Integration of recent infection monitoring into national HIV surveillance: 2016 results

January 2018

Key Points

- In this pilot study, 13% of HIV diagnoses in 2016 were likely to be recent infections (within 4 months), using the Recent Infection Testing Algorithm (RITA), which combined information from recency assays and other laboratory and clinical data.
- The pilot study indicated some on-going transmission, particularly among men who have sex with men (MSM) and people who inject drugs (PWID), with the proportion likely to be recent (within 4 months) at 14% (n=32) and 26% (n=5) respectively.
- Surveillance of recent infection is a useful additional tool to monitor the HIV epidemic in Ireland. Following this successful pilot, regular reporting of the proportion of recent infections among new HIV diagnoses will be carried out on a yearly basis.

1. Background

Between 2012 and 2016, the number of diagnoses of HIV in Ireland increased from 341 to 508, an increase of 50% (1). Although changes to the surveillance system accounted for some of this increase, we wished to examine further if this increase is due to ongoing transmission of HIV.

The current surveillance system in Ireland is based on HIV notifications at first diagnosis in Ireland. Recent increases may reflect ongoing transmission. Alternatively they may be due to the detection of previously undiagnosed cases due to changes in health seeking behaviours or testing practices, or inward migration of HIV positive persons.

The proportion of recent HIV infections in a population is an indicator of ongoing HIV transmission. Recent Infection Testing Algorithms (RITA) differentiates recent from long-standing infections. They combine recent infection assays and supplementary laboratory and clinical information that together are used to classify a HIV infection as likely to be recent or not recent. In 2011, the World Health Organization (WHO) Working Group on HIV Incidence Assays published guidelines on when and how to use assays for recent infections to estimate HIV incidence at a population level (2).

In 2013, the European Centre for Disease Prevention and Control (ECDC) also published a technical guide on how to integrate RITA as part of routine HIV surveillance (3).

A pilot study of the use of RITA in Ireland was undertaken during 2016. The overall aim of the project was to determine the proportion of infections that are likely to be recent among new HIV diagnoses notified, and to identify factors associated with recent infections.

The project was a collaboration between a range of stakeholders: the National Virus Reference Laboratory (NVRL), the Health Protection Surveillance Centre (HPSC), the Infectious Disease Society of Ireland (IDSI), the Public Health HIV and STI Special Interest Group, the Society for the Study of Sexually Transmitted Diseases in Ireland (SSSTDI), Positive Now, the Gay Men's Health Service (GMHS), and HIV Ireland (see Appendix 1 for membership).

2. Methodology

Serology samples of newly diagnosed HIV cases tested in the NVRL from January 1 2016 to 31 December 2016 underwent avidity testing. Following an evaluation by the NVRL of three avidity tests, avidity testing was undertaken using the Sedia HIV-1 limiting antigen-avidity EIA assay. These results were combined with enhanced surveillance data collected through the national HIV surveillance system in the computerised infectious disease reporting system (CIDR), in accordance with the ECDC technical guide.

The RITA adopted during this pilot project classified cases with a numeric avidity result of less than 1.5 as likely to be recent infections (within 4 months) unless there was clinical information available to indicate long standing infection within the enhanced surveillance data. Criteria used to indicate long standing infection were: CD4 count of less than 200 cells/µl; viral load less than 400 copies/mL; the presence of an AIDS defining illness; and being on anti-retroviral therapy (ART) at the time of the diagnosis. Cases with a history of PrEP or PEP use in the previous six months

were not classified as recent infections, as use of ART in this context would affect the recency assay results.

3. Results

Of the 508 HIV diagnoses in 2016, 88% (n=448) had a corresponding avidity test result available and 12% did not (n=60). Of those with avidity results, 56 (13%) were classified as likely to be recent infections following application of RITA. The false recency rate was 12% (52/448). Figure 1 describes the application of RITA to the 2016 data.

Table 1 describes the characteristics associated with recent infection. Regarding probable modes of transmission, PWID had the highest proportion of recent cases (26%), however the number of cases was small. Fourteen percent of MSM has recent infection compared to 8% among heterosexuals. Higher proportions of recent infections were seen in males (13%); the 15 to 24 year age group (23%); those who were born in Ireland (22%); those living in HSE East (13%); and those who had acquired their infection in Ireland (25%).

