

A new method to estimate the first step in the HIV care continuum

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9th NCHIV

Amsterdam, 18 November 2015



Disclosures

<i>Sponsoring or research grants</i>	European Centre for Disease Prevention and Control (ECDC)
<i>Honorarium or other (financial) compensation</i>	Gilead Sciences, ViiV Healthcare, Bristol-Myers Squibb, Janssen-Cilag
<i>Shareholder</i>	none
<i>Other relationship, namely...</i>	The ATHENA database is maintained by Stichting HIV Monitoring and supported by a grant from the Dutch Ministry of Health, Welfare and Sport through the Centre for Infectious Disease Control of the National Institute for Public Health and the Environment

Introduction

- The total number of individuals living with HIV, including those not yet diagnosed, is crucial information for national public health monitoring and planning.
- However, estimating this number remains a challenge.
- Methods based on prevalence surveys are less useful in concentrated epidemics.
- Many countries in Europe have implemented surveillance systems for HIV and AIDS diagnoses.
- No direct information on the undiagnosed population.

HIV surveillance in the Netherlands

- ATHENA national observational HIV cohort:
 - HIV and AIDS diagnoses
 - CD4 at the time of diagnosis
 - emigration or death
 - ...

- National AIDS registry
 - AIDS cases before 1996

Number living with HIV in 2014

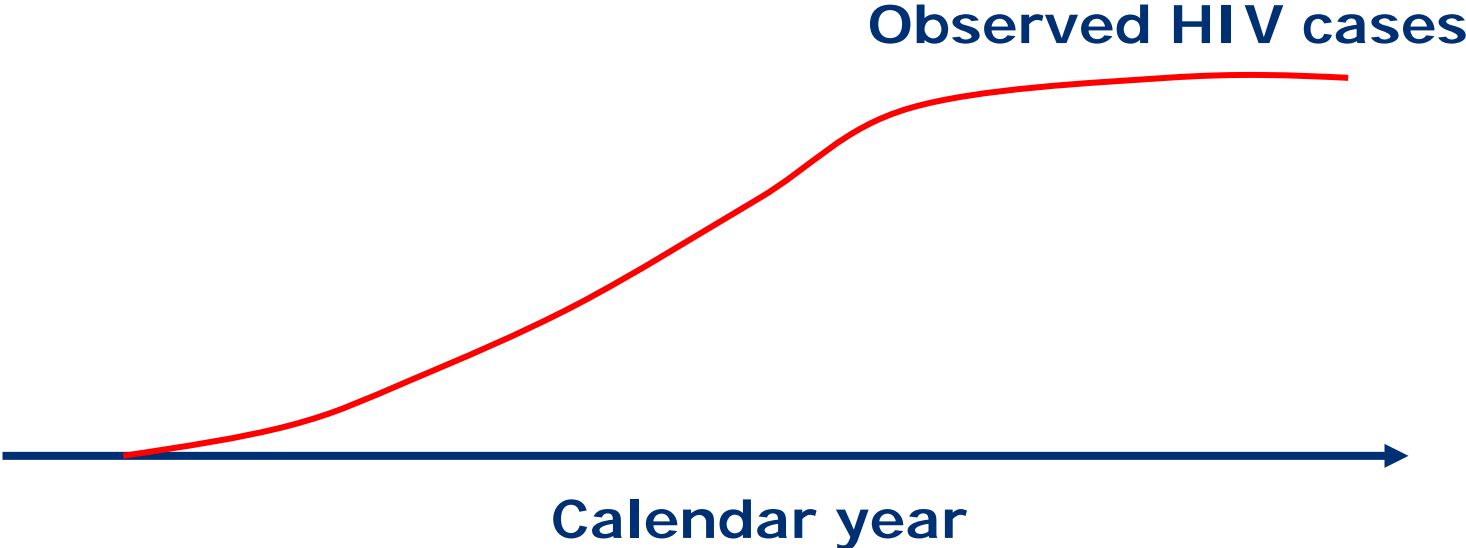
= number of *diagnosed* HIV-positive individuals registered for care who have not died or emigrated



