problematic.

Yet, perceptions of test value and expectation are also shaped by how legitimate patients considered their (and others') claims to clinic time and resources. The efficacy of the intervention—how efficient it is and who is going to pay—was a question often posited by patient participants: 'if the benefits of doing it cannot be justified by the resource cost that would be needed to do it then clearly it can't be done [...] It's a no-brainer' (Malcom). Patient anxieties of 'wasting time' betray a reluctance to access primary care until a specific health need can be clearly evidenced. Efforts to reconfigure testing norms and expectations can thus sit in tension with perceptions of systemic constraints that do not encourage or support people to 'just check':

It has to be like a society, society's mentality to just check, you know take care of your body and, you know, make sure everything is okay and not only when you're, you know, dying, or something is seriously wrong because many times it's too late when that happens, you know. (Lena)

Current testing cultures orientate around *having reason*, legitimised through an identifiable symptom or risk. Efforts to routinise the test practice remain situated within, and shaped by, broader norms of service deferral; an *ethic of waiting* until need is established, where public responsibilities to monitor one's health sit relative to the cost of doing so.

Renegotiating testing cultures meets further resistance in the limited knowledge and talk of the tested viruses. Although they did not infringe on participants' decisions to test in this study, illness stigma and related anxieties were commonly offered as a reason why 'others' may prove reluctant. Interview discussions orientated heavily around HIV, with HBV and HCV both less understood and spoken about. While degrees of HIV talk differed in relation to cultural norms and across generations, there was consensus that conversations would only ever go so far. Critical boundaries were identified between talking *about* HIV and *having* HIV: 'people talk about it (HIV) just as a, distant thing' (Lena). The condition was predominantly depicted as an abstraction, experienced remotely through news and media coverage. Rarely discussed in the private sphere, limits to knowledge were accounted for in not *needing* to know:

To be honest, the truth is I feel like it's something that doesn't affect or concern me. I know that sounds ignorant and stupid, but I'm just being honest with you [...] And I think that's how a lot of people feel. (Ishani)

Both staff and patient responses highlight the need for concurrent change in public norms, perceptions and talk surrounding HIV and hepatitis beyond the intervention, if routine opt-out BBV testing is to be understood and accepted, and a broader culture of testing supported.

## DISCUSSION

Our findings indicate that routine opt-out BBV testing in the ED setting is viewed as an acceptable and valuable practice by the majority of patient and staff participants. Consistent with qualitative findings exploring HIV testing acceptance in EDs in the USA, participants' receptivity to testing pivots around the narrative that it's better to know<sup>43</sup>—a 'better' widely underscored by the perceived availability and efficacy of HIV treatment. Knowledge of hepatitis viruses and respective treatments was notably limited. Problems of test implementation were primarily linked to broader systemic constraints,<sup>38</sup> where unrelenting pressures of the ED working environment impeded the process of integrating the test into routine

practice. Service providers spoke of the difficulties of navigating the *change* of the intervention, rather than reservations around the intervention itself. Yet, clinic staff also anticipated that once embedded into department procedure, and in time patients' expectations, the feasibility of the intervention would align more closely with the observed acceptability of the test practice.

### Narratives of responsibility

Findings suggest that the acceptability of the intervention is shaped in part by negotiations of competing responsibilities. A dominant narrative across participant responses was the *responsibility to know*. Responsibilities of knowing were articulated in relation to a private well-being of the individual but also a public responsibility—to know your status, more specifically a positive status, to ensure against onward transmission. Resonating with broader neoliberal discourses of citizen expectation and biological responsibility, participant accounts would often position test uptake as an enactment of health citizenship—the perceived role of a patient–citizen.<sup>50 51</sup>

Yet, narratives of responsibility were at once countered by an absence of need and the positioning of the self as not 'affected'. Patient participants' test histories demonstrate, for the most part, norms of passive test engagement made active in response to an altered sense of risk. Transitions from an assumed negative to a potential positive—where felt expectations to know converged with an overt health need—occasioned a more proactive, albeit temporary, test engagement. Expectations of *having need* that underscore participant narratives work to ensure the legitimacy of the test claim on clinic time and resources. With patients' heightened awareness of service rationing, a questioned appropriateness pulls against the dominant script of intervention acceptability. Responsibilities of knowing thus sit in tension with perceived personal and state responsibilities to ensure that increasingly limited clinic resources are efficiently deployed. This likewise speaks to a situated ethics of a test-for-all approach,<sup>39</sup> wherein the value of the test is positioned relative to the cost of its delivery and anticipated rate of return. In the absence of explicit risk and subsequent need, the test expense is less clearly supportable.

