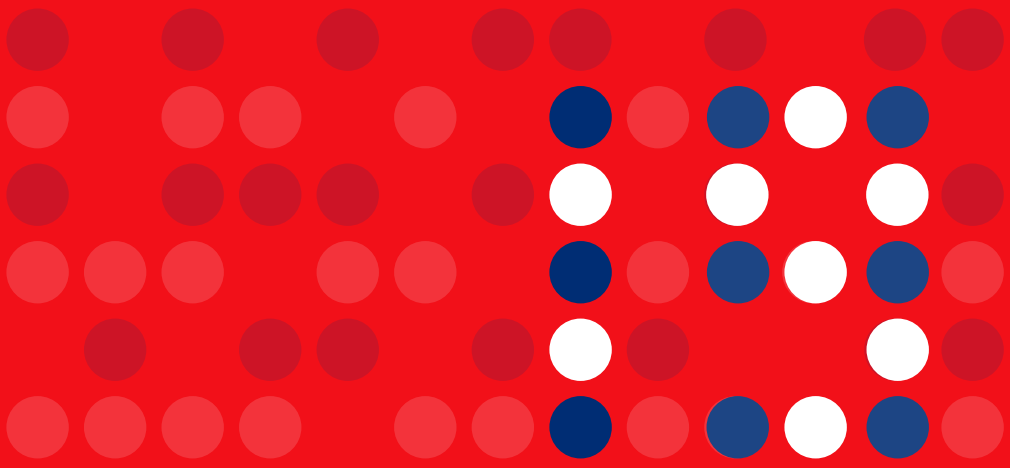
Human Immunodeficiency Virus (HIV)
Infection in the Netherlands

HIV Monitoring

HIV Monitoring Report 2019

Chapter 8: The Amsterdam Cohort Studies on HIV infection: annual report 2018



About Stichting HIV Monitoring

Stichting HIV Monitoring (SHM), the Dutch HIV monitoring foundation, was founded in 2001 and appointed by the Dutch minister of Health, Welfare and Sport as the executive organisation for the registration and monitoring of HIV-positive individuals in the Netherlands.

In collaboration with the HIV treatment centres in the Netherlands, SHM has developed a framework for systematically collecting HIV data for the long-term follow up of all registered individuals. The Netherlands is the only country in the world to have such a framework, which enables healthcare professionals to aspire to the highest standard of HIV care.

SHM contributes to the knowledge of HIV by studying the course of the infection and the effect of its treatment. To this end, SHM follows the treatment of every HIV-positive man, woman and child in care in the Netherlands and registered in the national observational HIV cohort, ATHENA. Continuous collection of data is carried out at 24 HIV treatment centres and subcentres and 4 paediatric HIV centres in the Netherlands. Patient data are collected and entered into the database in a pseudonymised form for storage and analysis. In this way SHM is able to comprehensively map the HIV epidemic and HIV treatment outcomes in the Netherlands.

Our mission

To further the knowledge and understanding of all relevant aspects of HIV infection, including comorbidities and co-infections (such as viral hepatitis), in HIV-positive persons in care in the Netherlands.

www.hiv-monitoring.nl

HIV Monitoring

Monitoring Report 2019

Human Immunodeficiency Virus (HIV) Infection in the Netherlands

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Guide to buttons

Content page

Next chapter

Preceding chapter

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Special reports

8. The Amsterdam Cohort Studies on HIV infection: annual report 2018

Amy Matser, Ward van Bilsen, and Maria Prins for the ACS

Introduction

The Amsterdam Cohort Studies (ACS) on HIV infection and AIDS were started shortly after the first cases of AIDS were diagnosed in the Netherlands. Since October 1984, men who have sex with men (MSM) have been enrolled in a prospective cohort study. A second cohort involving people who use drugs (PWUD) was initiated in 1985. In 2018, the cohorts reached 34 years of follow up. The initial aim of the ACS was to investigate the prevalence and incidence of HIV-1 infection and AIDS, the associated risk factors, the natural history and pathogenesis of HIV-1 infection, and the effects of interventions. During the past 34 years, these aims have remained primarily the same, although the emphasis of the studies has changed. Early on, the primary focus was to elucidate the epidemiology of HIV-1 infection, whereas later more in-depth studies were performed to investigate the pathogenesis of HIV-1 infection. In the past decade, research on the epidemiology of other blood-borne and sexually transmitted infections (STI) and their interaction with HIV has also become an important component of the ACS research programme.