+ number of *undiagnosed* HIV-positive individuals



Back-calculation



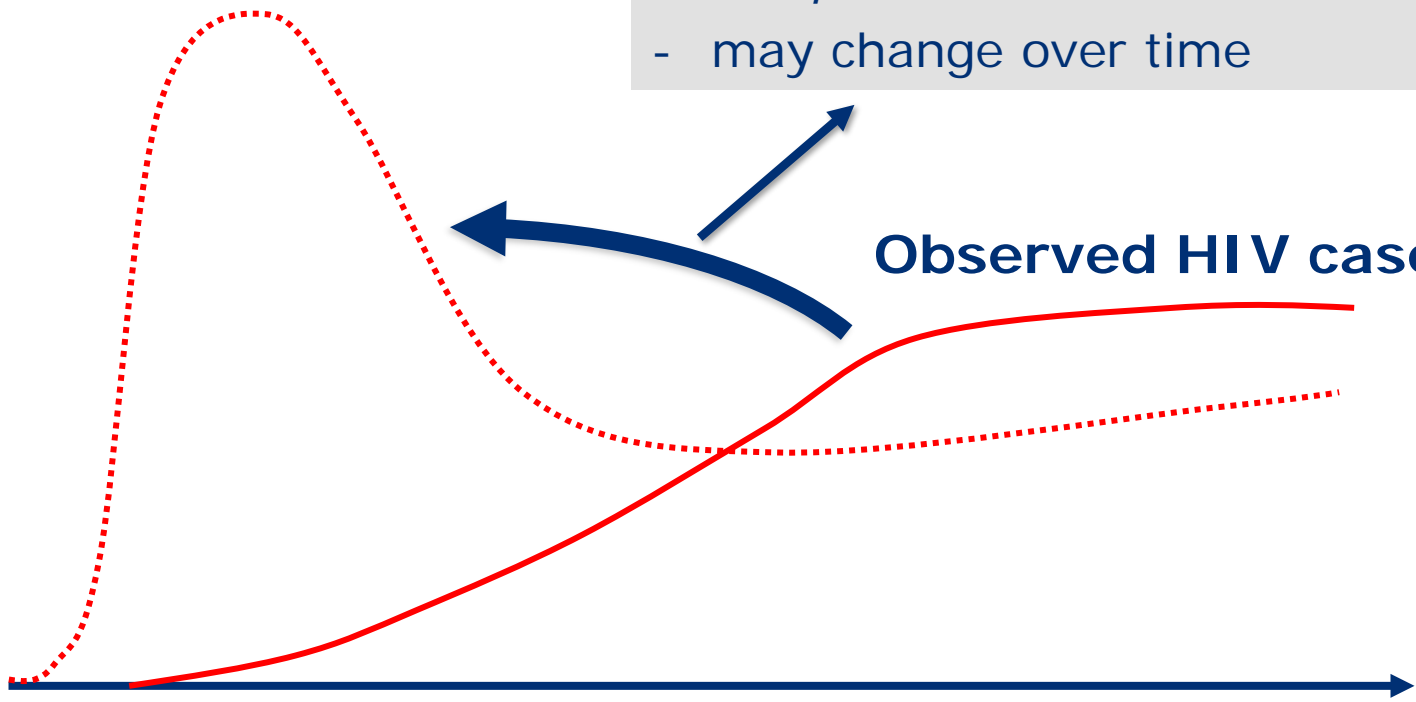
Back-calculation

HIV infections

Need to know the time between infection and diagnosis, which

