Tailoring HIV testing in a setting of late HIV diagnosis: is the tide turning?

Introduction: Routine HIV testing in areas of high HIV prevalence has been shown to be both cost effective and to avert downstream morbidity and mortality from 'late' HIV diagnosis (defined as CD4 cell count <350 cells/ml). In the London borough of Waltham Forest in 2010, late HIV diagnoses were resulting in high morbidity with associated lengthy and costly hospital admissions.
Methods: A retrospective analysis of all new HIV diagnoses was undertaken within a two-phased quality improvement project 2010–13. Newly diagnosed patients in 2010 were characterized, including immunological state, presence of HIV-related illness and department where they presented. After an intervention to set up an opt-out, walk-in rapid HIV testing service in outpatients, an analysis was conducted of numbers of tests, prevalence and immunological state of newly diagnosed patients in 2013.
Results: A total of 91 patients were diagnosed with HIV, January–December 2010, 70% of which were a late diagnosis, including 48% defined as 'very immunosuppressed' (CD4 count <100 cells/ml). Of these, 51 out of 91 patients (56%) had attended hospital services in the 5 years before diagnosis, including 204 outpatient department attendances. After the intervention, rates of late diagnosis in 2013 had reduced to 46%, and rates of those diagnosed 'very immunosuppressed' had reduced from 48% to 8%.
Conclusions: HIV testing in outpatients is feasible and acceptable to patients and can be offered alongside routine outpatient care. The rate of positive HIV tests in this group of patients in the authors' setting has been much higher than the HIV positivity rate of larger scale HIV testing interventions in other hospital settings. This approach also provides a model for more integrated care of HIV-positive patients.

The local authority of Waltham Forest in north east London has an HIV prevalence of 4.73 per thousand (Public Health England, 2013), defined by the Health Protection Agency (2012) as 'high prevalence'. Moreover, it is estimated that one in five HIV-positive patients in the region may not be aware of their diagnosis and may be missing opportunities for receiving HIV treatment and care (Public Health England, 2013). Enhanced HIV testing in areas of high prevalence is beneficial to patients, given that timely HIV diagnosis and treatment prevents HIV-related morbidity and mortality and can decrease onward HIV transmission.

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Pilot studies commissioned by the Department of Health in 2011 demonstrated the acceptability to patients of routine HIV testing in the hospital setting, as well as financial viability and cost-effectiveness of routinely testing all medical admissions in areas of high prevalence, such as the authors' own.

The challenge

Existing data show that more than half (51.6%) of patients newly diagnosed with HIV in Waltham Forest were diagnosed late (defined as CD4 cell count <350 cells/ml) (Health Protection Agency, 2012), which is higher than the averages for London (47.4%) and the UK overall (47%) (Health Protection Agency, 2012). Anecdotally, this corresponded with the authors' observation that many patients were presenting with AIDS-defining conditions, moribund, and often requiring lengthy admissions in the intensive treatment unit.

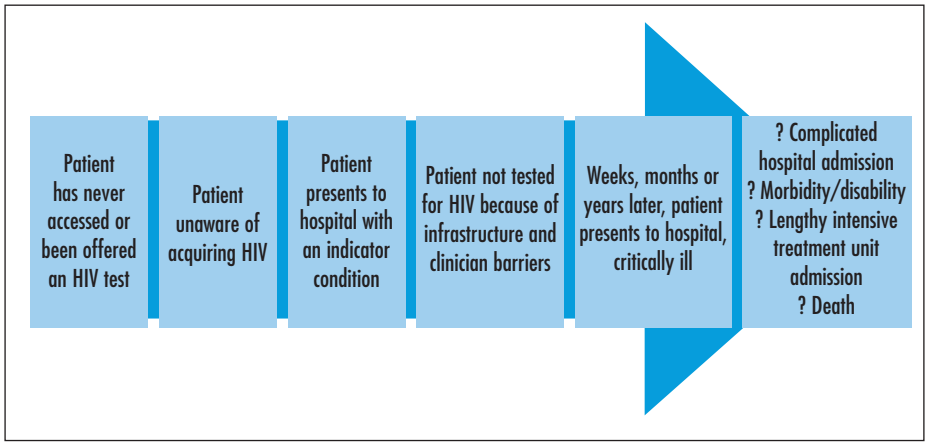
The flowchart in *Figure 1* depicts a typical patient journey.

