

Background

- Accurate estimates of the size of the HIV-infected population, including those not yet diagnosed, are important to understand the HIV epidemic and to plan interventions.
- We sought to estimate the number living with HIV as well as trends in the undiagnosed population, HIV incidence, and rate of diagnosis in the past 10 years.

Methods

- Newly developed adaptation of a multi-state back-calculation method^{1,2}.
- The method describes disease progression in the absence of antiretroviral treatment from infection to HIV diagnosis or onset of AIDS through stages of CD4 counts.
- Rates of progression between CD4 stages are based on data from untreated HIV-infected patients in the CASCADE collaboration³.
- By fitting to observed data from the ATHENA national observational HIV cohort we can simultaneously estimate
 - number of annual new HIV infections since the start of the epidemic in 1980.
 - CD4 stratum-specific diagnosis rates.
- Data items include
 - annual number of new HIV diagnoses
 - annual total number of AIDS cases
 - annual number of HIV/AIDS diagnoses
 - CD4 cell counts at diagnosis
- Bootstrap techniques were used to calculate 95% confidence intervals (CI).

Results

- Cumulative 29,200 (95% CI 28,000-30,400) infections by the end of 2013.
- 23,400 (22,200-24,600) still alive.
- 3400 (2500-4650) still undiagnosed.

Figure 1: Annual number of new HIV infections in the Netherlands with 95% CI (dashed lines) and sensitivity analyses (grey lines).