From the outset, research in the ACS has taken a multidisciplinary approach, integrating epidemiology, social science, virology, immunology, and clinical medicine in one study team. This unique collaboration has been highly productive, significantly contributing to the knowledge and understanding of many different aspects of HIV-1 infection. This expertise, in turn, has contributed directly to advances in prevention, diagnosis, and management of HIV infection.

Collaborating institutes and funding

Within the ACS, different institutes collaborate to bring together the data and biological sample collections and to conduct research. These include the Public Health Service of Amsterdam (*Gemeentelijke Gezondheidsdienst Amsterdam*; GGD Amsterdam): Department of Infectious Diseases, Research and Prevention; the Amsterdam University Medical Centers (Academic Medical Center (AMC) site): Departments of Medical Microbiology, Experimental Immunology, and Internal Medicine (Division of Infectious Disease); the Emma Kinderziekenhuis (paediatric HIV treatment centre); Stichting HIV Monitoring (SHM); MC Jan van Goyen: Department of Internal Medicine; and the Hiv Focus Centrum (DC Klinieken Lairesse). From the start, Sanquin Blood Supply Foundation has been involved in

the ACS and, since 2007, has provided financial support for the biobank of viable peripheral blood mononuclear cells (PBMC) at the AMC's Department of Experimental Immunology. In addition, there are numerous collaborations between the ACS and other research groups both within and outside the Netherlands. The ACS are financially supported by the Centre for Infectious Disease Control Netherlands of the National Institute for Public Health and the Environment (*Centrum voor Infectieziektenbestrijding-Rijksinstituut voor Volksgezondheid en Milieu*, RIVM-CIb).

Ethics statement

The ACS have been conducted in accordance with the ethical principles set out in the declaration of Helsinki. Participation in the ACS is voluntary and written informed consent is obtained from each participant. The most recent version was approved by the AMC medical ethics committee in 2007 for the MSM cohort and in 2009 for the PWUD cohort.

The ACS in 2018

The cohort of men who have sex with men

As of 31 December 2018, 2,888 MSM were included in the ACS. Every three to six months, participants complete a standardised questionnaire designed to obtain information regarding medical history, sexual and drug use behaviour, underlying psychosocial determinants, healthcare use, depression, psychological disorders, and demographics. Blood is also collected for diagnostic tests and storage. Of the 2,888 MSM, 607 were HIV-positive at entry into the study, and 261 seroconverted during follow up. In total, the GGD Amsterdam was visited 59,792 times by MSM.

From 1984 until 1985, men who had had sexual contact with a man in the preceding six months were enrolled independent of their HIV status. In the period 1985–1988, HIV-negative men of all age groups were eligible to participate if they lived in or around Amsterdam and had had at least two male sexual partners in the preceding six months. From 1988 to 1998, the cohort was also open for HIV-positive MSM. During the period 1995–2004, only men aged ≤30 years with at least one male sexual partner in the previous six months could enter the study. From 2005 to 2013, recruitment has been open to MSM of all ages with at least one sexual partner in the preceding six months.

Since 2013, HIV-negative men of all age groups have been eligible to participate in the ACS if they live in or are closely connected with the city of Amsterdam and have had at least one male sexual partner in the preceding six months. In line

with the advice issued by the international scientific advisory committee in 2013, the cohort now also makes additional efforts to recruit young HIV-negative MSM (age ≤30 years).

HIV-seroconverters within the ACS remained in the cohort until 1999, when follow up of a selection of HIV-positive MSM was transferred to the MC Jan van Goyen. In 2003, the *Hiv Onderzoek onder Positieven* (HOP) protocol (*HIV Research in Positive Individuals*) was initiated. Individuals with a recent HIV infection at study entry at the GGD Amsterdam and those who seroconverted for HIV during follow up within the cohort continue to return for study visits at the GGD Amsterdam or at an HIV treatment centre. Blood samples from these participants are stored for future research. All behavioural data are collected on a six-monthly basis by questionnaires, coordinated by the GGD Amsterdam, and clinical data are provided by SHM.

In 2018, 749 HIV-negative and 60 HIV-positive MSM were in active follow up at the GGD Amsterdam; in other words, these men had visited the cohort at least once in the current or preceding year. All HIV-positive MSM at the GGD had filled in behavioural questionnaires. In addition to the HIV-positive MSM visiting the GGD Amsterdam, 197 HIV-positive participants have been followed outside the GGD Amsterdam at the MC Jan van Goyen or the DC Klinieken Lairesse-Hiv Focus Centrum in Amsterdam since 1999.

