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What Is the Optimal Time to Retest Patients With a Urogenital Chlamydia Infection? A Randomized Controlled Trial

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Background: *Chlamydia trachomatis* is a common, often recurring sexually transmitted infection, with serious adverse outcomes in women. Current guidelines recommend retesting after a chlamydia infection, but the optimum timing is unknown. We assessed the optimal retest interval after urogenital chlamydia treatment.

Methods: A randomized controlled trial among urogenital chlamydia nucleic acid amplification test positive heterosexual clients of the Amsterdam sexually transmitted infection clinic. After treatment, patients were randomly assigned for retesting 8, 16, or 26 weeks later. Patients could choose to do this at home (and send a self-collected sample by mail) or at the clinic. Retest uptake and chlamydia positivity at follow-up were calculated.

Results: Between May 2012 and March 2013, 2253 patients were included (45% men; median age, 23 years; interquartile range, 21–26). The overall uptake proportion within 35 weeks after the initial visit was significantly higher in the 8-week group (77%) compared with the 16- and 26-week groups (67% and 64%, respectively, $P < 0.001$), and the positivity proportions among those retested were comparable ($P = 0.169$). The proportion of people with a diagnosed recurrent chlamydia infection among all randomized was similar between the groups ($n = 69$ [8.6%], $n = 52$ [7.4%], and $n = 69$ [9.3%]; $P = 0.4$).

Conclusions: Patients with a recent urogenital chlamydia are at high risk of recurrence of chlamydia and retesting them is an effective way of detecting chlamydia cases. We recommend inviting patients for a re-test 8 weeks after the initial diagnosis and treatment.

Chlamydia trachomatis (CT) is the most prevalent bacterial sexually transmitted infection (STI) worldwide¹ and is mostly

asymptomatic. Left untreated, chlamydia can have serious complications like pelvic inflammatory disease, ectopic pregnancy and infertility.² Reinfections can increase the probability of complications.³ Sexually transmitted infection clinic clients with a urogenital chlamydia infection have a high reinfection rate.^{4,5} Retesting can be an effective strategy to prevent onward transmission and late sequelae. National guidelines in several countries differ regarding the recommended timing of retesting of chlamydia, ranging from 3 to 12 months after initial diagnosis and treatment.^{6–10} Cohort studies regarding retesting have been inconclusive on the optimal timing.^{4,5} A modeling study estimated a peak in reinfections between 2 and 5 months.¹¹ Studies on the uptake of retesting often show a low uptake (range of reattendance between 17% and 89%).^{12,13}

At the Amsterdam STI clinic, chlamydia retest uptake within 35 weeks was 28% (678/2384), and retest positivity was 21% (142/678) among heterosexual clients testing urogenital chlamydia positive in 2010 (unpublished data). To our knowledge no randomized studies have been performed on the optimal timing of retesting, considering the effect on uptake and on the proportion of patients with reinfections.¹⁴ We postulated that the proportion being retested would be lower with a later timing of retest and that the proportion positive would be higher with a later timing of retest. If so, we envisioned an optimum timing to offer a retest, which would provide the highest yield of diagnosed reinfections. We tested this hypothesis in a parallel-group randomized controlled trial. We assessed the proportion uptake of chlamydia retesting and the proportion positive among patients assigned and invited to get retested, 8, 16, or 26 weeks after treatment.

MATERIALS AND METHODS

Study Setting and Study Population

The STI clinic of the Amsterdam Public Health Service in Amsterdam, the Netherlands, is a low-threshold clinic serving approximately 40,000 clients annually.¹⁵ Clients may attend the clinic anonymously, free of charge, and without referral by a medical doctor. Clients with at least one of the following indications were tested at the clinic: age, younger than 25 years, men who have sex with men, born in an STI or human immunodeficiency virus (HIV) endemic country, having received money and/or goods for sex, having paid for sex, 3 or more partners in the previous 6 months, reporting a sexual partner from an STI and HIV endemic country, notified by a sexual partner, or having STI-related symptoms (ie, symptoms the patient relates to having a possible STI). Clients younger than 25 years without any of the other abovementioned indications were routinely tested for chlamydia only, all other clients were routinely tested for chlamydia, gonorrhoea, and syphilis, and HIV using an opt-out strategy.¹⁶ For this study, all heterosexual patients of the Amsterdam STI clinic testing positive

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for urogenital chlamydia were included in the study between May 2012 and March 2013, and followed up through December 2013.