- is *a priori* unknown
- may change over time

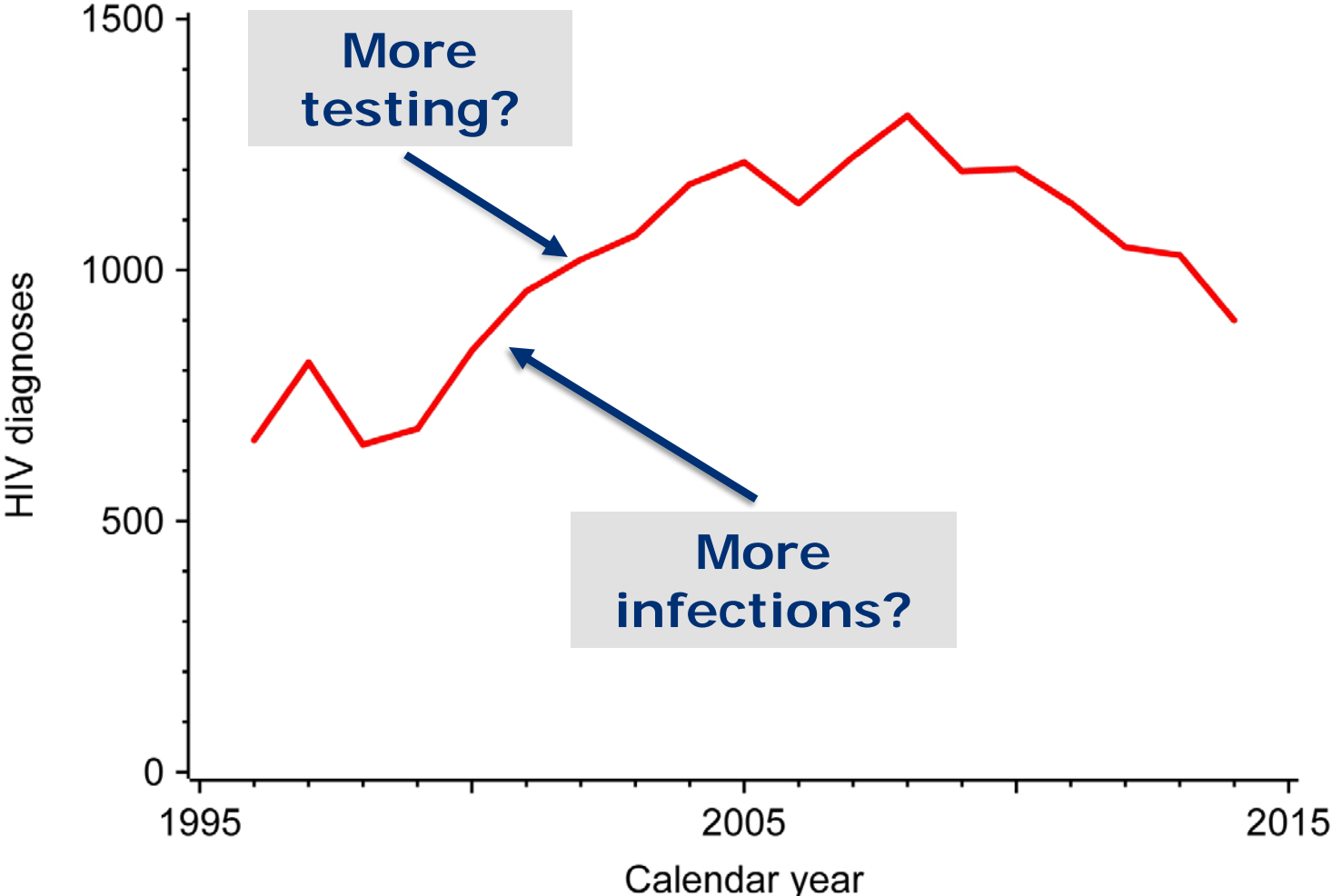
Observed HIV cases



Calendar year

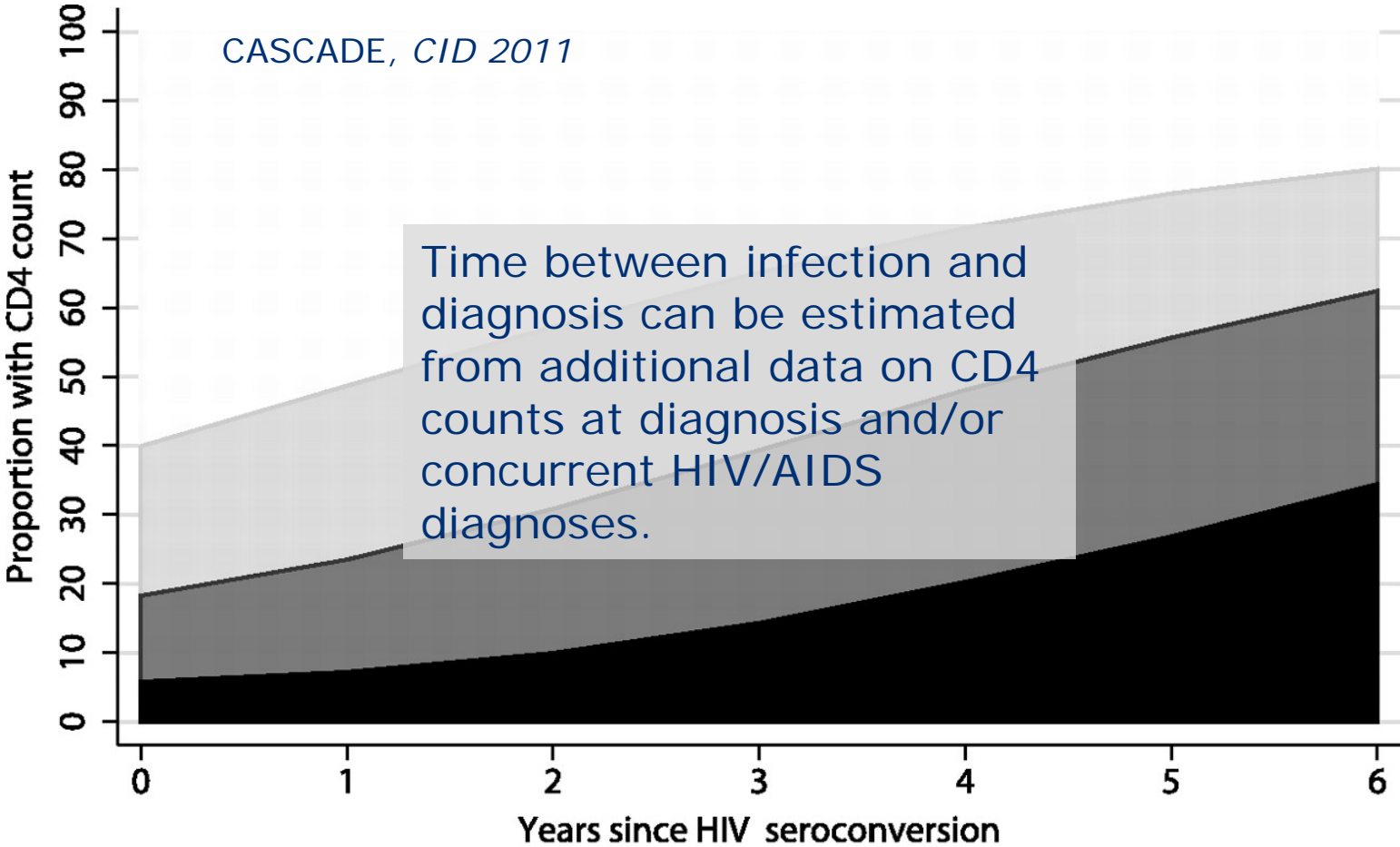


HIV diagnoses in the Netherlands

