Public Health England

HIV incidence among people who attend sexual health clinics in England in 2012: estimates using a biomarker for recent infection

Adamma Aghaizu[1], Gary Murphy[1], Jenny Tosswill[1], Daniela DeAngelis[1], Andre Charlett[1], Noel Gill[1], Samuel Moses[1], Gwenda Hughes[1], Helen Ward[2], Valerie Delpech[1]

[1]Centre for Infectious Disease Surveillance and Control, Public Health England
[2]Imperial College London

Background

- HIV incidence remains challenging to determine, due to the prolonged asymptomatic infection period
- Currently there are two estimates for HIV incidence among MSM in the UK using modelling techniques
- Incidence estimates are imprecise for recent years as current data are used to determine transmission rates in prior years (back calculation)
- Biomarkers for recent infection are an alternate method which permit timely results at low cost.

[1]Birrell PJ, Gill ON, Delpech VC, et al. HIV incidence in men who have sex with men in England and Wales 2001-2010: a nationwide population study. *Lancet Infect Dis* 2013; 4:313-318
[2]Phillips A, Cambiano V, Nakagawa F. Increased HIV Incidence in Men Who Have Sex with Men Despite High Levels of ART-Induced Viral Supression: Analysis of an Extensively Documented Epidemic. *PLOS ONE* 2013; 8(2):e55312

Aim and methods

Aim

To estimate HIV incidence using biomarkers for recent HIV infection

Methods

WHO cross-sectional HIV incidence estimation method[1]:

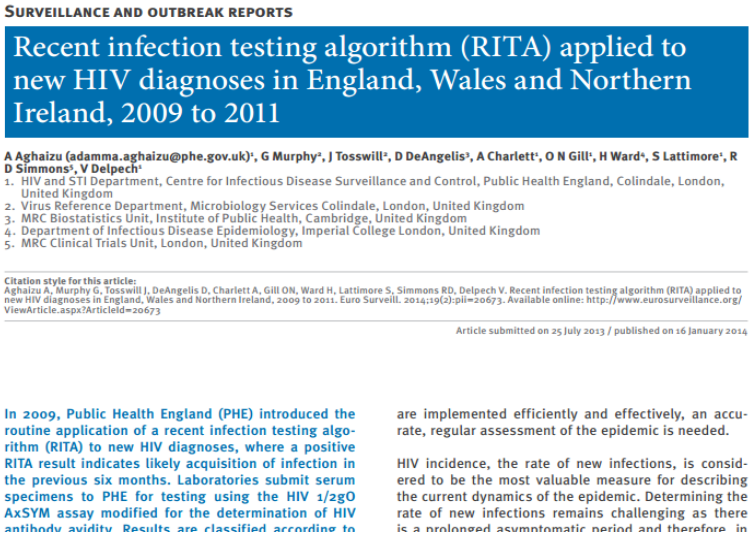
$$lr = \frac{\mathrm{R} - \in \mathrm{P}}{(1 - \in)\mathrm{wN}}$$

lr = Annual rate
R= the number of recent infection cases
$\in$= the False Recent Rate (FRR)
P = is the number of HIV positive people
W= the mean duration of recency
N= the number of people that tested negative

[1] UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance. When and how to use assays for recent infection to estimate HIV incidence at a population level. 2011

Testing for recent HIV infection

- Samples from persons newly diagnosed tested at PHE since 2009
- In 2012, 50% of new HIV diagnoses tested for recent infection
- AxSym avidity assay (result <0.8 is considered a recent infection)



SURVEILLANCE AND OUTBREAK REPORTS

Recent infection testing algorithm (RITA) applied to new HIV diagnoses in England, Wales and Northern Ireland, 2009 to 2011

A Aghaizu (adamma.aghaizu@phe.gov.uk)[1], G Murphy[2], J Tosswill[2], D DeAngelis[3], A Charlett[1], O N Gill[1], H Ward[4], S Lattimore[1], R D Simmons[5], V Delpech[1]
1. HIV and STI Department, Centre for Infectious Disease Surveillance and Control, Public Health England, Colindale, London, United Kingdom
2. Virus Reference Department, Microbiology Services Colindale, London, United Kingdom
3. MRC Biostatistics Unit, Institute of Public Health, Cambridge, United Kingdom
4. Department of Infectious Disease Epidemiology, Imperial College London, United Kingdom
5. MRC Clinical Trials Unit, London, United Kingdom

