Public Health England

Protecting and improving the nation's health

Population-based trends in HIV incidence shortly before the introduction of PrEP: insights into the baseline need in non-MSM groups

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Background

- HIV incidence is challenging to determine, due to the prolonged asymptomatic infection period
- Current methods to determine the incidence are based on back calculation models of diagnosis data making it challenging to provide precise estimates for recent years
- Biomarkers for recent infection are an alternate method which could address this limitation of the back calculation method
- Understanding incidence in key populations may help equitable delivery of HIV Pre-Exposure Prophylaxis (PrEP) and monitoring of progress towards elimination goals

Laboratory methods

- Since 2014, Public Health England has undertaken testing for recent infection with HIV among new diagnoses using the Limiting Antigen Avidity Assay (Sedia BioSciences)
- Testing performed in about 50% of new infections
- Results are linked to the national HIV database
- An incident case is defined as:
  - avidity result <1.5 AND
  - no history of ARV treatment or AIDS diagnosis AND
  - viral load ≥400 copies/mL AND
  - CD4 >50cells/mm^3 at diagnosis

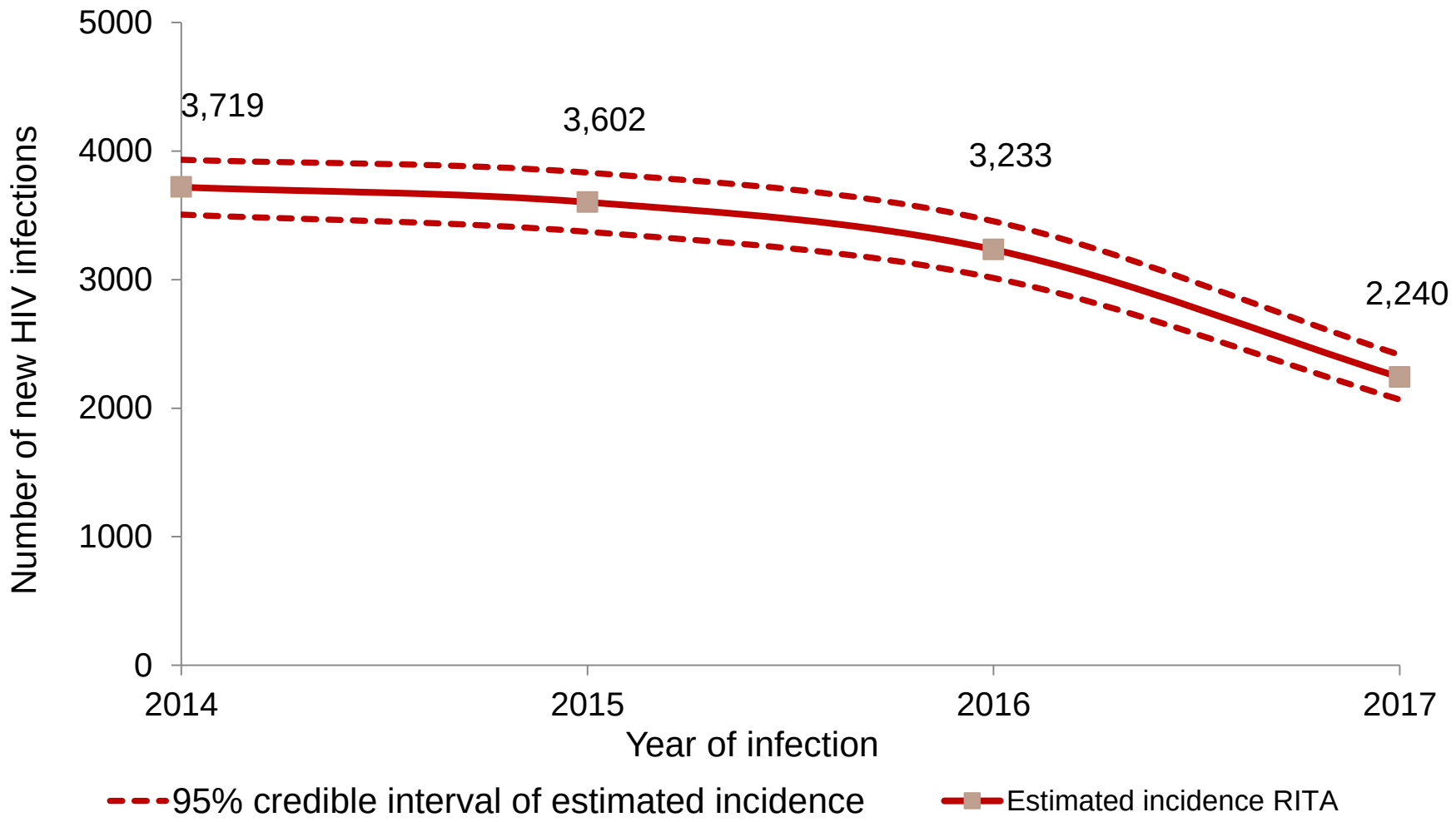
Statistical methods

- Stratified extrapolation approach where the number of individuals diagnosed with a recent HIV infection are treated as a survey sample[1,2]
- Each new diagnosis is weighted depending on available information on HIV testing history i.e. frequent testers are more likely to be diagnosed with recent infection and therefore, weighted less heavily
- These weights are used to infer incidence from the sample of recent infections to the whole population

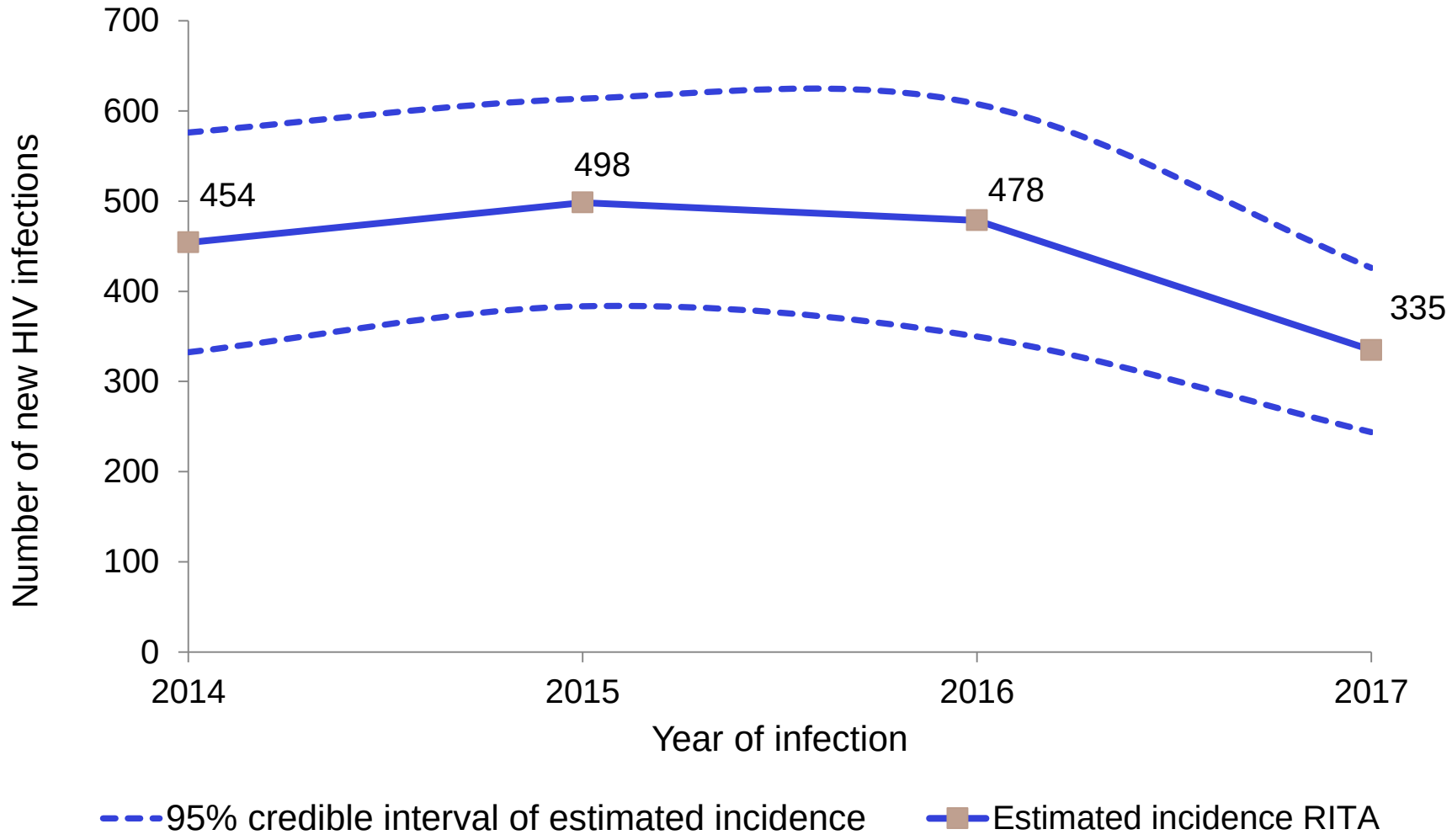
[1] *Estimating HIV incidence in the United States from HIV/AIDS surveillance data and biomarker HIV test results*.*Stat Med. 2008 Oct 15;27(23):4617-33*