Plan

This project had three primary aims:

1. To characterize patients with a new HIV diagnosis in the authors' hospital setting during a 12-month period, including numbers, immunological state (early *vs* late HIV diagnosis), presence of HIV-related illness, and department in which the testing took place
2. To retrospectively identify previous hospital attendances of newly diagnosed HIV patients in the 5 years before HIV diagnosis
3. To review background HIV testing activity in the authors' hospital setting in the context of clear national guidelines.

Figure 1. A typical patient journey before this project took place.



Results

Characterization of new HIV diagnoses

A total of 91 patients were diagnosed with HIV between 1 January and 31 December 2010. Of these patients 70% had a 'late' diagnosis, defined by a CD4 count of <350 cells/ml; almost half of newly diagnosed patients (48%) were very immunosuppressed and had a CD4 count of <100 cells/ml. Patients diagnosed as inpatients, including those in the intensive treatment unit, were significantly immunosuppressed and most had an AIDS-defining illness. By contrast, patients who tested HIV positive in antenatal testing (338 cells/ml) and the Department of Sexual Health (213 cells/ml), which both operate 'opt-out' testing, had a higher median CD4 count (*Figure 2*).

The estimated cost of HIV-related admissions using the hospital coding system (Healthcare Resource Group codes) during the study period was £187 000, which may be an underestimate given coding delays and missing codes. In addition, 107 intensive treatment unit days were required by eight inpatients, at a cost of £159 969, bringing the total to £346 969. Drug-related costs and other staff costs were not included in the calculation.

Previous hospital attendances

All patients' records and previous hospital attendances (as recorded on Patient Administration Systems) were reviewed for previous presentation to the hospital, stratified by speciality. This showed that 51 out of 91 (56%) patients had attended hospital services in the 5 years before diagnosis, including a total of 18 hospital admissions and 204 outpatient department attendances.

A random subset of 34 hospital records was identified and reviewed for previous presentations with HIV indicator conditions (British HIV Assocation, 2008). Of these 18 (53%) had a prior indicator condition, at which point an HIV test should have been promptly offered.

Background HIV testing in the hospital setting

During 2010 only 318 HIV tests were requested in medical admissions settings, representing 8% of the 4000 yearly admissions of patients aged 16–60 years old. Of these 16 out of 318 (5%) medical admissions tested positive for HIV. Nine out of 27 (33%) HIV tests in the intensive treatment unit, 7/676 (1%) performed on patients in the outpatient department and 0/74 (0%) HIV tests from the emergency department tested positive.

Summary of primary findings

Three main contributory problems were identified:

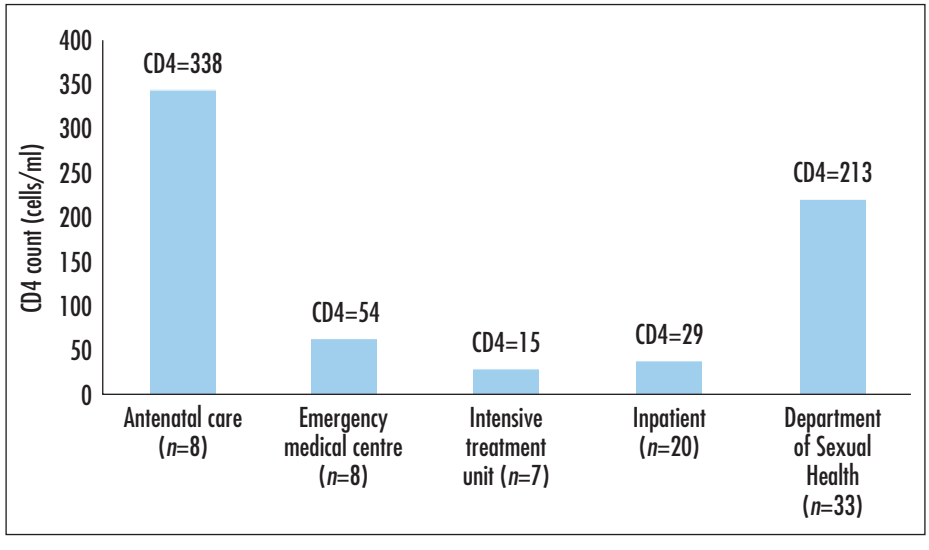
1. A very high rate of late HIV diagnosis and related complications in the hospital setting
2. Many late diagnoses were potentially previously missed diagnoses, where HIV indicator conditions had not prompted HIV testing by consulting clinicians
3. Missed opportunities for testing: patients newly diagnosed with HIV had presented to hospital services previously and were most commonly seen in the outpatient department.