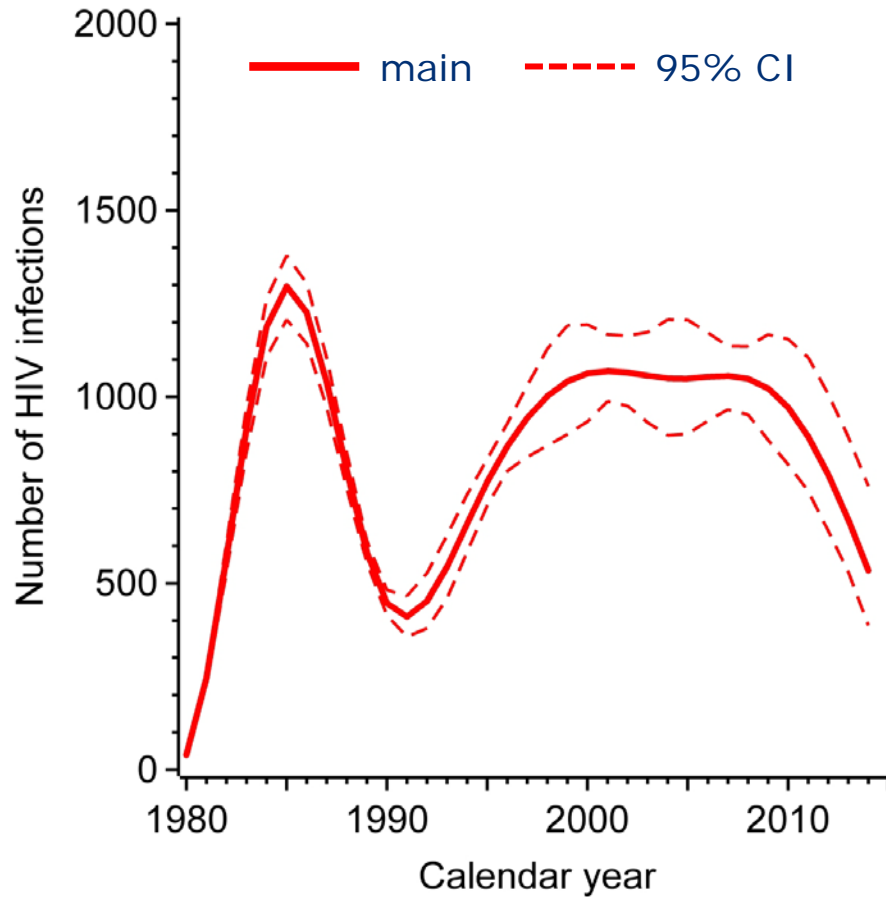


Bezemer *et al*, AIDS 2008; Epidemics 2010

Solution: CD4 counts



Annual number of new HIV infections

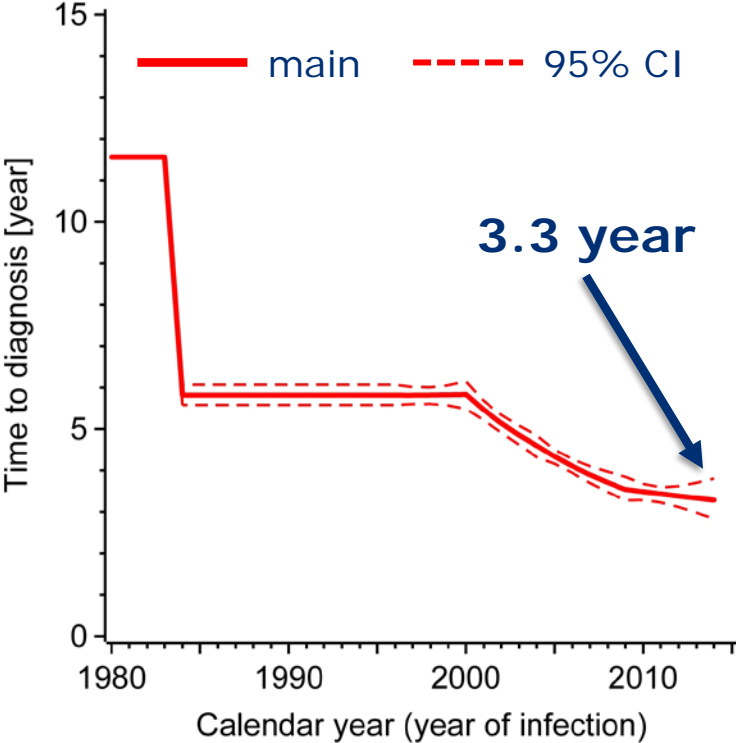