Randomization, Specimen Collection, and Testing Procedures

Patients with a positive urogenital CT nucleic acid amplification test were randomized for chlamydia retesting, either 8, 16, or 26 weeks after they received treatment, advised on partner notification, and counselled. The randomization procedure was automated within the electronic patient file, and the moment of clicking a button determined the randomization category, which switched invisibly every 2 seconds. After clicking, the randomization category appeared on the screen, and the patient was informed by the nurse when to expect an invitation for retesting. Patients were free to choose between 2 retest options: either collect a self-sample at home with a home collection kit (urine for men and vaginal swab for women), or return to the clinic for an on-site self-collected sample. Those who chose home collection received an email 7 days before the scheduled time of retest, informing them they would receive a self-collection kit within the next week, with a preaddressed return envelope. To those who chose to return to the clinic, an email with an open invitation was sent 7 days before the scheduled time of retest. Regardless of the chosen option, email and/or SMS reminders were sent 7 and 14 days after the scheduled retest time to all patients who failed to provide a retest sample at the planned date.

Urine samples and self-collected vaginal swabs were tested using the Tigris direct tube sampling system for the detection of CT rRNA (Hologic Inc., San Diego, Calif). When the retest result was available (approximately 7 days after providing the sample), patients received an online code to obtain their test result.

Statistical Analysis

Patients were included in the study only once. To assess determinants of choice for sample collection location (home collection versus clinic based collection), we performed univariable logistic regression analysis and examined the effect of the following variables: sex, age, ethnicity and assigned retest interval. Age was divided into 4 categories based on the median and interquartile range (IQR); ethnicity was divided into 2 categories (Dutch and non-Dutch). Variables that were associated with sample collection location at P values of 0.1 or less in the univariable analysis were entered into a multivariable model. We checked for interactions between age and sex in the final model.

For each individual, we used the results of their first retest after inclusion regardless whether this retest was at their chosen testing location. For each randomization group, we assessed the number, percentage, and chlamydia positivity proportion of those who: (A) returned more than 1 week before the assigned date, (B) returned at assigned date (this was defined as a visit in the period >1 week before, until 6 weeks after the assigned date), (C) returned >6 weeks after the assigned date but no later than 35 weeks (8 months) after inclusion, and (D) those who did not return within 35 weeks of inclusion. The primary outcomes were (1) the number and percentage retested and (2) the proportion CT positive of all included in the study arm. The Kaplan-Meier product limit method was used to estimate the cumulative probability of retesting up to 35 weeks after inclusion, stratified by randomization arm. Those who retested more than 35 weeks after inclusion or did not retest were censored at 35 weeks. Among those who retested CT positive up to 35 weeks, the median time to a positive retest was calculated.

To assess determinants of uptake of retesting till 35 weeks after the assigned date, we performed univariable logistic regression analysis and examined the effect of the following variables: sex, age, ethnicity, and assigned retest interval. Because the choice

of test location was influenced by assigned test interval, and may thus be on the causal pathway between assigned test interval and test uptake, we excluded chosen test location from the multivariable model. Variables that were associated with uptake of retesting at P values of 0.1 or less in the univariable analysis were entered into a multivariable model. We considered a P less than 0.05 as statistically significant. Analyses were performed with SPSS package version 21.0 (SPSS Inc., Chicago, Ill), STATA version 11.2 (College Station, Tex) and R version 3.2.2, logistf package (Vienna, Austria).¹⁷

Ethics Statement

The study was reviewed by the ethics committee of the Academic Medical Center, University of Amsterdam, the Netherlands. The board exempted the study from a full review and written patient consent because it was a modification of current practice and did not apply to the Dutch law "Medical Research Involving Human Subjects Act." The study was registered at the International Standard Randomized Controlled Trials under number ISRCTN12159453.