Indeed, the most interesting finding from the data was that the most common setting for a missed diagnosis was general outpatients (204 outpatient department attendances *vs* 18 hospital admissions), especially general surgery and colposcopy/gynaecology. Moreover, newly diagnosed patients diagnosed via established HIV screening routes, such as antenatal and genitourinary medicine clinics, had significantly higher CD4 counts. While the British HIV Association (2008) and Health Protection Agency (2011) have made recommendations for opt-out testing in medical admissions and general practice in areas of high prevalence, the benefits of opt-out HIV testing in outpatient departments have not previously been explored.

Moreover, although targeted testing had a high yield of positive diagnoses (5%) in medical admissions, half of these patients had a CD4 count <100 cells/ml and associated AIDS-defining illnesses, suggesting that targeted testing identifies primarily late diagnoses.

Following these results, the Department of Sexual Health and the outpatients department began a consultation process with a view to increasing accessibility to HIV testing and decreasing rates of late HIV diagnosis.

Figure 2. Median CD4 count and referral route.



Implementation of change: setting up HIV testing in the outpatient department

After focus group meetings with local leads, two main barriers were identified:

1. Infrastructure challenges, such as lack of electronic laboratory test request methods and shortage of lab staff, with subsequent inability to process large numbers of tests
2. Clinician barriers (described in the Health Protection Agency pilot studies: including a perceived lack of training, concerns about lack of knowledge and perceived lack of time to gain informed consent in a busy clinical setting).

To pursue aims of increased testing, decreased late and missed diagnoses, and decreased total intensive treatment unit days of stay, a two-pronged approach was agreed.

First, a feasibility study was conducted. This offered opt-out HIV testing in the outpatient department with a willing clinical team via a routine blood test, for all patients attending ear, nose and throat outpatient appointments.

Second, in June 2013, the Department of Sexual Health set up a rapid walk-in HIV testing service for all adults, using rapid oral swab HIV testing kits (Orasure) in the outpatient department. Patients attending the outpatient department were informed about the test by posters, promotion cards, as well as by outpatient department clinicians or other health-care workers, who were proactive in offering HIV tests to all patients. Patients could have a rapid HIV test, with results available within 20 minutes. The clinic was also open for the general public.

Data from the primary analysis, presented during focus group meetings, acted as leverage for funding from the local authority. This led to additional funding towards the new appointment of an HIV Testing Facilitator, who is able to provide the rapid testing and counselling in the outpatient department.

An educational package for all hospital staff was put together and delivered as part of an increased promotional drive in HIV Testing Week 2013 to tackle the clinician barriers identified in the focus group meetings. Separate skill- and knowledge-tailored sessions were delivered by the Department of Sexual Health to doctors, nurses and allied health-care professionals.

Results for 2013

The review of outpatient HIV testing showed that the number of patients being referred for HIV tests has increased. To date, one patient has been diagnosed HIV positive and he has been referred to specialist HIV services. A total of 676 HIV blood tests were carried out in outpatients between January and October, compared to 420 for the same period in 2010.

The rapid HIV testing service located in outpatients has seen an increase in attendances, both from patients attending outpatient department appointments as well as the general public. Of the 148 patients requesting HIV tests, 127 patients were attending outpatient department appointments and 21 were from the general public. Two patients were new HIV diagnoses. A third HIV-positive patient identified was aware of their HIV status but was not accessing HIV services; after further counselling this patient has now been successfully referred to specialist HIV services.

Discussion of outcomes

This service demonstrates that HIV testing in outpatients is feasible and acceptable to patients and can be offered alongside routine outpatient care. The rate of positive HIV tests in this group of patients has been 1.4%, which is much higher than the HIV positivity rate of larger scale HIV testing interventions in other hospital settings (Health Protection Agency, 2011).

CD4 counts at diagnosis (as shown in *Figures 3* and *4*) were much higher in 2013 than 2010. Where 70% had had a CD4 count of <350 cells/ml in 2010, in 2013 only 46% were 'late' diagnoses. In 2010 48% of patients had a CD4 count of <100 cells/ml, which had decreased to 8% in 2013.

Further trust-wide work on HIV testing in the outpatient department was carried out through the 'Test me East' programme, which involved expansion of HIV testing in the outpatient departments across three hospitals, as well as a large celebrity-endorsed media campaign to normalise HIV testing. The success of this expanded HIV testing in outpatient departments across the trust was further endorsement of the initial positive outcomes locally. It has also led to better working relationships between the three departments of sexual health, the three outpatients departments, and between outpatients and sexual health departments respectively, creating a better model for integrated care of HIV-positive patients (*Figure 5*).