- 530 (390-760) new HIV infections in 2014
- 29,400 HIV infections by the end of 2014

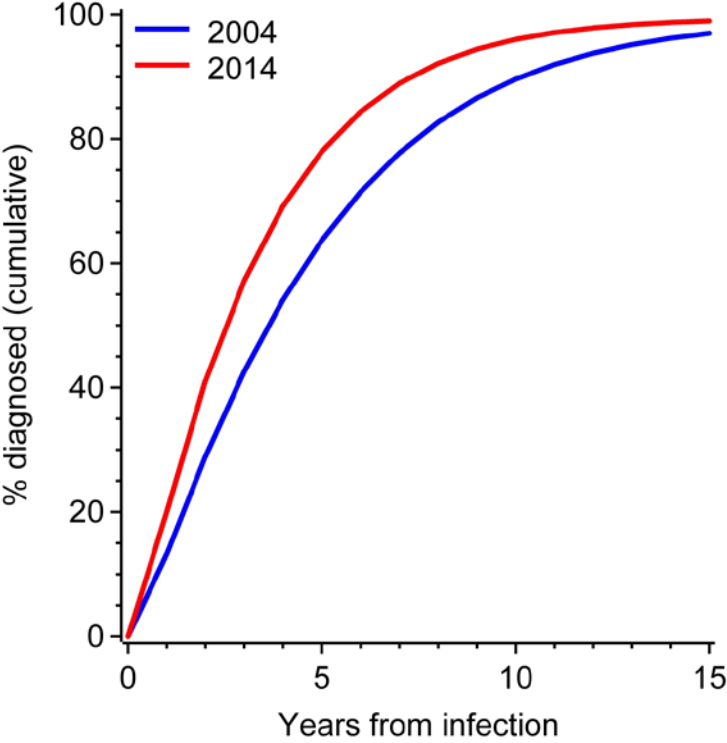


including corrections for reporting delay in 2013 (+3%) and 2014 (+11%)