### A productive disruption

The extent to which the test practice can be made routine and move beyond the initial disruption of its implementation—the point at which the extra vial ceases to be an 'extra'—though envisioned, remains uncertain. While staff spoke of the test practice becoming more instinctive over time, the 'struggle' to make the intervention a routine procedure remains evident. Amidst the pressures of ED workflows, the intervention still posits a point of disruption. Yet, efforts to standardise the test practice also allow for a more productive disturbance. First, the intervention has neutralising potential as test practice and meaning are reconstituted within and through the particularities of the emergency clinic environment.<sup>59</sup> The

'struggle' to integrate the test into department procedure amidst uncompromising clinic demands enables, necessitates and makes visible the 'standardisation' of test practice; the test is rendered less of an event because it *has* to be. The high patient traffic, close proximity and discernible number of others tested make the routine of the procedure more evident. Second, the tentative displacement of the test target in a generalised clinic environment disrupts 'at-risk' boundaries felt to be conferred through targeted test practices and engagement. The routine practice of the test points to a test need, expectation and responsibility that extends beyond existing risk parameters. This suggests a potential of the spatial dynamics of the ED setting to challenge socially embedded risk associations. Obscuring 'affected/unaffected' binaries stands to lessen the social risk of being seen to be tested. The routine of the procedure thus affords a form of public protection that, in turn, lends the intervention a social value beyond the quantifiable efficacy of intervention uptake and diagnostic case return.

### Situated intervention potential

Yet, our study findings also call attention to the limits of the test intervention's 'normalising' effect. The extent to which risk associations of testing technologies *can* be reconfigured through generalised test settings and procedures remains questionable. As demonstrated in our findings, while the nontarget approach was positively received among study participants, test uptake was framed by narratives of test ambivalence. Distinctions between those who were and were not 'at risk', though momentarily disrupted, were then refashioned through retrospective accounts of test engagement (or would-be engagement) that continued to position the self as one not affected. Such narrative devices, though peripheral, call attention to embedded social constraints that continue to impede patients' efforts to renegotiate tacit risk identities conferred through test practices and engagement. Expectations that a standardisation of clinic practice could translate into a 'normalisation' of test experience is a formidable aspiration, but one that faces resistance and local negotiation. As we have observed, the routinising of the test procedure at once shapes and is shaped by: prior knowledge and experience of the viruses to be tested; the dynamics of the clinic space and therapeutic pathways; perceived health responsibilities; socially embedded test associations and the anticipated reading of test engagement by others. Our findings indicate that the intervention's embryonic effect is constituted through, and contingent on, the processes of its local implementation.<sup>59 60</sup> Test meaning and value are recursively produced, as altered norms of practice are variously encountered and negotiated within and beyond the test event.

### Policy implications and study limitations

Our qualitative analysis offers a critical sociological contribution to intervention evaluation that will enrich



statistical appraisal of BBV test uptake, diagnosis rates and cost-effectiveness.<sup>56</sup> An improved understanding of participant perspectives and intervention experience, as supported by this study's analysis, will likely contribute to the success and efficacy of intervention scale-up beyond the pilot. Study findings highlight the need to attend to the local particularities of intervention implementation if the benefits of the test initiative are to be fully realised. Considerations of expanded practice in the UK must take seriously the intensity of ED workflows and the implications of increasing demands on already over-stretched emergency care resources. Intervention reach and test uptake among migrant populations—as pertinent to those disproportionately affected by HIV and viral hepatitis in the UK<sup>2 3 32 47</sup>—will likely remain restricted while language barriers continue to preclude test offer and delivery to this patient subgroup. Yet, our findings also demonstrate the intervention's potential to extend an alternative route of contact with individuals at risk of falling through the gaps,<sup>33</sup> or positioned beyond targeted test strategies. Significant also is the extent to which HBV and HCV, relative to HIV, were not only less discussed but, for the most part, much less understood. Limited public knowledge of these conditions calls to question the ethical implications of introducing an opt-out test procedure among individuals who have little if any understanding of what a positive result might mean.