In 2018, 92 new HIV-negative MSM were recruited. The median age in this group was 28.1 years (interquartile range (IQR) 25.9-40.0), while that of the total group of MSM in active follow up was 42.9 years at their last visit (IQR 33.3-50.3). The majority (83.7%) of the total group were born in the Netherlands and 85.7% were residents of Amsterdam. Finally, 75.9% of the participants had a college degree or higher.

The cohort of drug users

As of 31 December 2016, 1,680 PWUD were included in the ACS and contributed 28,194 visits. In 2014, the cohort was closed for new participants. Regular follow up of drug users continued until February 2016. All PWUD who had ever participated in the ACS were then invited for an end-of-study interview and follow up of PWUD was successfully ended in July 2016. Of the 1,680 PWUD, 323 were HIV-positive at entry, and 99 seroconverted during follow up. The last HIV seroconversion was seen in 2012. By 31 December 2016, 576 deaths had been confirmed among PWUD. The median age of the PWUD who visited the ACS in 2016 was 55 (IQR 49-59), 8.1% had attained a high level of education, and 63.4% were born in the Netherlands.

ACS biobank

The ACS visits, together with data collection from several subgroup studies and affiliated studies embedded in the ACS, have resulted in a large collection of stored samples. The ACS biobank includes plasma/serum and PBMC samples collected within the context of the Primo-SHM study (a national randomised study comparing the effects of early temporary antiviral therapy with that of no therapy among people who presented with primary HIV-1 infection at the AMC HIV outpatient clinic and ACS seroconverters). These samples are stored at the AMC. At present, biological samples are still being collected prospectively for Primo-SHM participants visiting the AMC clinic until one year after they have recommenced therapy. The ACS biobank also includes plasma and PBMC samples that were collected from HIV-positive and HIV-exposed children at the Emma Kinderziekenhuis in the AMC until 2008. All stored samples are available for ACS research.

Subgroup studies and affiliated studies

AGE$_h$IV cohort study

The AGEhIV cohort study (a collaboration between the AMC Departments of Infectious Diseases and Global Health, the Amsterdam Institute of Global Health and Development, the GGD Amsterdam, and SHM) was started in October 2010. The aim of the study is to assess the prevalence and incidence of a broad range of comorbidities and known risk factors for these comorbidities in HIV-positive individuals aged ≥45 years, and to determine the extent to which comorbidities, their risk factors and their relation to quality of life differ between HIV-positive and HIV-negative groups.

Participants undergo a comprehensive assessment for comorbidities and complete a questionnaire at intake and follow-up questionnaires every 2 years afterwards. In total, 598 HIV-1-positive participants and 550 HIV-negative individuals completed a baseline visit between October 2010 and September 2012. HIV-1-positive participants were included through the AMC HIV outpatient clinic and HIV-negative participants from similar risk groups through the STI clinic at the GGD Amsterdam (n=486) or the ACS (n=64). All participants were aged ≥45 years and were as comparable as possible with respect to age, gender, ethnicity, and risk behaviour. By mid-2018, the fourth round had been completed; 420 HIV positive and 457 HIV-negative participants had had a fourth visit. In the second half of 2018, preparations were made for the fifth round. By the end of 2018, 40 HIV-1-positive participants and 6 initially HIV-negative individuals had completed the fifth follow-up visit. Round 5 visits will continue through 2019 and will be completed mid-2020.

H2M cohort study

From 2010 to 2013, the H2M (HIV and human papillomavirus (HPV) in MSM) cohort study was conducted in a subset of the HIV-negative (n=459) and HIV-positive (n=40) participants of the ACS who were in active follow up, and also among patients of the STI clinic of GGD Amsterdam and MC Jan van Goyen. The aim of the study was to compare the prevalence, incidence, and clearance of high-risk (hr) HPV infections between HIV-negative and HIV-positive MSM.