RESULTS

Study Population

Between May 2012 and March 2013, 25,840 consultations among 22,285 heterosexual clients were performed at the clinic. In 2867 consultations, urogenital chlamydia was diagnosed. We only included patients at their first positive chlamydia test. In total, 2253 patients were included of whom 45% were men, 75% had a Dutch ethnicity, and the median age was 23 years (IQR, 21–26; range, 14–66 years). Eight hundred five (36%), 703 (31%), and 745 (33%), respectively, were randomly scheduled to a retest after 8, 16, and 26 weeks (Table 1).

Preferred Testing Location

After randomization, patients chose their preferred retest location; 947 (42%) opted for the home collection kit and 1306 (58%) to reattend the clinic. Table 2 shows the univariable and multivariable logistic regression analyses of the determinants associated with home testing as the preferred choice for chlamydia retesting. In multivariable analysis, choosing home sample collection was significantly associated with female sex (odds ratio [OR], 1.25; 95% confidence interval [CI], 1.05–1.50), older age (OR, 2.12; 95% CI, 1.64–2.73 for those aged ≥ 26 years compared with those aged <21 years), Dutch ethnicity (OR, 1.90; 95% CI, 1.55–2.34 compared with non-Dutch ethnicity) and being assigned to the 8-week group (OR, 1.42; 95% CI, 1.16–1.76 compared with the 26-week group).

Uptake Proportions for Chlamydia Retesting

In total, 1572 (70%) patients retested within 35 weeks after inclusion, and retesting was significantly higher in the 8-week group ($n = 620$, 77%) compared with the 16-week group ($n = 474$, 67%, $P < 0.001$) and compared with the 26-week group ($n = 478$, 64%, $P < 0.001$). Figure 1 shows the cumulative probability of retesting up to 35 weeks after inclusion for each randomization group. The cumulative probability of retesting for the total group was 18.0% (95% CI, 16.5–19.6) at 8 weeks, 42.7% (95% CI, 40.7–44.8) at 16 weeks, 60.5% (95% CI, 58.4–62.5) at 26 weeks, and 69.0 (95% CI, 67.1–70.9) at 35 weeks.

In total, 1475 (65%) were retested prior, or up to 6 weeks after the assigned date of retesting, of whom 290 (13%) were retested earlier than 1 week before their scheduled retest. This occurred significantly more often in the 26-weeks group (22%) compared to the 16- (13%) and 8-week (5%) groups ($P < 0.001$;

TABLE 1. General Characteristics of Heterosexual Patients With Urogenital Chlamydia, by Assigned Retest Intervals, May 2012 to March 2013, STI Clinic Amsterdam, the Netherlands

| | Study Arm | | |
|----------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| | Assigned to Retest After 8 wk, n (%) | Assigned to Retest After 16 wk, n (%) | Assigned to Retest After 26 wk, n (%) |
| Total | 805 | 703 | 745 |
| Median age (IQR), y | 23 (21–27) | 23 (21–26) | 23 (21–26) |
| Sex | | | |
| Male | 358 (44.5) | 318 (45.2) | 338 (45.4) |
| Female | 447 (55.5) | 385 (54.8) | 407 (54.6) |
| Ethnicity | | | |
| Dutch | 595 (73.9) | 521 (74.1) | 563 (75.6) |
| Non-Dutch | 210 (26.1) | 182 (25.9) | 182 (24.4) |
| STI-related symptoms | | | |
| Yes | 292 (36.3) | 230 (32.7) | 266 (35.7) |
| No | 513 (63.7) | 473 (67.3) | 479 (64.3) |
| Notified for STI | | | |
| Yes | 214 (26.6) | 202 (28.7) | 212 (28.5) |
| No | 591 (73.4) | 501 (71.3) | 533 (71.5) |

Table 3A). Of the 160 patients in the 26-week group who returned before their assigned date, 101 (63%) retested within 16 weeks. The uptake proportion of retesting in the period 1 week or less before 6 weeks or less after the assigned date was significantly higher for patients assigned to the 8-week group (65%) compared with those assigned to the 16- (50%) and 26-week (42%) groups ($P < 0.001$ and $P < 0.001$, respectively). Among those who did not return up to 6 weeks after the assigned retest date the majority, 185 (75%), 229 (89%), and 267 (97%) in the 8-, 16-, and 26-week groups, respectively, did not return at all up to 35 weeks after study inclusion ($P < 0.001$). A small proportion did return more than 6 weeks after the assigned retest date but 35 weeks or less after study inclusion, ranging between 61 (8%) in the 8-week group and 7 (1%) in the 26-week group ($P < 0.001$).