Interpretation of our qualitative findings must also attend to a number of study limitations. First, study findings draw from a small, site-specific population. Second, our sample does not include patients who felt themselves to be potentially at risk of a positive result. As identified through explorative research of alternative HIV test interventions,<sup>44</sup> test practices and the acceptability of intervention procedure will invariably take on different meanings for those negotiating a potential positive, and demands further enquiry. Likewise, in interviewing individuals at the point of clinic contact, the study was not able to explore the views and experiences of those diagnosed through the ED test procedure, and thus the onward dimensions of the test intervention that are integral to the intervention process. Exploration of post-test experience, and its implications for test acceptability and engagement, is needed for a more comprehensive understanding and evaluation of intervention experience and value.

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#### REFERENCES

1. Nardone A, Delpech V, Gill ON, *et al.* HIV in the UK: test, test, and test again. *Lancet* 2013;382:1687–8.
2. Brown AE, Kirwan PD, Chau C, *et al.* *Towards elimination of HIV transmission, AIDS and HIV-related deaths in the UK – 2017 report*. London: Public Health England, 2017.
3. Harris H. *Hepatitis C in the UK – 2017 Report*. London: Public Health England, 2017.
4. Nash SG, Furegato M, Gill ON, *et al.* *HIV testing in England: 2017 report*. London: Public Health England, 2017.
5. United Nations General Assembly. Political Declaration on HIV and AIDS: On the Fast Track to Accelerating the Fight against HIV and to Ending the AIDS Epidemic by 2030. A/RES/70/266. 2016.
6. World Health Organisation. *Global Health Sector Strategy on Viral Hepatitis 2016–2021: Towards ending viral hepatitis*. Geneva, 2016.
7. World Health Organisation. *Global Hepatitis Report 2017*. Geneva: WHO, 2017.
8. World Health Organisation. Statement on HIV testing services. 2017.
9. May MT, Gompels M, Delpech V, *et al.* Impact on life expectancy of HIV-1 positive individuals of CD4+ cell count and viral load response to antiretroviral therapy. *AIDS* 2014;28:1193–202.
10. Rodger AJ, Sabin CA. How have guidelines on when to start antiretroviral therapy affected survival of people living with HIV infection? *Curr Opin HIV AIDS* 2016;11:487–91.
11. Lundgren JD, Babiker AG, Gordin F, *et al.* Initiation of antiretroviral therapy in early asymptomatic HIV infection. *N Engl J Med* 2015;373:795–807.