[2] *Estimated HIV incidence in the United States, 2006-2009. PLoS One.2011;6(8):e17502*.

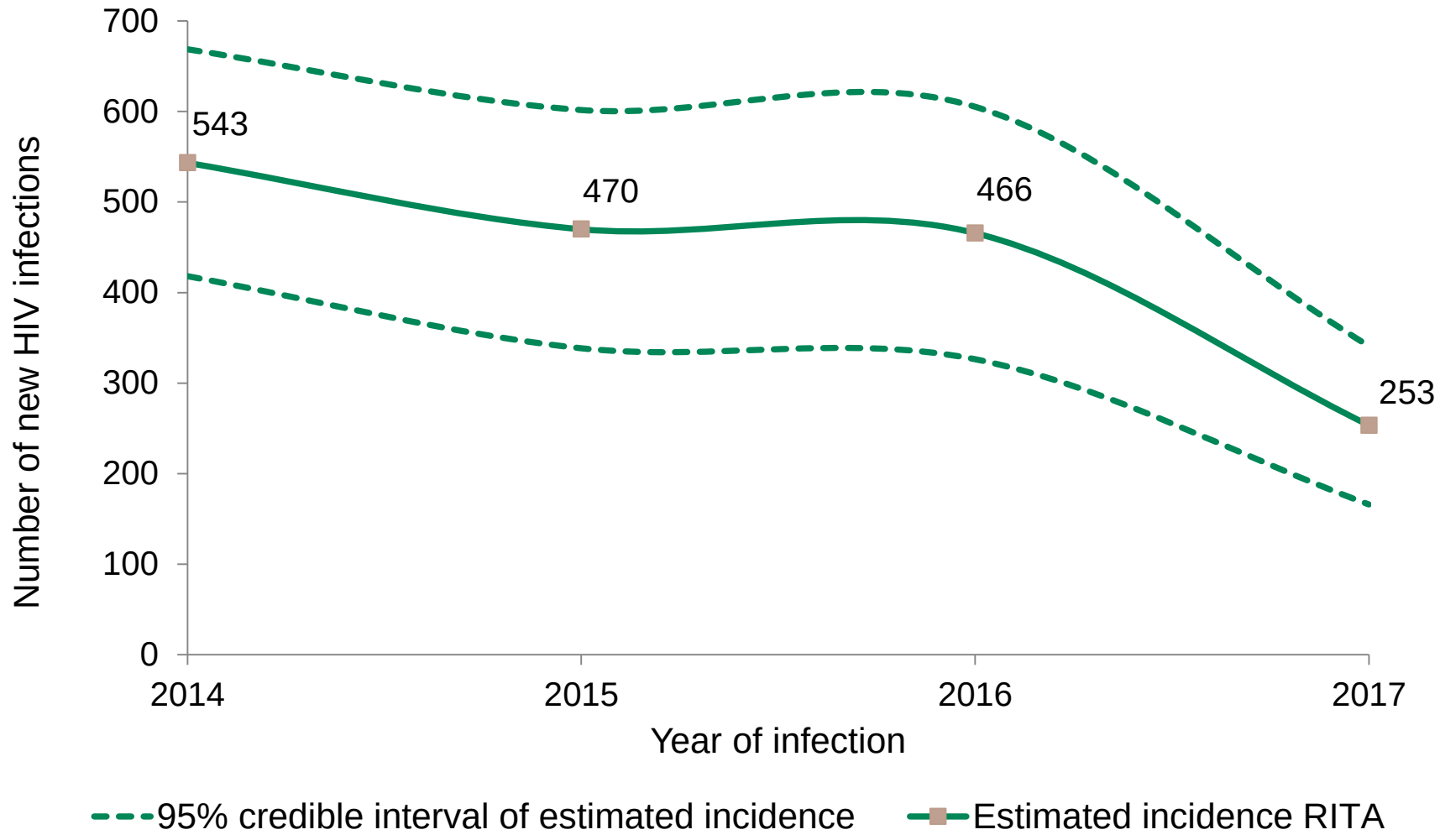
New HIV infections in England, 2014 - 2017