H2M3 study

Since September 2014, collection of anal and genital swabs has been resumed in all consenting ACS participants. The key aim of this second new study (the H2M3 study), which builds on the H2M study, is to examine long-term incidence and clearance of anal and penile hrHPV infections. Between September 2014 and November 2015, 700 men provided samples for HPV testing during ACS cohort visits. Of these, 434 (62%) were already participating in the H2M study (recruited 2010-2011), and 266 (38%) were new participants who joined the ACS after inclusion in the H2M study had ended. Samples at two time points (6 months apart) have been tested in the laboratory for HPV DNA, and analyses of anal samples have been conducted. This study found that a quarter of MSM had not cleared an anal HPV-16 infection after three years; thus, persistence of anal HPV is common. Twenty-two percent of men who were not infected with HPV-16 at baseline acquired an anal HPV-16 infection over a four-year period. Thus, even in highly pre-exposed men, the incidence rate of hrHPV infections is high. In 2018, collection of anal and penile swabs from ACS participants continued and these are stored for future studies.

AMPrEP project in H-TEAM

The Amsterdam pre-exposure prophylaxis (AMPrEP) project is a prospective, longitudinal, open-label demonstration study. The aim of the study is to assess the uptake and acceptability of daily versus event-driven PrEP among MSM and transgender persons (TG) at increased risk for HIV infection, as part of a comprehensive HIV reduction package offered at a large STI clinic.

In total, 374 MSM and 2 TG were enrolled between August 2015 and May 2016 at the STI outpatient clinic of the GGD Amsterdam, including 35 ACS participants who participated in the AMPrEP project at their own initiative. Participants were asked to return for follow-up visits one month after the PrEP start visit and then every three months. At every visit, participants fill in questionnaires on risk behaviour, adherence and general wellbeing and are screened for STI and HIV. Participants will be provided with PrEP until January 2020.

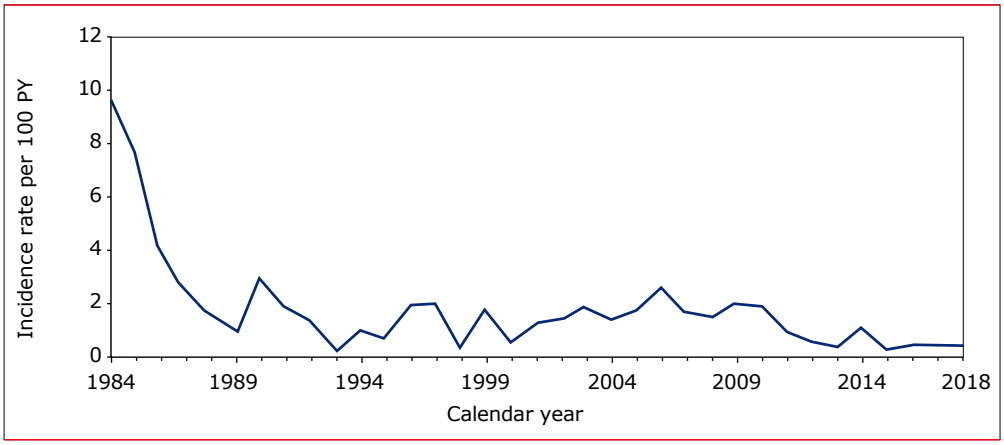
The AMPrEP project is part of the HIV Transmission Elimination Amsterdam (H-TEAM) initiative, a multidisciplinary and integrative approach to stop the epidemic.

The HIV epidemic

HIV incidence

In 2018, 3 MSM participating in the ACS seroconverted for HIV. The observed HIV incidence among MSM has remained relatively stable in recent years and was 0.5 per 100 person years in 2018. *Figure 8.1* shows the yearly observed HIV incidence rate for MSM from the start of the ACS through 2018, respectively.

Figure 8.1: *HIV incidence per calendar year in the Amsterdam Cohort Studies (ACS) among men who have sex with men (MSM), 1984–2018.*



Legend: *PY=person years.*

Transmission of therapy-resistant HIV strains

In 2018, no surveillance of transmission of drug-resistant HIV-1 strains was performed.