12. Danel C, Moh R, Gabillard D, *et al.* A trial of early antiretrovirals and isoniazid preventive therapy in Africa. *N Engl J Med* 2015;373:808–22.
13. Cohen MS, McCauley M, Gamble TR. HIV treatment as prevention and HPTN 052. *Curr Opin HIV AIDS* 2012;7:99–105.
14. Miller WC, Powers KA, Smith MK, *et al.* Community viral load as a measure for assessment of HIV treatment as prevention. *Lancet Infect Dis* 2013;13:459–64.
15. Rodger AJ, Cambiano V, Bruun T, *et al.* Sexual activity without condoms and risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner is using suppressive antiretroviral therapy. *JAMA* 2016;316:171–81.
16. World Health Organisation. *Consolidated guidelines on HIV Testing Services: 5Cs – consent, confidentiality, counselling, correct results and connection.* France: World Health Organisation, 2015.
17. Kiran PD, Chau C, Brown AE, *et al.* *HIV in the UK – 2016 Report.* London: Public Health England, 2016.
18. Costella A, Balogaun K, Andrews N, *et al.* *Hepatocellular Carcinoma Deaths in England with Chronic Hepatitis B and Hepatitis C Infection. Poster presented at Faculty of Public Health Annual Conference and Public Health Exhibition.* Brighton: Brighton Centre, 2016.
19. Public Health England. *2nd Atlas of variation in risk factors and Healthcare for Liver Disease in England – Hepatitis B.* London: Public Health England, 2017.
20. Public Health England. *Shooting up: infections among people who inject drugs in the UK, 2015.* London: Public Health England, 2016.
21. British HIV Association (BHIVA). *British HIV Association for Sexual Health and HIV, British Infection Society. UK Guidelines for HIV testing 2008.* London, 2008.
22. National Institute for Health and Clinical Excellence (NICE). *Hepatitis B and C: ways to promote and offer testing to people at increased risk of infection:* Public health guidance:PH43.
23. Croxford S, Kitching A, Desai S, *et al.* Mortality and causes of death in people diagnosed with HIV in the era of highly active antiretroviral therapy compared with the general population: an analysis of a national observational cohort. *Lancet Public Health* 2017;2:e35–46.
24. Rayment M, Thornton A, Mandalia S, *et al.* HIV testing in non-traditional settings--the HINTS study: a multi-centre observational study of feasibility and acceptability. *PLoS One* 2012;7:e39530.
25. Burns F, Edwards SG, Woods J, *et al.* Acceptability and feasibility of universal offer of rapid point of care testing for HIV in an acute admissions unit: results of the RAPID project. *PLoS One* 2012;7:e35212.
26. Phillips D, Barbour A, Stevenson J, *et al.* Implementation of a routine HIV testing policy in an acute medical setting in a UK general hospital: a cross-sectional study. *Sex Transm Infect* 2014;90:185–7.
27. Leber W, McMullen H, Anderson J, *et al.* Promotion of rapid testing for HIV in primary care (RHIVA2): a cluster-randomised controlled trial. *Lancet HIV* 2015;2:e229–35.
28. Glew S, Pollard A, Hughes L, *et al.* Public attitudes towards opt-out testing for HIV in primary care: a qualitative study. *Br J Gen Pract* 2014;64:e60–6.
29. Witzel TC, Rodger AJ, Burns FM, *et al.* HIV Self-Testing among Men Who Have Sex with Men (MSM) in the UK: A Qualitative Study of Barriers and Facilitators, Intervention Preferences and Perceived Impacts. *PLoS One* 2016;11:e0162713.
30. Bath R, Ahmad K, Orkin C. Routine HIV testing within the emergency department of a major trauma centre: a pilot study. *HIV Med* 2015;16:326–8.
31. College of Emergency Medicine. *The way ahead 2008-2012: strategy and guidance for Emergency Medicine in the United Kingdom and the Republic of Ireland.* London, 2008.
32. Cochrane A, Collins P, Horwood JP. Barriers and opportunities for hepatitis B testing and contact tracing in a UK Somali population: a qualitative study. *Eur J Public Health* 2016;26:389–95.
33. Harris M, Ward E, Gore C. Finding the undiagnosed: a qualitative exploration of hepatitis C diagnosis delay in the United Kingdom. *J Viral Hepat* 2016;23:479–86.
34. Datta S, Horwood J, Hickman M, *et al.* Case-finding for hepatitis C in primary care: a mixed-methods service evaluation. *British Journal of General Practice* 2014;64:e67–74.
35. Branson BM, Handsfield HH, Lampe MA, *et al.* Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Recomm Rep* 2006;55:1–17.
36. Schnall R, Clark S, Olender S, *et al.* Providers' perceptions of the factors influencing the implementation of the New York State mandatory HIV testing law in two Urban academic emergency departments. *Acad Emerg Med* 2013;20:279–86.