Fragmentation of commissioning of sexual health services (currently under local authority) and HIV services by a special commissioning group centrally resulted in uncertainty about the source funding towards HIV testing in general outpatient/hospital settings. While the local authority has continued to fund an HIV testing facilitator, the cost of HIV blood tests done in other hospital settings has not yet been covered, resulting in an enthusiastic opt-in rapid HIV testing led by sexual health in outpatients. The authors are confident that once funding is sourced the bridges already built will serve as foundation for future successful opt-out interventions.

The HIV Testing Facilitator works jointly with the Department of Sexual Health and the local authority, which has led to enhanced communication channels between local government and hospital.

In order to help promote rapid HIV testing in the outpatient department at this hospital, the Department of Sexual Health in collaboration with outpatient depart-

Figure 3. CD4 count (cells/ml) at presentation (2010 data).

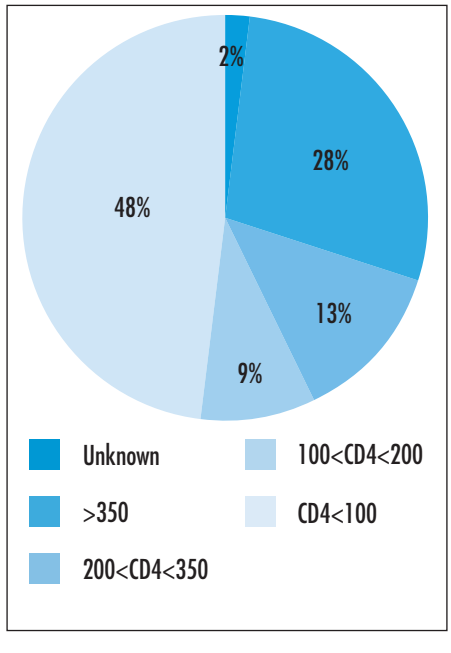
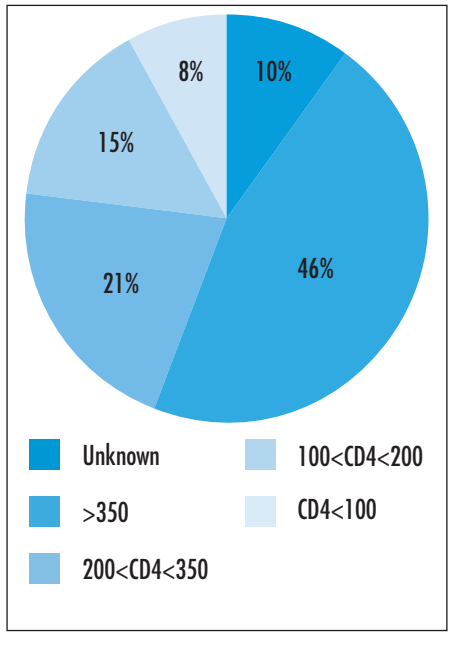


Figure 4. CD4 count (cells/ml) at presentation (2013 data).