Combination antiretroviral therapy (cART) uptake

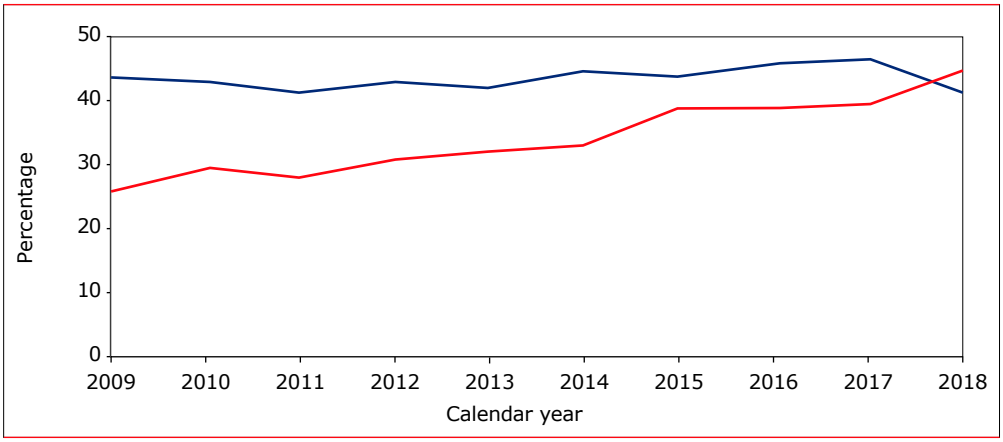
All 60 HIV-positive MSM in follow-up at the GGD were in HIV care.

Risk behaviour of MSM in ACS

Condomless anal sex (CAS) with a steady partner in the preceding six months was reported by 258/657 (39.3%) HIV-negative MSM in active follow up at their last cohort visit, compared with 257/659 (39.0%) who reported CAS with a casual

partner. Annual trends in CAS among HIV-negative MSM participating in the ACS, especially CAS with casual partners, continue to show a gradual increase from 2009 onwards. (*Figure 8.2*). The use of pre-exposure prophylaxis has also increased over time since 2015. In 2018, 125/679 (18.4%) HIV-negative MSM in active follow up reported PrEP use in the preceding 6 months. CAS with a steady partner was reported by 45/121 (37.2%) MSM who used PrEP and 213/537 (39.7%) MSM who did not use PrEP. CAS with a casual partner was reported by 105/121 (86.8%) MSM who used PrEP and 152/539 (28.2%) MSM who did not use PrEP.

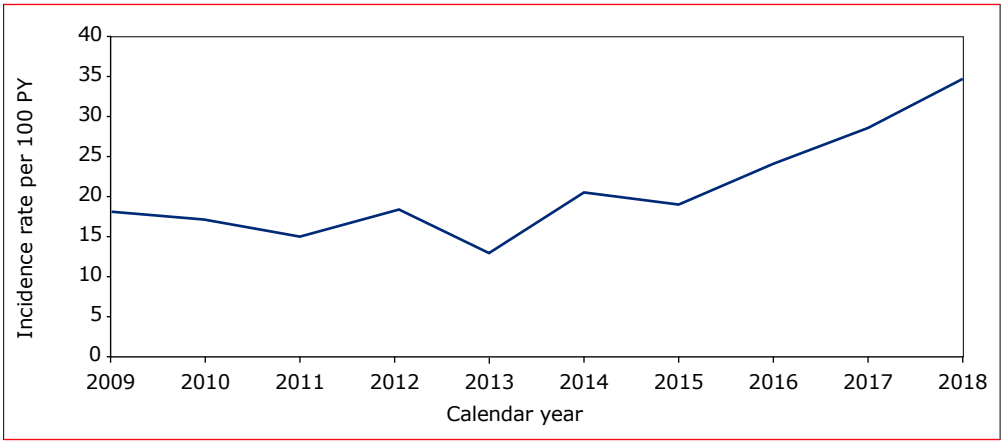
Figure 8.2: *Trend in proportion of condomless anal sex (CAS) with casual partners and steady partners among HIV-negative men who have sex with men (MSM) in the Amsterdam Cohort Studies (ACS), 2009-2018.*



STI screening among MSM in ACS

Since October 2008, all MSM in the ACS have been routinely screened for chlamydia and gonorrhoea by polymerase chain reaction (PCR) techniques using urine samples and pharyngeal and rectal swabs. Cases of syphilis are detected by *Treponema pallidum* haemagglutination assay (TPHA). In 2018, 726 MSM from the ACS were screened for STIs. The incidence rate of any STI (i.e., chlamydia, gonorrhoea and syphilis) was 34.5/100 person years in 2018 (95% confidence interval (CI) 28.6-41.7) among HIV-negative MSM. The incidence rate of any STI significantly increased between 2009-2018 (*Figure 8.3*). The incidence rate of any STI was 50.8/100 PY (95%-CI 31.6-81.7) among HIV-negative MSM who used PrEP and 31.1/100 PY (95%-CI 25.4-38.2) among HIV-negative MSM who did not report use of PrEP.