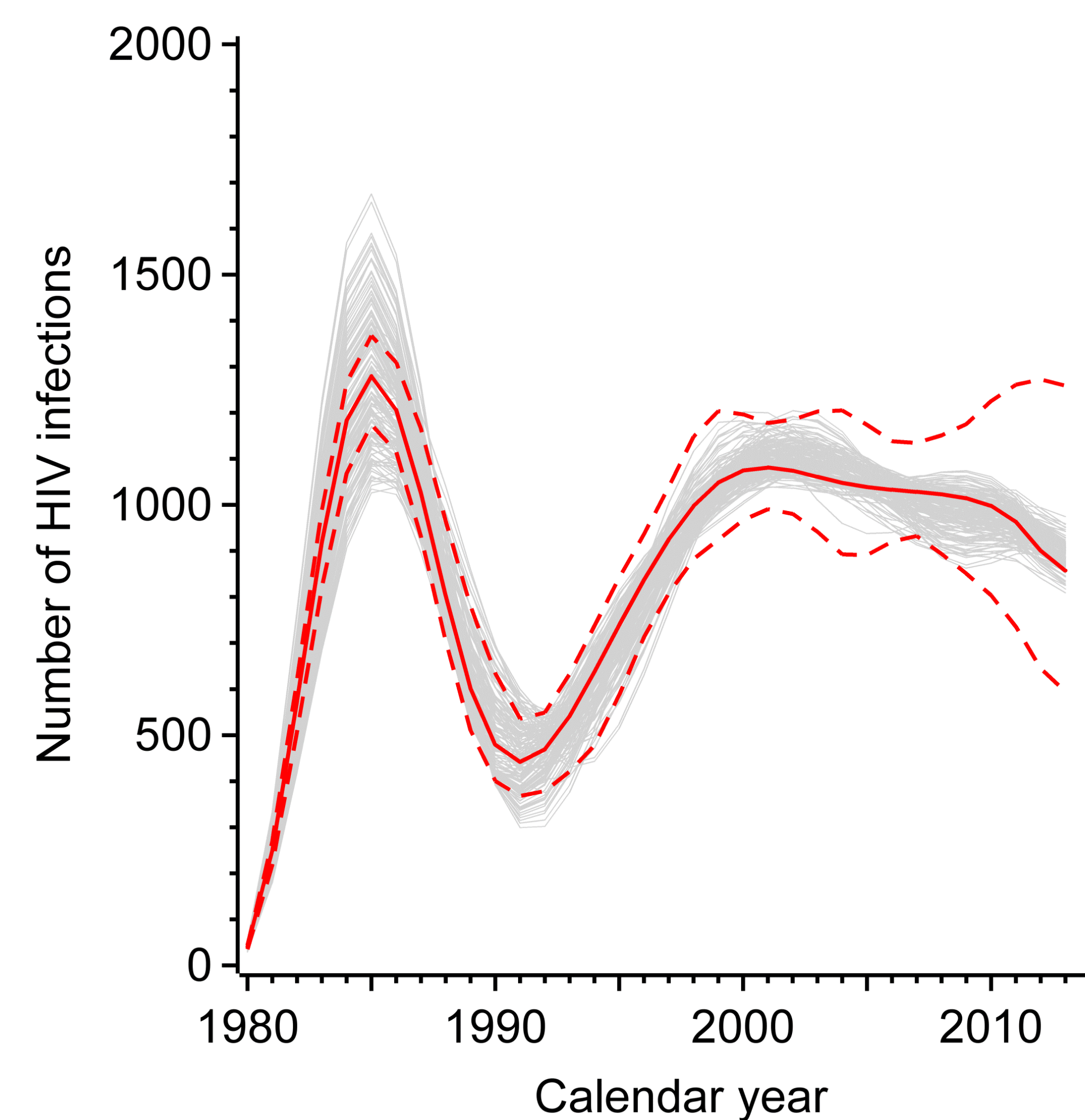
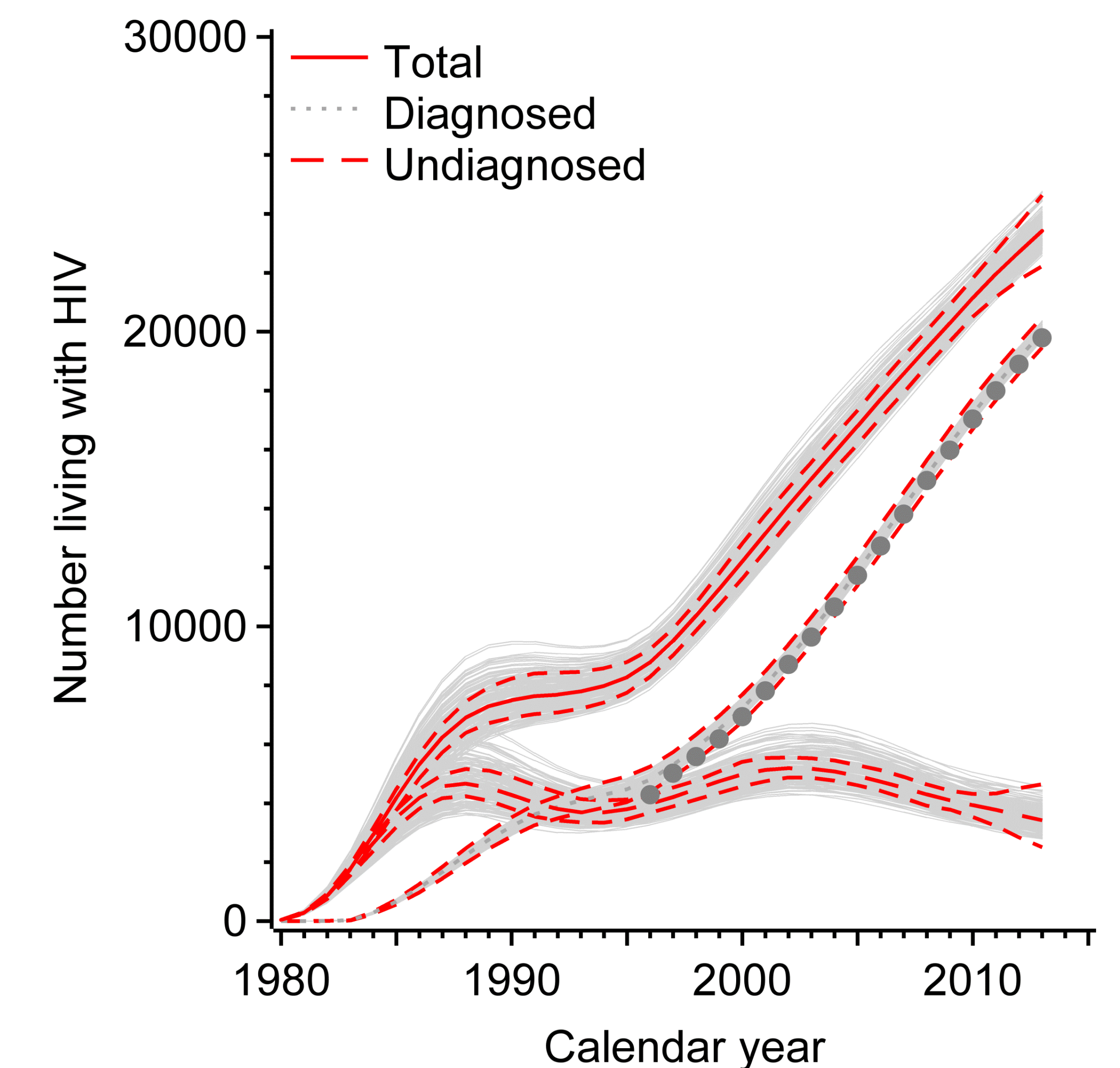


Table 1: Number of individuals living with undiagnosed HIV, their duration of infection, and duration since infection at the time of diagnosis.

	2003	2013
Nr. undiagnosed	5150 (4850-5500)	3400 (2500-4650)
Duration		
<1 year	19% (17-22)	23% (19-27)
2-4 years	51% (49-54)	53% (49-56)
≥5 years	29% (26-33)	24% (19-30)
Duration (diagnosis)		
<2 years	21% (18-23)	26% (21-30)
<5 years	60% (57-63)	67% (62-73)

Figure 2: Number of individuals living with HIV and number of diagnosed and undiagnosed infections with 95% CI (dashed red lines), observed number of HIV diagnoses in ATHENA (grey dots), and sensitivity analyses (grey lines).



Conclusions

- The number of undiagnosed HIV infections in the Netherlands is decreasing.
- Still almost a quarter has been infected for more than 5 years.
- Much greater increases in diagnosis rates are likely to be needed for a more substantial decrease in the annual number of new infections.

References

- ¹Sweeting *et al*, *Stat Med* 2005, 24:3991-4007.
²Van Sighem *et al*, *Epidemiology*, accepted.
³Lodi *et al*, *CID* 2011, 53:817-825.

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