Figure 1: Application of RITA to HIV diagnoses, 2016

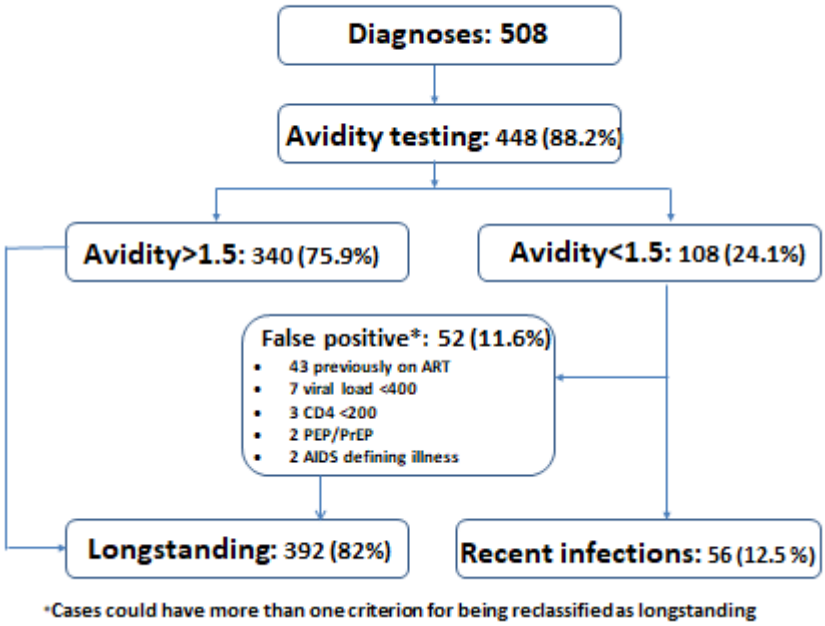

Table 1: Characteristics associated with recent HIV infections (within 4 months) as determined by RITA, 2016

Characteristic		Recent
		% (n/N)
Total		12.5 (56/448)
Sex	Female	9.7 (10/103)
	Male	13.3 (46/345)
Age Group	15-24	22.9 (8/35)
	25-34	13.7 (25/183)
	35-44	8.2 (12/146)
	45+	13.1 (11/84)
Mode of transmission	Heterosexual	7.6 (9/120)
	PWID	26.3 (5/19)
	MSM	13.6 (32/235)
Area of residence	East (Dublin, Kildare, Wicklow)	13.5 (44/326)
	Other areas	9.8 (12/122)
Region of origin	Ireland	22.2 (24/108)
	Europe	17.9 (12/67)
	Sub Saharan Africa	4.0 (4/101)
	Latin America	5.3 (5/95)
	Other	10.5 (2/19)
Region of infection	Ireland	25.0 (28/112)
	Outside Ireland	5.9 (13/222)

4. Discussion

Surveillance of recent infection is a useful additional tool to monitor the HIV epidemic in Ireland. Analysis of the 2016 data has identified that a relatively small proportion of overall diagnoses were recent infections (13%). Increasing trends in HIV diagnoses in recent years, therefore, may be a reflection of detection of previously undiagnosed cases due to changes in health seeking behaviours or testing practices, and inward migration to Ireland of HIV positive persons.

The pilot study indicated some on-going transmission, particularly among MSM and PWID. In all, 26% of PWID diagnoses in 2016 were recent infections. This should be interpreted with caution, however, given the small numbers involved. The group with the highest number of recent infections were MSM, though a smaller proportion of MSM cases overall were recent infections.

The pilot project demonstrated that it is feasible to combine epidemiological and clinical data from CIDR with avidity assay results from the NVRL, to apply the RITA algorithm and determine the proportion of recent infections among new HIV diagnoses. Following the success of the pilot, regular reporting of the proportion of recent infections among new HIV diagnoses will be carried out using this methodology on a yearly basis. Continuation of the use of RITA, improvement in data completeness and further analysis with data from future years will allow for a more precise determination of factors associated with recent infection in Ireland.

There were some limitations to this work:

- In 2016 a relatively high proportion (34%) of cases diagnosed in Ireland in 2016 had been previously diagnosed abroad. In this analysis, we did not exclude those previously diagnosed abroad as false recent cases. The majority of these cases however, fulfilled other criteria that identified them as false recent cases.
- Avidity testing results were not available for 12.5% of cases in 2016. Cases with avidity test results didn't differ from cases without results apart from being more likely to be resident in the Dublin, Kildare and Wicklow area. A small proportion of these (13%; n=8) were p24 antigen positive, indicating very recent infection, and did not undergo avidity testing. They were not included in this analysis. This led to an underestimate of the proportion of cases that are recent. In future years, p24 antigen positive cases will be included in analysis of recent cases.
- The completeness of surveillance data affects the accuracy of the estimation of recent infection and also impacts on the investigation of factors associated with recent infection. As in previous years, data quality should continue to be monitored on an ongoing basis (4)

5. References

1. HSE Health Protection Surveillance Centre. HIV in Ireland, 2015. Dublin: Health Protection Surveillance Centre; 2016.

2. UNAIDS/ WHO Working Group on Global HIV/AIDS and STI Surveillance. When and how to use assay for recent infection to estimate HIV incidence at a population level. UNAIDS/ WHO; 2013.

3. European Centre for Disease Prevention and Control. Monitoring recently acquired HIV infections in the European context. Stockholm: ECDC; 2013.

4. O'Donnell K, McDermott C, Igoe D. An evaluation of the completeness of national HIV surveillance data in CIDR: 2014 and 2015. Dublin: HSE Health Protection Surveillance Centre; 2017.

Appendix 1: Membership of the Monitoring Recently Acquired HIV Infection Group

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Joanne Moran Jaythoon Hassan Cillian de Gascun Jeff Connell	National Virus Reference Laboratory (NVRL)
Helen Tuite	Infectious Disease Society Ireland (IDSI)
Orla Ennis Fionnuala Cooney Sarah Doyle	Public Health HIV&STI Special Interest Group
Erin Nugent	HIV Ireland
Lysander Preston	Positive Now
Siobhan O'Dea	Gay Men's Health Service
Shay Keating	Society for the Study of Sexually Transmitted Diseases in Ireland (SSSTDI)