Positivity Proportions for Chlamydia Retesting

Of 1572 patients who provided a retest sample, 7 had a missing or invalid test result, and test results were available for 1565 (99.6%). The proportion CT positives in the period from inclusion till 35 weeks was 11%, 11% and 14% for the 8-, 16- and 26-week groups, respectively, and this did not differ significantly

between the groups ($P = 0.169$). In the period from inclusion till 35 weeks among those with a positive retest, the median time to a positive retest was 8.0 weeks (IQR, 7.6–10.9 weeks) for patients assigned to the 8-week group and 16.0 weeks (IQR, 15.4–17.3 weeks), and 23.4 (IQR, 12.9–26.7 weeks) for those assigned to the 16- and 26-week groups, respectively ($P < 0.001$).

In the period 1 week or less before to 6 weeks or less after the assigned date (8, 16 or 26 weeks), the proportion CT positives was 9%, 9% and 11%, respectively, and did not differ significantly between the groups ($P = 0.617$; Table 3B). Among those who returned more than 6 weeks after the assigned date up to 35 weeks after study inclusion, the proportion CT positives did not significantly differ between the groups ($P = 0.305$), whereas among those who returned more than 1 week before their assigned date, the proportion CT positives was significantly higher in the 8-week group (38%) compared with the 16-week (13%) and 26-week (23%) groups ($P = 0.007$).

STI-Related Symptoms

At study inclusion, 788 (35%) reported STI-related symptoms. Upon return, 110 (38%) of those who returned more than

TABLE 2. Univariable and Multivariable Logistic Regression Analyses of Determinants Associated With Preference of Chlamydia Retest Collection Location (Home vs Clinic-based Collection) Among Heterosexual Patients With Urogenital Chlamydia at the STI Clinic in Amsterdam, the Netherlands, May 2012 to December 2013

| | Preferred Home Testing n/N (%) | Univariable OR (95% CI) | P | Multivariable Adjusted OR (95% CI) | P |
|--|--------------------------------|-------------------------|--------|------------------------------------|--------|
| Sex | | | 0.099 | | 0.015 |
| Male | 407/1014 (40.1) | 1 | | 1 | |
| Female | 540/1239 (43.6) | 1.15 (0.97–1.36) | | 1.25 (1.05–1.50) | |
| Age, y | | | <0.001 | | <0.001 |
| < 21 | 171/534 (32.0) | 1 | | 1 | |
| 21–22 | 213/472 (45.1) | 1.75 (1.35–2.26) | | 1.80 (1.39–2.33) | |
| 23–25 | 258/565 (45.7) | 1.78 (1.40–2.28) | | 1.93 (1.50–2.48) | |
| ≥ 26 | 305/682 (44.7) | 1.72 (1.36–2.18) | | 2.12 (1.64–2.73) | |
| Ethnicity | | | <0.001 | | <0.001 |
| Non-Dutch | 183/574 (31.9) | 1 | | 1 | |
| Dutch | 764/1679 (45.5) | 1.78 (1.46–2.18) | | 1.90 (1.55–2.34) | |
| Assigned retest interval after chlamydia infection | | | 0.004 | | 0.004 |
| 8 wk | 371/805 (46.1) | 1.41 (1.15–1.73) | | 1.42 (1.16–1.76) | |
| 16 wk | 295/703 (42.0) | 1.19 (0.97–1.47) | | 1.22 (0.98–1.51) | |
| 26 wk | 281/745 (37.7) | 1 | | 1 | |