Figure 8.3: The incidence of any STI (i.e., chlamydia, gonorrhoea and syphilis) among HIV-negative MSM in the Amsterdam Cohort Studies (ACS), 2009-2018.



Legend: PY=person years.

ACS 2018 research highlights

Systemic DPP4 activity is reduced during primary HIV-1 infection and is associated with intestinal RORC+ CD4+ cell levels: a surrogate marker candidate of HIV-induced intestinal damage

Combined antiretroviral therapy (cART) transformed HIV-1 from a deadly disease into a chronic infection, but does not cure HIV infection. It also does not fully restore HIV-induced gut damage unless administered extremely early after infection. Additional biomarkers are needed to evaluate the capacity of therapies aimed at HIV remission/cure to restore HIV-induced intestinal immune damage and limit chronic inflammation. We aimed to identify a systemic surrogate marker whose levels would reflect gut immune damage such as intestinal Th17 cell loss starting from primary HIV-1 infection. We showed that soluble Dipeptidylpeptidase 4 (sDPP4) levels were strongly decreased in primary HIV-1 infection. Strikingly, sDPP4 levels in primary HIV-1 infection predicted time to AIDS. In the gut of SIV-infected non-human primates, DPP4 mRNA specifically correlated with RORC expression, a Th17 marker, in CD4+ cells from the intestine. We further demonstrated that sDPP4 activity levels were increased in animals treated with IL-21 and that this increase was associated with restoration of the Th17 compartment and reduced inflammation. Furthermore, DPP4 mRNA levels in small intestine CD4+ cells

positively correlated with circulating DPP4 activity. These data provide evidence that blood sDPP4 levels could be useful as a correlate for HIV-induced intestinal damage.
Ploquin MJ, Casrouge A, Madec Y, Noël N, Jacquelin B, Huot N, Duffy D, Jochems SP, Micci L, Lécuroux C, Boufassa F, Booiman T, Garcia-Tellez T, Ghislain M, Grand RL, Lambotte O, Kootstra N, Meyer L, Goujard C, Paiardini M, Albert ML, Müller-Trutwin M.
J Int AIDS Soc. 2018 Jul;21(7):e25144. doi: 10.1002/jia2.25144.

Immunogenicity in rabbits of HIV-1 SOSIP trimers from clades A, B, and C, given individually, sequentially, or in combination

A successful HIV-1 vaccine most probably requires a trimeric envelope glycoprotein (Env) component, as the Env trimer is the only viral protein on the surface of the virus and therefore the only target for neutralizing antibodies. Env trimers can induce strain-specific neutralizing antibodies but not yet broadly neutralizing antibodies. To try to broaden the antibody response, we immunized rabbits with soluble Env trimers from clade A, clade B, and clade C HIV-1 strains, using monovalent, multivalent, and sequential regimens. We found that when the Env trimers from different clades were delivered sequentially, the neutralizing antibody response could be cross-boosted, and this result provides the necessary clues on how to use Env trimers in vaccination experiments.
Torrents de la Peña A, de Taeye SW, Sliepen K, LaBranche CC, Burger JA, Schermer EE, Montefiori DC, Moore JP, Klasse PJ, Sanders RW.
J Virol. 2018 Mar 28;92(8). pii: e01957-17. doi: 10.1128/JVI.01957-17. Print 2018 Apr 15.

Incidence and clearance of anal high-risk HPV infection and their determinants among HIV-negative men who have sex with men over a period up to five years

The incidence and clearance of anal high-risk human papillomavirus (hrHPV) infections and determinants thereof among human immunodeficiency virus (HIV)-negative men who have sex with men (MSM) over a period of up to 5 years were assessed. Data from HIV-negative MSM who participated in the ACS in the period 2010-2015 were used. Anal self-swabs were collected during every 6-monthly visit, and were HPV genotyped using the SPF10-PCR DEIA/LiPA25-system-v1. Incidence rates (IRs) and clearance rates (CRs) of incident anal hrHPV infections were assessed by hrHPV type (types 16, 18, 31, 33, 45, 52, and 58). Determinants of transitions between uninfected and infected states were assessed by hrHPV type using a time-homogenous multi-state Markov model. This study included 713 HIV-negative MSM, with a median age of 37 years (interquartile range [IQR] 31-43) and a median number of study visits of 6 (IQR 2-7). The IRs of anal infections had a median of 5.2 per 100 person-years (range: 2.2-7.9) across types, with HPV16 having the highest IR. The CRs of incident anal hrHPV infections had a median of 53.7 per