Time from infection to diagnosis

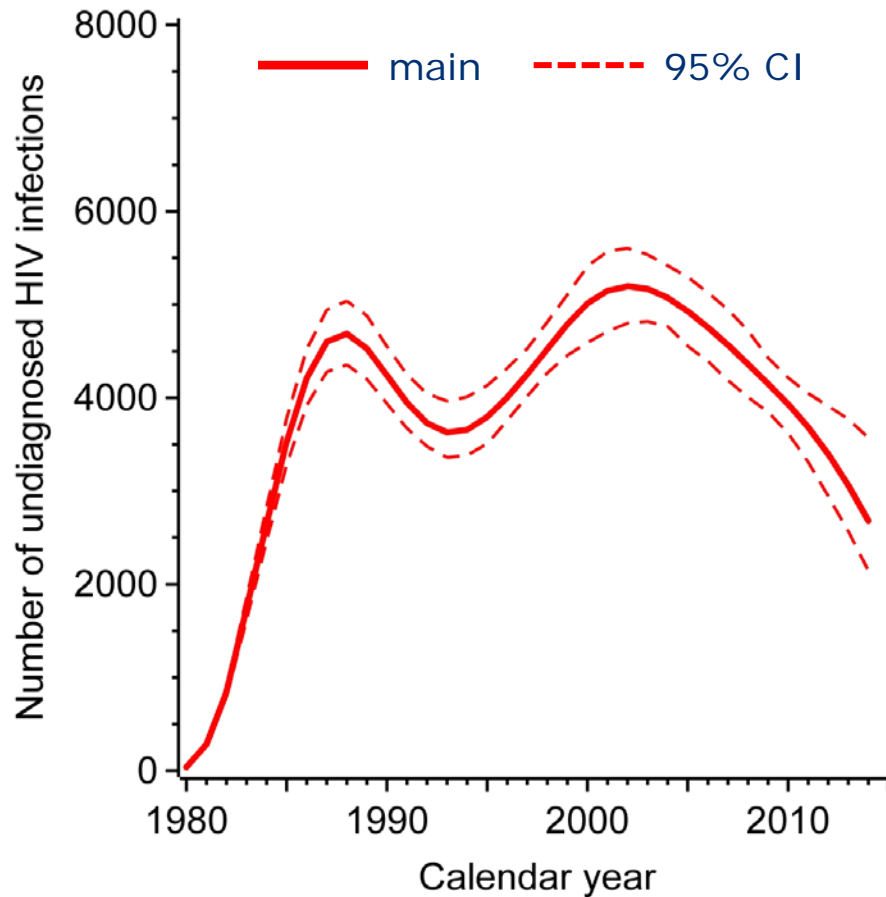


Time to diagnosis



Proportion diagnosed

Undiagnosed HIV infections

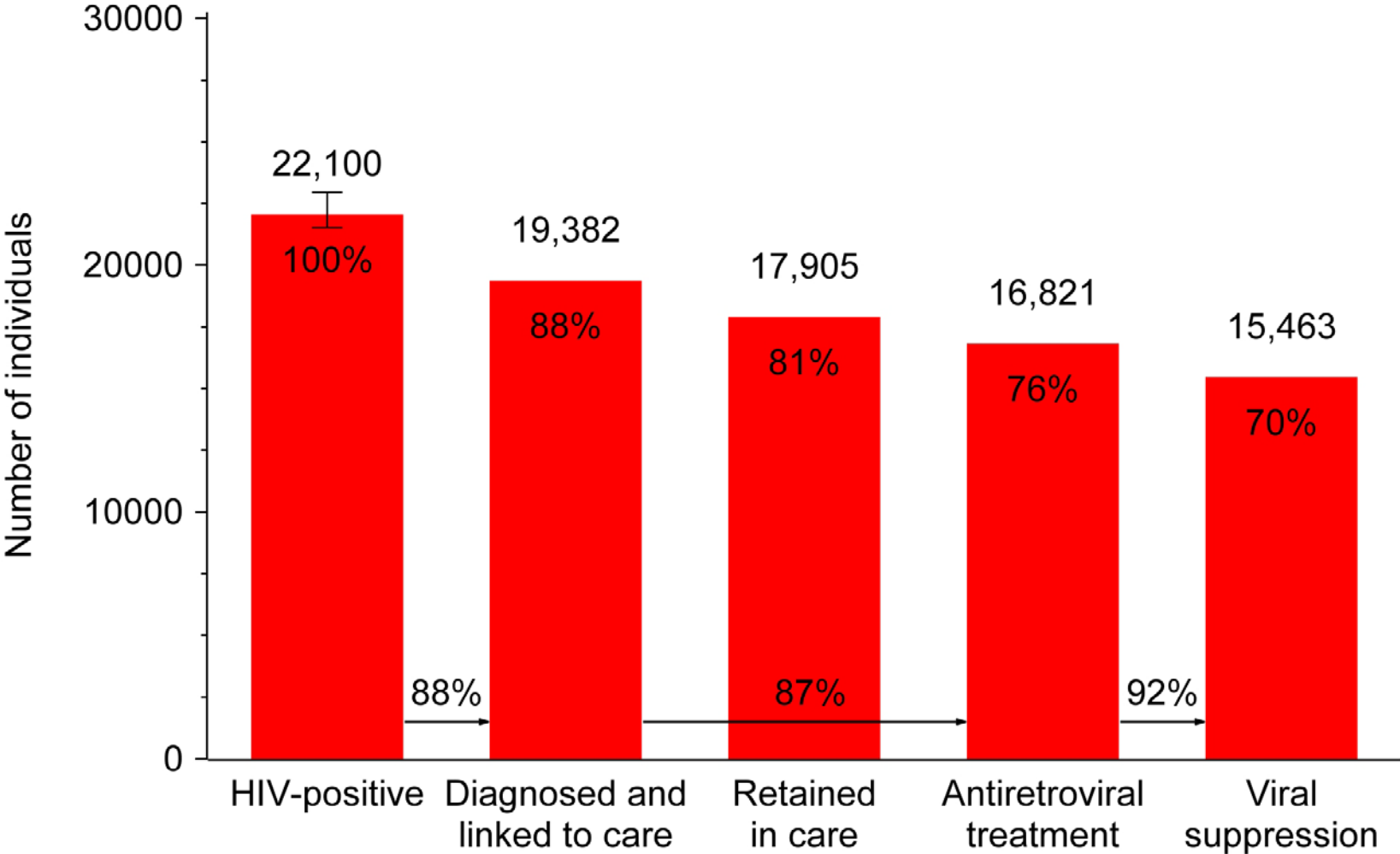


- 2,700 (2,150-3,550) HIV infections still undiagnosed by the end 2014

Constructing a continuum of HIV care

1. Living with HIV: Step 2 + 2,700 undiagnosed
2. Diagnosed (and linked to care) by the end of 2014
3. Retained in care
 - clinic visit or CD4 or RNA measurement in 2014
4. Combination antiretroviral treatment (cART)
 - *ever* started a combination of at least 3 drugs from at least 2 classes
5. Viral suppression
 - latest RNA measurement in 2014 <100 copies/ml, irrespective of treatment

Continuum of HIV care in 2014



Conclusion & discussion

- The estimated proportion of HIV-positive individuals with viral suppression is 70%, close to the UNAIDS' 90-90-90 goal of 73%.
- Our method only uses routine surveillance data on HIV diagnoses.
- Limitations:
 - underreporting may affect estimates, e.g.:
 - 1.5% opt out of registration
 - some of the 1,477 patients not in care anymore may have emigrated or died
 - if a large fraction of the HIV cases are found in migrants, estimated numbers are less straightforward to interpret.
 - need extensive historical data

ECDC HIV Modelling Tool

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ecdc.europa.eu/en/healthtopics/aids/Pages/hiv-modelling-tool.aspx