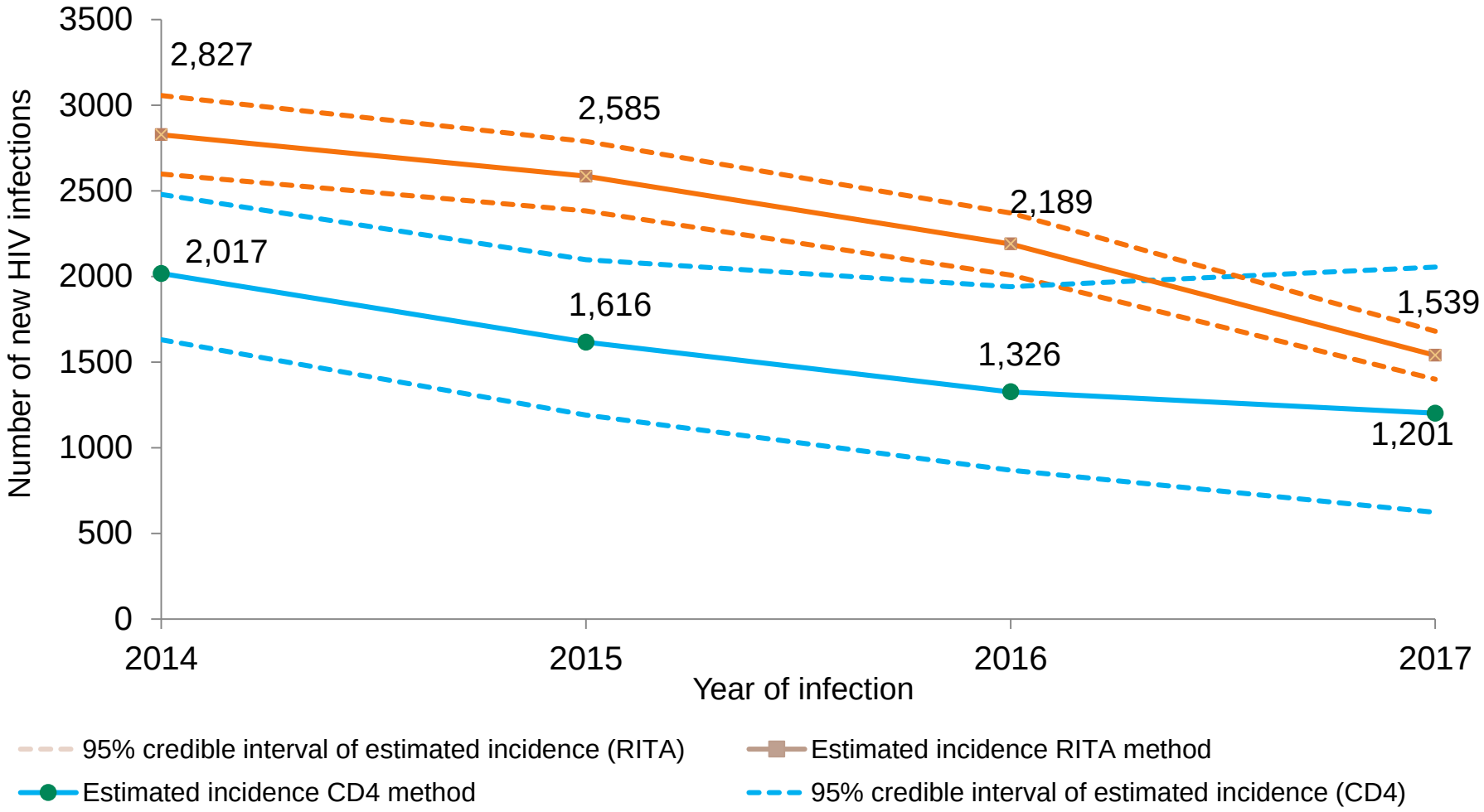
New HIV infections in **heterosexual women**