Citation style for this article:
Aghaizu A, Murphy G, Tosswill J, DeAngelis D, Charlett A, Gill ON, Ward H, Lattimore S, Simmons RD, Delpech V. Recent infection testing algorithm (RITA) applied to new HIV diagnoses in England, Wales and Northern Ireland, 2009 to 2011. Euro Surveill. 2014;19(2):pii=20673. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20673

Article submitted on 25 July 2013 / published on 16 January 2014

In 2009, Public Health England (PHE) introduced the routine application of a recent infection testing algorithm (RITA) to new HIV diagnoses, where a positive RITA result indicates likely acquisition of infection in the previous six months. Laboratories submit serum specimens to PHE for testing using the HIV 1/2gO AxSYM assay modified for the determination of HIV antibody avidity. Results are classified according to

are implemented efficiently and effectively, an accurate, regular assessment of the epidemic is needed.

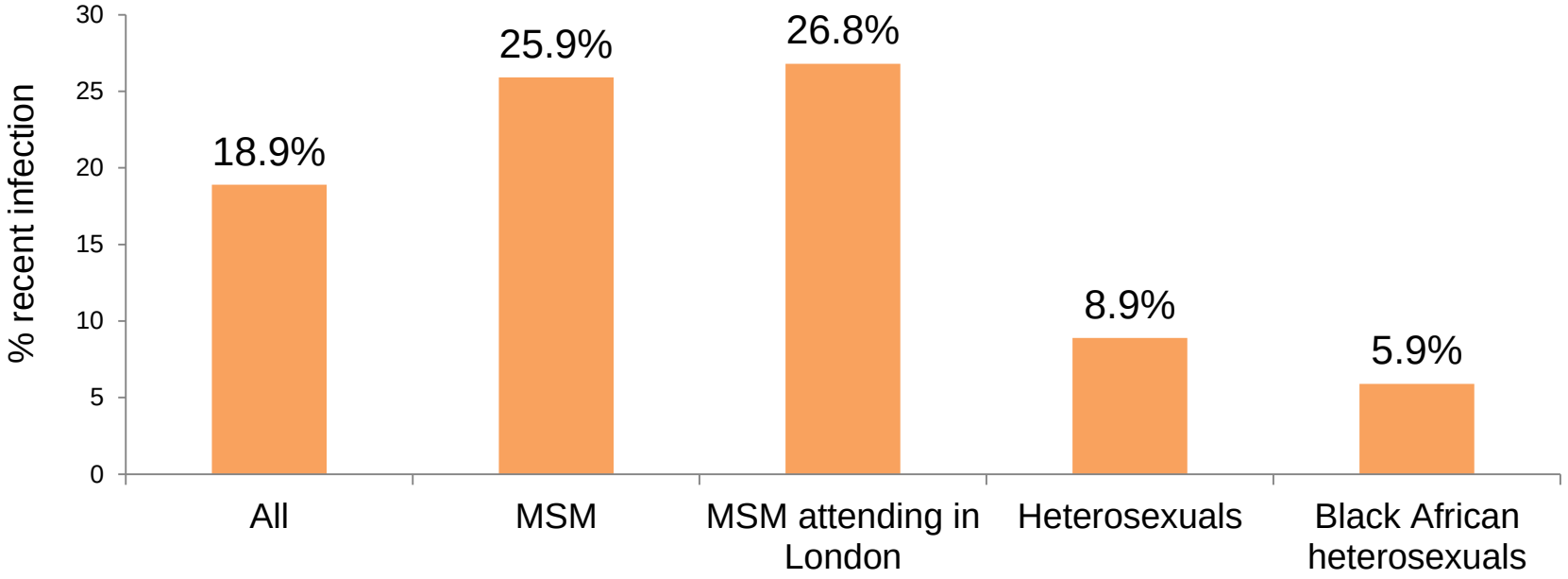
HIV incidence, the rate of new infections, is considered to be the most valuable measure for describing the current dynamics of the epidemic. Determining the rate of new infections remains challenging as there is a prolonged asymptomatic period and therefore, in