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Acknowledgements

Academic Medical Centre of the University of Amsterdam: J.M. Prins, T.W. Kuijpers, H.J. Scherpbier, J.T.M. van der Meer, F.W.M.N. Wit, M.H. Godfried, P. Reiss, T. van der Poll, F.J.B. Nellen, S.E. Geerlings, M. van Vugt, D. Pajkrt, J.C. Bos, W.J. Wiersinga, M. van der Valk, A. Goorhuis, J.W. Hovius, A.M. Weijnsfeld, J. van Eden, A. Henderiks, A.M.H. van Hes, M. Mutschelknauss, H.E. Nobel, F.J.J. Pijnappel, S. Jurriaans, N.K.T. Back, H.L. Zaaijer, B. Berkhout, M.T.E. Cornelissen, C.J. Schinkel, X.V. Thomas. **Admiraal De Ruyter Ziekenhuis, Goes:** M. van den Berge, A. Stegeman, S. Baas, L. Hage de Looft, D. Versteeg. **Catharina Ziekenhuis, Eindhoven:** M.J.H. Pronk, H.S.M. Ammerlaan, E.S. de Munnik. A.R. Jansz, J. Tjhie, M.C.A. Wegdam, B. Deiman, V. Scharnhorst. **Emma Kinderziekenhuis:** A. van der Plas, A.M. Weijnsfeld. **Erasmus Medisch Centrum, Rotterdam:** M.E. van der Ende, T.E.M.S. de Vries-Sluijs, E.C.M. van Gorp, C.A.M. Schurink, J.L. Nouwen, A. Verbon, B.J.A. Rijnders, H.I. 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Dorama, N. van Holten, E.C.J. Claas, E. Wessels. **Maasstad Ziekenhuis, Rotterdam:** J.G. den Hollander, K. Pogary, A. Roukens, M. Kastelijns, J.V. Smit, E. Smit, D. Struik-Kalkman, C. Tearno, M. Bezemer, T. van Niekerk, O. Pontesilli. **Maastricht UMC+, Maastricht:** S.H. Lowe, A.M.L. Oude Lashof, D. Posthouwer, R.P. Ackens, J. Schippers, R. Vergoossen, B. Weijnenberg-Maes, I.H.M. van Loo, T.R.A. Havenith. **MC Slotervaart, Amsterdam:** J.W. Mulder, S.M.E. Vrouwenraets, F.N. Lauw, M.C. van Broekhuizen, H. Paap, D.J. Vlasblom, P.H.M. Smits. **MC Zuiderzee, Lelystad:** S. Weijer, R. El Moussaoui, A.S. Bosma. **Medisch Centrum Alkmaar:** W. Kortmann, G. van Twillert, J.W.T. Cohen Stuart, B.M.W. Diederden, D. Pronk, F.A. van Truijen-Oud, W. A. van der Reijden, R. Jansen. **Medisch Centrum Haaglanden, Den Haag:** E.M.S. Leyten, L.B.S. Gelinck, A. van Hartingsveld, C. Meerkerk, G.S. Wildenbeest, J.A.E.M. Mutsaers, C.L. Jansen. **Medisch Centrum Leeuwarden, Leeuwarden:** M.G.A. van Vonderden, D.P.F. van Houte, L.M. Kampschreur, K. Dijkstra, S. Faber, J. Weel. **Medisch Spectrum Twente, Enschede:** G.J. Kootstra, C.E. Delsing, M. van der Burg-van de Plas, H. Heins, E. Lucas. **Onze Lieve Vrouwe Gasthuis, Amsterdam:** K. Brinkman, P.H.J. Frissen, W.L. Blok, W.E.M. Schouten, G.E.L. van den Berk, C.J. Brouwer, G.F. Geerders, K. Hoeksema, M.J. Kleene, I.B. van der Meché, A.J.M. Toonen, S. Wijnands, M. Damen, D. Kwa. **Radboudumc, Nijmegen:** P.P. Koopmans, M. Keuter, A.J.A.M. van der Ven, H.J.M. ter Hofstede, A.S.M. Dofferhoff, R. van Crevel, M. Albers, M.E.W. Bosch, K.J.T. Grintjes-Huisman, B.J. Zomer, F.F. Stelma, J. Rahamat-Langendoen, D. Burger. **Rijnstate, Arnhem:** C. Richter, E.H. Gisolf, R.J. Hassing, G. ter Beest, P.H.M. van Bentum, N. Langebeek, R. Tiemessen, C.M.A. Swanink. **Sint Lucas Andreas Ziekenhuis, Amsterdam:** J. Veenstra, K.D. Lettinga, M. Spelbrink, H. Sulman, M. Spelbrink, E. Witte, M. Damen, S.Q. van Veen. **Spaarne Gasthuis, Haarlem:** S.F.L. van Lelyveld, R. Soetekouw, N. Hulshoff, L.M.M. van der Prijt, J. van der Swaluw, N. Bermon, W.A. van der Reijden, R. Jansen, B.L. Herpers, D. Veenendaal. **Stichting Medisch Centrum Jan van Goyen, Amsterdam:** D.W.M. Verhagen, M. van Wijk. **St Elisabeth Ziekenhuis, Tilburg:** M.E.E. van Kasteren, A.E. Brouwe, B.A.F.M. de Kruijff-van de Wiel, M. Kuipers, R.M.W.J. Santegoets, B. van der Ven, J.H. Marcelis, A.G.M. Buiting, P.J. Kabel. **Universitair Medisch Centrum Groningen, Groningen:** W.F.W. Bierman, H. Scholvinck, K.R. Wilting, Y. Stienstra, H. de Groot-de Jonge, P.A. van der Meulen, D.A. de Weerd, J. Ludwig-Roukema, H.G.M. Niesters, A. Riezebos-Brilman, C.C. van Leer-Buter, M. Knoester. **Universitair Medisch Centrum Utrecht, Utrecht:** A.I.M. Hoepelman, M.M.E. Schneider, T. Mudrikova, P.M. Ellerbroek, J.J. Oosterheert, J.E. Arends, R.E. Barth, M.W.M. Wassenberg, E.M. Schadd, D.H.M. van Elst-Laurijssen, E.E.B. van Oers-Hazelzet, J. Patist, S. Vervoort, M. van Berkel, R. Schuurman, F. Verduyn-Lunel, A.M.J. Wensing. **VU medisch centrum, Amsterdam:** E.J.G. Peters, M.A. van Agtmael, M. Bomers, J. de Vocht, M. Heitmuller, L.M. Laan, A.M. Pettersson, C.M.J.E. Vandenbroucke-Grauls, C.W. Ang. **Wilhelmina Kinderziekenhuis, UMCU, Utrecht:** S.P.M. Geelen, T.F.W. Wolfs, L.J. Bont, N. Nauta. **Coordinating centre:** P. Reiss, D.O. Bezemer, A.I. van Sighem, C. Smit, F.W.M.N. Wit, S. Zaheri, M. Hillebregt, A. de Jong, D. Bergsma, P. Hoekstra, A. de Lang, S. Grivell, A. Jansen, M.J. Rademaker, M. Raethke, L. de Groot, M. van den Akker, Y. Bakker, M. Broekhoven, E. Claessen, A. El Berkaoui, J. Koops, E. Kruijne, C. Lodewijk, R. Meijering, L. Munjishvili, B. Peeck, C. Ree, R. Regtop, Y. Ruijs, T. Rutkens, L. van de Sande, M. Schoorl, S. Schnörr, E. Tuijn, L. Veenenbergh, S. van der Vliet, T. Woudstra, B. Tuk.