100 person-years (range: 33.4-65.3) across types, with HPV16 having the lowest CR. Having had over 100 lifetime sex partners was significantly associated with incident anal hrHPV infections in multivariable analyses. The high incidence and low clearance rates of anal HPV16 infection, compared to other hrHPV types, is consistent with HPV16 being implicated in the large majority of anal cancer cases.
Marra E, Kovaleva A, Bruisten SM, Vermeulen W, Boyd A, Schim van der Loeff MF.
Clin Infect Dis. 2019 Apr 24;68(9):1556-1565. doi: 10.1093/cid/ciy738

Steering committee

In 2018, the steering committee met four times. Seven proposals for use of data and/or samples (serum/PBMC) were submitted to the committee: Five from the AMC Experimental Immunology, one from the AIGHD in collaboration with the GGD Amsterdam and one from GGD Amsterdam. One of the proposals involved collaborations with groups outside the ACS. All seven requests were approved, of which three after revisions recommended by the ACS steering committee.

Publications in 2018 that include ACS data

Sexual risk behaviour trajectories among MSM at risk for HIV in Amsterdam, the Netherlands
Basten M, Heijne JCM, Geskus R, Den Daas C, Kretzschmar M, Matser A.
AIDS. 2018 Jun 1;32(9):1185-1192. doi: 10.1097/QAD.0000000000001803

Preexposure prophylaxis among men who have sex with men in the Amsterdam Cohort Studies: Use, eligibility, and intention to use
Coyer L, van Bilsen W, Bil J, Davidovich U, Hoornenborg E, Prins M, Matser A.
PLoS One. 2018 Oct 12;13(10):e0205663.

The effect of female sex on hepatitis C incidence among people who inject drugs: Results from Collaborative. the International Multicohort InC3
Esmaeili A, Mirzazadeh A, Morris MD, Hajarizadeh B, Sacks HS, et al. ; InC3 Collaborative.
Clin Infect Dis. 2018 Jan 6;66(1):20-28. doi: 10.1093/cid/cix768. MID:29020200.

Model projections on the impact of HCV treatment in the prevention of HCV transmission among people who inject drugs in Europe
Fraser H, Martin NK, Brummer-Korvenkontio H, Carrieri P, Dalgard O, et al.
J Hepatol. 2018 Mar;68(3):402-411.

Anal HPV 16 and 18 viral load: A comparison between HIV-negative and -positive MSM and association with persistence
Marra E, King A, van Logchem E, van der Weele P, Mooij SH, *et al.*
J Med Virol. 2018 Jan;90(1):76-83.

Incidence and clearance of anal high-risk HPV infection and their determinants among HIV-negative men who have sex with men over a period up to five-years
Marra E, Kovaleva A, Bruisten SM, Vermeulen W, Boyd A, Schim van der Loeff MF.
Clin Infect Dis. 2019 Apr 24;68(9):1556-1565. doi: 10.1093/cid/ciy738

Virological and serological predictors of anal high-grade squamous intraepithelial lesions among HIV-positive men who have sex with men
Marra E, Siegenbeek van Heukelom ML, Leeman A, Waterboer T, *et al.*
Clin Infect Dis. 2019 Apr 8;68(8):1377-1387. doi: 10.1093/cid/ciy719

Multiplex flow cytometry-based assay to study the breadth of antibody responses against E1E2 glycoproteins of hepatitis C virus
Merat SJ, van de Berg D, Bru C, Yasuda E, Breij E, *et al.*
J Immunol Methods. 2018 Mar;454:15-26.

Immunological and virological response to antiretroviral treatment in migrant and native men and women in Western Europe; is benefit equal for all?
Migrant Health Working Group for the Collaboration of Observational HIV Epidemiological Research in Europe (COHERE) in EuroCoord.
HIV Med. 2018 Jan;19(1):420-48.

Temporal trends of transmitted HIV drug resistance in a multinational seroconversion cohort
Olson A, Bannert N, Sönnerborg A, de Mendoza C, Price M, *et al.*; for CASCADE Collaboration in EuroCoord.
AIDS. 2018 Jan 14;32(2):161-169.