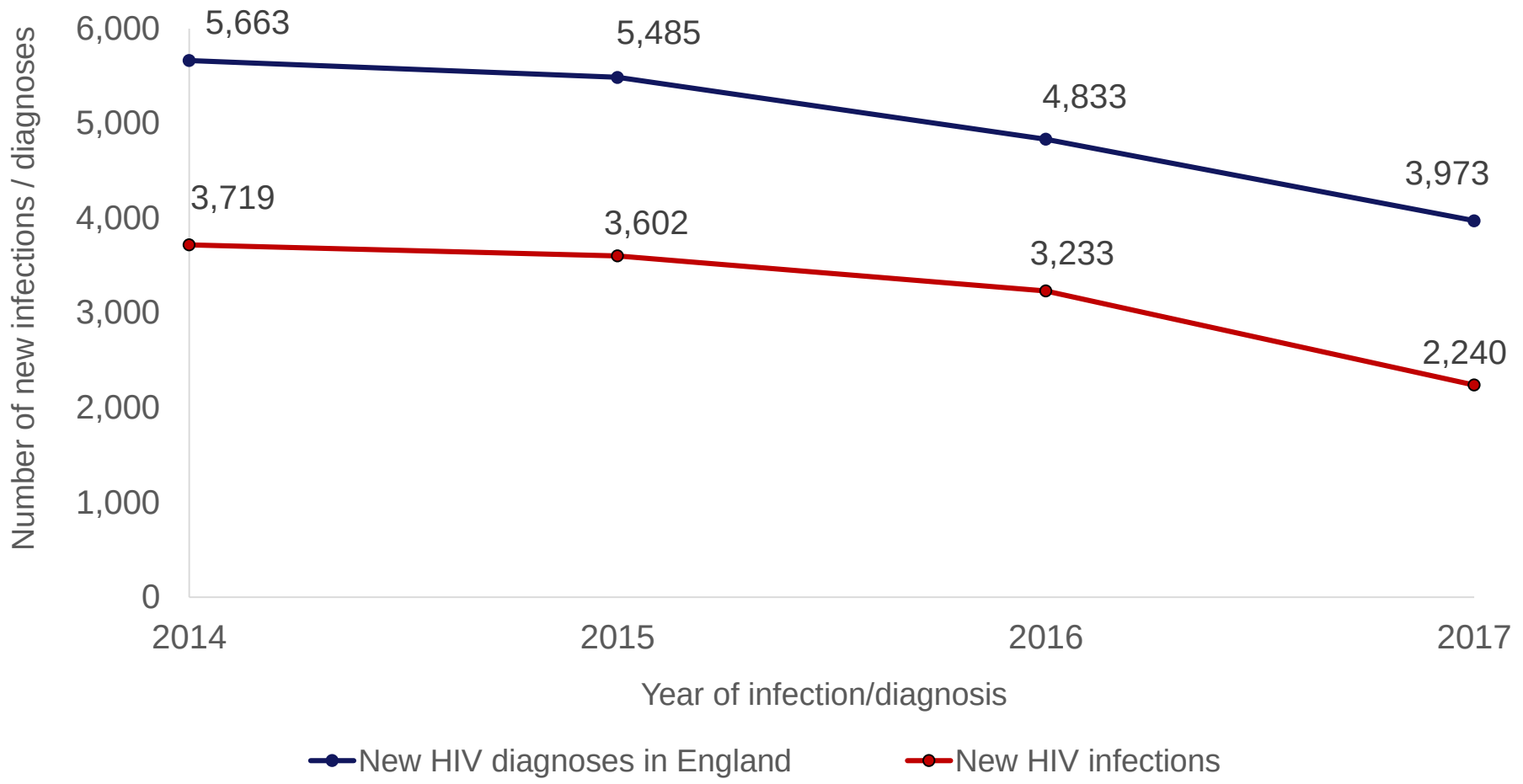
New HIV infections in **heterosexual men**



New HIV infections in **MSM**: biomarker estimates compared to CD4 back-calculation model



Comparison of total new HIV infections and new HIV diagnoses



Conclusions

- Of all incident HIV infections in 2017:
  - Heterosexual women accounted for approximately 15%
  - Heterosexual men accounted for approx. 11%
- A decline in incident HIV infections was evident in all population groups prior to the start of the PrEP Impact trial
- Availability of PrEP may help to accelerate the decline, but this depends on uptake in key populations
- Stratification by additional exposure categories (e.g. age and ethnicity) can help with equitable delivery of PrEP to underserved key populations

Acknowledgements

- Peter Kirwan, Public Health England
- We gratefully acknowledge the continuing collaboration of people living with HIV, as well as clinicians, microbiologists, immunologists, public health practitioners, occupational health doctors, nurses and other colleagues who contribute to the surveillance of HIV and STIs in the UK