Recent HIV infections among persons diagnosed with HIV, 2012

Group of attendees	N new Dx tested in the RITA programme	N tested recent	% HIV diagnoses tested recent
All	2968	562	18.9 %
MSM	1715	444	25.9%
MSM attending in London	1042	279	26.8%
Heterosexuals	1108	99	8.9%
Black African heterosexuals	608	36	5.9%

HIV incidence among people who attend sexual health clinics in England in 2012: estimates using a biomarker for recent infection

Recent HIV infections in 2012, by transmission risk group



HIV incidence among people who attend sexual health clinics in England in 2012: estimates using a biomarker for recent infection

Estimating the total number of negative HIV tests corresponding to RITA tests conducted

Group of attendees	Tests per HIV Dx in GUMCAD[1]	N DX tested in RITA programme	Estimated N HIV tests	Estimated N negative HIV tests
All	222.5	2968	660253	657286
MSM	35.5	1715	60957	59242
MSM in London	30.9	1042	32191	31149
Heterosexuals	396.5	1108	439300	438192
Black African heterosexuals	45.1	608	27421	26813

[1]Genitourinary Medicine Clinical Activity Dataset

HIV incidence among sexual health clinic attendees in 2012

Group of attendees	Estimated incidence	95% C.I.
All	**0.15%**	0.13%-0.17%
MSM	**1.34%**	1.15%-1.53%
MSM attending in London	**1.6%**	1.34%-1.86%
Heterosexuals	**0.03%**	0.02% -0.04%
Black African heterosexuals	**0.17%**	0.08%-0.27%

HIV incidence among people who attend sexual health clinics in England in 2012: estimates using a biomarker for recent infection

Comparisons with other studies

- Data only available on MSM in the general population
- Estimates from a CD4 back calculation model, 2300-2500 infections each year (0.4%) among MSM in 2010[1]
- Estimates from simulation of risk behaviours between 2006 & 2010, estimated 0.53% among MSM[2]
- **As expected, both estimates are lower than our findings (1.3%) as our study population consists of higher risk HIV test seeking sexual health clinic attendees**

[1]Birrell PJ, Gill ON, Delpech VC, et al. HIV incidence in men who have sex with men in England and Wales 2001-2010: a nationwide population study. *Lancet Infect Dis* 2013; 4:313-318
[2]Phillips A, Cambiano V, Nakagawa F. Increased HIV Incidence in Men Who Have Sex with Men Despite High Levels of ART-Induced Viral Supression: Analysis of an Extensively Documented Epidemic. *PLOS ONE* 2013; 8(2):e55312

Limitations

- Number of new diagnoses in GUMCAD may be an overestimate as can only identify individuals within and not between clinics.
- Coverage of RITA testing incomplete, those tested may differ to those not
- Potential testing bias: ‘seroconversion effect’. MSM more likely to test earlier during the course of their infection if recent risk exposure or symptomatic, would inflate incidence estimates as testing is not random.
- Analyses by geographic area may not reflect area of transmission
- Not generalisable to the whole population

Conclusions

- Testing for recent HIV infection allows timely estimation of HIV incidence among the sexual health clinic attending population
- HIV incidence among sexual health clinics attendees is high, highest among MSM attending clinics in London (1.34%)
- Combining findings from the CD4 back calculation study[1] which estimates 2500 new infections annually, and extrapolating 1.34% incidence to all MSM clinic attendees (n=87,000), half (47%) of incident infections are diagnosed within a year

[1]Birrell PJ, Gill ON, Delpech VC, et al. HIV incidence in men who have sex with men in England and Wales 2001-2010: a nationwide population study. *Lancet Infect Dis* 2013; 4:313-318.

Acknowledgments

We gratefully acknowledge the continuing collaboration of clinicians, microbiologists, immunologists, public health practitioners, occupational health doctors and nurses and other colleagues who contribute to the surveillance of HIV and STIs in the UK.

Adjusting for the false recent rate (FRR)

We estimated a false recent rate of 1.9% (n=11) among 580 specimens from persons known to have been infected for more than a year

Group of attendees	N new DX tested	N recent	% recent	N recent after FRR applied	% recent after FRR
All	2968	562	18.9	520.8	17.5
MSM	1715	444	25.9	422.5	24.6
MSM attending in London	1042	279	26.8	266.2	25.5
Heterosexuals	1108	99	8.9	81.4	7.3
Black African heterosexuals	608	36	5.9	26.0	4.3

We used a mean duration of recent infection 202 days (**0.55** years)