Systemic DPP4 activity is reduced during primary HIV-1 infection and is associated with intestinal RORC(+) CD4(+) cell levels: a surrogate marker candidate of HIV-induced intestinal damage
Ploquin MJ, Casrouge A, Madec Y, Noël N, Jacquelin B, *et al.*
J Int AIDS Soc. 2018 Jul;21(7):e25144. doi: 10.1002/jia2.25144.

Genomic variability of within-host hepatitis C variants in acute infection
Rodrigo C, Leung P, Lloyd AR, Bull RA, Luciani F, *et al.*; InC3 Collaborative.
J Viral Hepat. 2018 Dec 22.

DC-SIGN polymorphisms associate with risk of hepatitis C virus infection among men who have sex with men but not among injecting drug users
Steba GS, Koekkoek SM, Vanhommerig JW, Brinkman K, Kwa D, *et al.;* MSM Observational Study of Acute Infection with Hepatitis C (MOSAIC) Study Group and Amsterdam Cohort Studies (ACS).
J Infect Dis. 2018 Jan 17;217(3):353-357.

Predictors of CD4 cell recovery following initiation of antiretroviral therapy among HIV-1 positive patients with well-estimated dates of seroconversion
Stirrup OT, Copas AJ, Phillips AN, Gill MJ, Geskus RB, et al.; CASCADE Collaboration in EuroCoord.
HIV Med. 2018 Mar;19(3):184-194. doi: 10.1111/hiv.12567

Immunogenicity in rabbits of HIV-1 SOSIP trimers from clades A, B, and C, given individually, sequentially, or in combination
Torrents de la Peña A, de Taeye SW, Sliepen K, LaBranche CC, Burger JA, *et al.*
J Virol. 2018 Mar 28;92(8). pii: e01957-17. doi: 10.1128/JVI.01957-17. Print 2018 Apr 15.

Detection of incident anal high-risk HPV-DNA in MSM: Incidence or reactivation?
Twisk DE, van der Sande MAB, van Eeden A, Heideman DAM, van der Klis FRM, *et al.*
J Infect Dis. 2018 Aug 24;218(7):1018-1026.

Infection pressure in men who have sex with men and their suitability to donate blood
Van Bilsen WPH, Zaaijer HL, Matser A, Hurk KVD, Slot E, *et al.*
Clin Infect Dis. 2019 Mar 5;68(6):1001-1008. doi: 10.1093/cid/ciy596

The evolution of subtype B HIV-1 tat in the Netherlands during 1985-2012
van der Kuyl AC, Gall A, Vink M, Zorgdrager F, Binter S, *et al.*; BEEHIVE Collaboration.
Virus Research (2018) 250: 51-64. https://doi.org/10.1016/j.virusres.2018.04.008

High proportions of liver fibrosis and cirrhosis in an ageing population of people who use drugs in Amsterdam, the Netherlands
Van Santen DK, Schim van der Loeff MF, Cartier van Dissel J, Martens JPD, van der Valk M, Prins M.
J Gastroenterol Hepatol. 2018 Oct;30(10):1168-1176. doi:10.1097/MEG.0000000000001213

Easy and accurate reconstruction of whole HIV genomes from short-read sequence data
Wymant C, Blanquart F, Gall A, Bakker M, Bezemer D, *et al.*
Virus Evolution: 2018 May 18;4(1):vey007. doi: 10.1093/ve/vey007

Theses in 2018 that include ACS data

Daniëla van Santen – 4 May 2018: Epidemiological studies on viral (co)-infections: human immunodeficiency virus, hepatitis C virus, and human papillomavirus. Supervisor: Prof. M. Prins; co-supervisors: Dr. R. B. Geskus & Dr. J. J. van der Helm.

Wijnand van den Boom – 9 May 2018: Casual sex, risk and context. HIV risk-reduction strategies among men who have sex with men. Supervisors: Prof. M. Prins & Prof. T.G.M. Sandfort; co-supervisors: Dr. E. Davidovich & Dr. I. G. Stolte.

Alba Torrents de la Peña – 29 June 2018: Structure-based stabilization of HIV-1 trimer vaccines. Supervisors: Prof. B. Berkhout & Prof. R. W. Sanders.

Elske Marra – 7 September 2018: Anal HPV infection & disease: common, easy to prevent, hard to treat. Supervisors: Prof. H.J.C. de Vries & Prof. J.M. Prins; co-supervisor: Dr. M.F. Schim van der Loeff.