37. Torres GW, Heffelfinger JD, Pollack HA, *et al.* HIV screening programs in US emergency departments: a cross-site comparison of structure, process, and outcomes. *Ann Emerg Med* 2011;58:S104–13.
38. Thornton AC, Rayment M, Elam G, *et al.* Exploring staff attitudes to routine HIV testing in non-traditional settings: a qualitative study in four healthcare facilities. *Sex Transm Infect* 2012;88:601–6.
39. Waxman MJ, Popick RS, Merchant RC, *et al.* Ethical, financial, and legal considerations to implementing emergency department HIV screening: a report from the 2007 conference of the National Emergency Department HIV Testing Consortium. *Ann Emerg Med* 2011;58:S33–43.
40. Chen JC, Goetz MB, Feld JE, *et al.* A provider participatory implementation model for HIV testing in an ED. *Am J Emerg Med* 2011;29:418–26.
41. Cowan E, Leider J, Velastegui L, *et al.* A qualitative assessment of emergency department patients' knowledge, beliefs, attitudes, and acceptance toward revised HIV testing strategies. *Acad Emerg Med* 2013;20:287–94.
42. Christopoulos KA, Massey AD, Lopez AM, *et al.* Patient perspectives on the experience of being newly diagnosed with HIV in the emergency department/urgent care clinic of a public hospital. *PLoS One* 2013;8:e74199.
43. Christopoulos KA, Weiser SD, Koester KA, *et al.* Understanding patient acceptance and refusal of HIV testing in the emergency department. *BMC Public Health* 2012;12:3.
44. Witzel TC, Weatherburn P, Rodger AJ, *et al.* Risk, reassurance and routine: a qualitative study of narrative understandings of the potential for HIV self-testing among men who have sex with men in England. *BMC Public Health* 2017;17:491.
45. Flowers P, Knussen C, Li J, *et al.* Has testing been normalized? An analysis of changes in barriers to HIV testing among men who have sex with men between 2000 and 2010 in Scotland, UK. *HIV Med* 2013;14:92–8.
46. Lupton D. *The imperativeness of health: public health and the regulated body.* London: Sage, 1995.
47. Sweeney L, Owiti JA, Beharry A, *et al.* Informing the design of a national screening and treatment programme for chronic viral hepatitis in primary care: qualitative study of at-risk immigrant communities and healthcare professionals. *BMC Health Serv Res* 2015;15:97.
48. d'Almeida KW, Kierzek G, de Truchis P, *et al.* Modest public health impact of nontargeted human immunodeficiency virus screening in 29 emergency departments. *Arch Intern Med* 2012;172:535.
49. Waxman MJ, Merchant RC, Celada MT, *et al.* *Perspectives on the ethical concerns and justifications of the 2006.* Centers for Disease Control and Prevention HIV testing: HIV screening policy changes BMC Med Ethics, 2013:14. 46.
50. Petersen A, Davis M, Fraser S, *et al.* Healthy living and citizenship: an overview. *Crit Public Health* 2010;20:391–400.
51. Rose N, Novas C. Biological citizenship. In: Ong A, Collier SJ, eds. *Global assemblages: technology, politics, and ethics as anthropological problems.* Malden, MA and Oxford: Blackwell Publishing, 2005.
52. Petryna A. *Life exposed: biological citizens after Chernobyl.* Princeton, NJ and Oxford: Princeton University Press, 2002.
53. Boydell N, Buston K, McDaid LM. Patterns of HIV testing practices among young gay and bisexual men living in Scotland: a qualitative study. *BMC Public Health* 2017;17:660.
54. Flowers P, Estcourt C, Sonnenberg P, *et al.* HIV testing intervention development among men who have sex with men in the developed world. *Sex Health* 2017;14:80–8.
55. Flowers P. HIV transitions: consequences for self in an era of medicalisation. In: Davis M, Squire C, eds. *HIV Treatment and Prevention Technologies in International Perspective.* Basingstoke: Palgrave Macmillan, 2010:109–25.
56. Orkin C, Flanagan S, Wallis E, *et al.* Incorporating HIV/hepatitis B virus/hepatitis C virus combined testing into routine blood tests in nine UK Emergency Departments: the "Going Viral" campaign. *HIV Med* 2016;17:222–30.
57. Strauss AL, Corbin JM. *Grounded theory procedures and techniques.* Newbury Park, CA: Sage Publications, 1990.
58. Green J, Thorogood T. *Qualitative Methods for Health Research.* 3rd edn. London: Sage Publications, 2014.
59. Rhodes T, Closson EF, Papparini S, *et al.* Towards "evidence-making intervention" approaches in the social science of implementation science: The making of methadone in East Africa. *Int J Drug Policy* 2016;30:17–26.
60. Mol A. *The body multiple.* Durham, NC: Duke University Press, 2002.