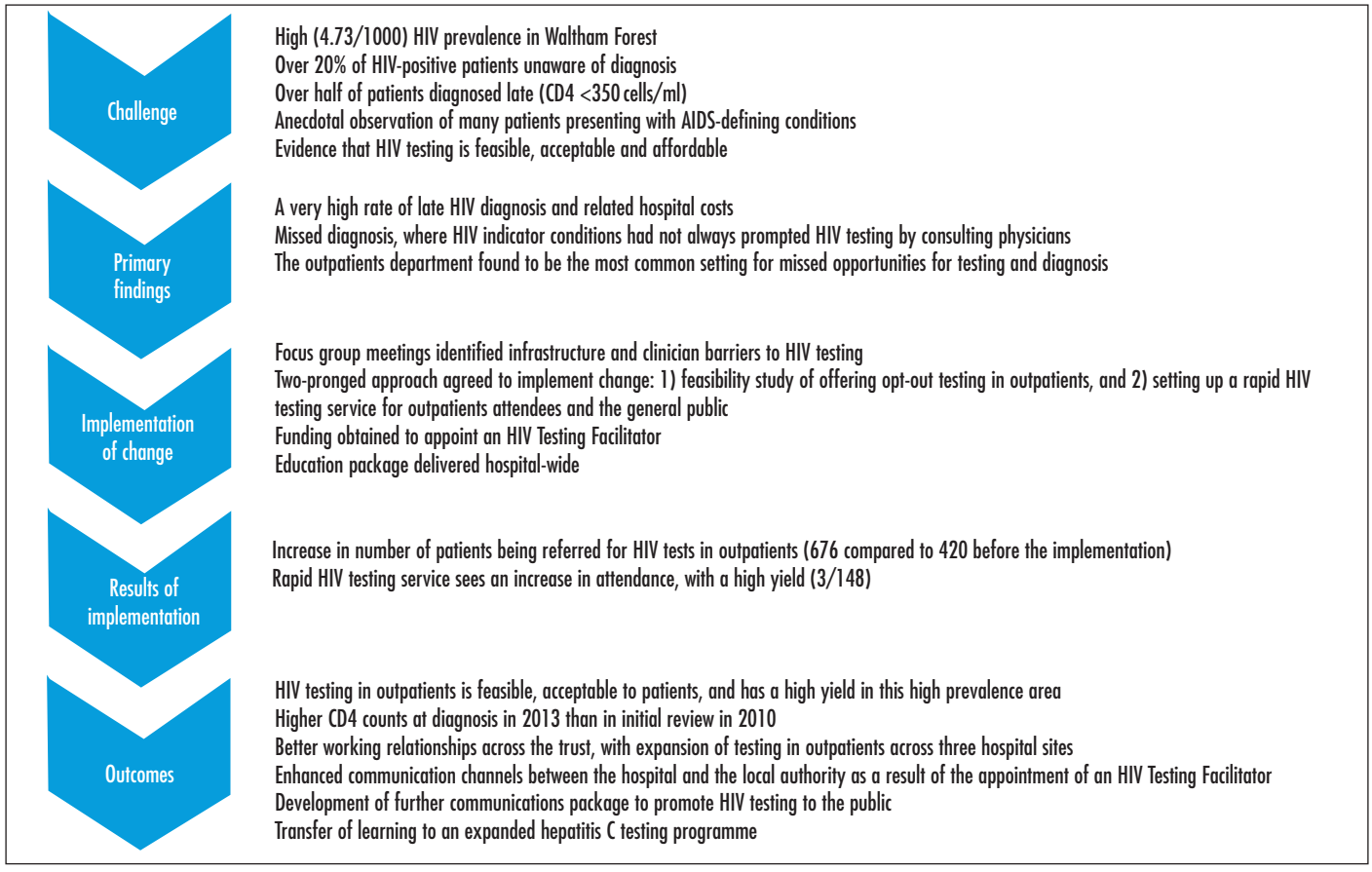


Figure 5. Project methodology and outcomes, 2010–13.

ment management and the communication team has developed a short educational film which is shown on the outpatient department TV screens.

A hepatitis C testing outreach programme has been developed using a similar model to that for HIV testing in the outpatient department.

Conclusions

In an area of high HIV prevalence, frequent missed opportunities for testing were resulting in many patients being diagnosed late. A combination of opt-out testing in outpatients – identified as the most common setting for a missed diagnosis in the authors' hospital – and enthusiastic hospital-wide opt-in testing is feasible, acceptable to patients, and has a high yield of positive HIV diagnoses. **BJHM**

Statement of contributions: Dr J Freer wrote the original draft of the paper, designed tables and figures, sourced and analysed the data for 2013. Mr E Phiri wrote part of the original draft of the paper, aided with data collection for 2013, and carried out testing work, teaching, and liaising with staff in the outpatient department. Dr M Lascar conceived the idea of the quality improvement project, advised on design, structure, and sourced and analysed the data for 2010 and 2013. All authors read and approved the final manuscript.

Ethics: This quality improvement project has been judged exempt from full ethics form submission, but has been registered with Barts Health Clinical Effectiveness Unit.

Conflict of interest: none.

British HIV Association (2008) UK National Guidelines for HIV Testing 2008. www.bhiva.org/documents/guidelines/testing/glineshivtest08.pdf (accessed 8 September 2015)

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Public Health England (2013) HIV in the United Kingdom: 2013 Report. www.gov.uk/government/uploads/system/uploads/attachment_data/file/326601/HIV_annual_report_2013.pdf (accessed 9 September 2015)

LEARNING POINTS

- Missed diagnoses, where HIV indicator conditions had not always prompted HIV testing by consulting physicians, can be averted with opt-out testing, awareness campaigns and support to clinicians from the department of sexual health.
- Sexual health services should look to non-traditional settings for HIV testing to maximize screening opportunities.
- Quality improvement work can lead to better working relationships and enhanced communication channels, creating a better model for integrated care, and enabling the procurement of funding.
- An HIV testing facilitator plays an invaluable role in the roll-out of opt-out and opt-in HIV testing across the trust.