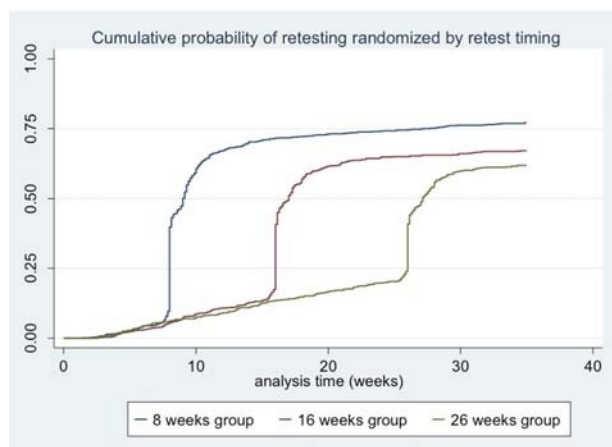


Figure 1. Cumulative probability of retesting up to 35 weeks after inclusion, by randomization group.

1 week before the assigned date and 35 (36.1%) of those who returned more than 6 weeks after the assigned date up to 35 weeks after study inclusion reported STI-related symptoms ($P = 0.745$). STI-related symptoms did not significantly differ between those included in the 8-week group (51%) and those in the 16-week (34%) and 26-week (37%) groups, respectively, among those who returned more than 1 week before the assigned date ($P = 0.183$). Of those who returned 1 week or less before to 6 weeks or less after the assigned date, only 21 (2%) reported STI-related symptoms, which did not differ significantly between the randomization groups ($P = 0.428$).

Determinants for Uptake of Testing

Table 4 shows the univariable and multivariable logistic regression analyses of determinants associated with chlamydia retesting through 35 weeks after assigned date. In multivariable analysis, retesting was significantly associated with the female sex (OR, 1.73; 95% CI, 1.42–2.09), older age (OR, 1.46; 95% CI, 1.11–1.93 for those aged 21–22 years, compared with <21 years), Dutch ethnicity (OR, 1.43; 95% CI, 1.16–1.76 compared with non-Dutch ethnicity), and earlier assigned retest interval (OR, 1.90; 95% CI, 1.51–2.37 for the 8-week group compared with the 26-week group).

Subgroup Analysis

We performed several subgroup analyses. When only including patients younger than 25 years, similar results in the primary

outcomes were found compared to the main results (supplemental digital content table 1A, 1B, 2A, 2B, <http://links.lww.com/OLQ/A195>). When we analyzed men and women separately, we found that in the period from inclusion through 35 weeks, the uptake proportion of retesting did not significantly differ between men and women in each randomization group ($P = 0.550$). The proportion CT-positive men was significantly higher compared with women in this period for those assigned to the 8-week group (16% and 8%, respectively; $P = 0.002$), but not for those assigned to the 16-week group (13% and 10%, respectively; $P = 0.258$) and 26-week group (18% and 12%, respectively; $P = 0.059$) (supplemental digital content table 3A, 3B, 4A, 4B, <http://links.lww.com/OLQ/A195>).

DISCUSSION

To our knowledge, this is the first randomized clinical trial on the optimal timing of retesting, considering its effect on uptake and diagnosed reinfections. We show that inviting STI clinic urogenital CT patients to retest for chlamydia is a feasible strategy to identify reinfections. The retest uptake was high, and among those who retested up to 35 weeks after the treatment visit, the positivity proportion was substantial, between 11% and 15%. Because the risk of reinfection is partly determined by the length of the period of exposure, we expected that the positivity proportion would increase with increasing time to retest. Yet, the positivity proportion did not differ significantly between the randomization groups. On the other hand, we anticipated that the invitation time for retesting would be negatively correlated with the uptake proportion. This was confirmed, the uptake proportion decreased with a later invitation time for retesting and was lowest among patients assigned to the 26-week group. The uptake proportion within 35 weeks after the initial visit was 77% in the 8-week group and 64% in the 26-week group. However, even in the 26-week groups, the uptake was considerable compared with 28% uptake of retesting in the same clinic in the year before this study (unpublished data). The median time to actual retest was significantly shorter in the 8-week group compared with the 16- and 26-week groups. We consider 8 weeks the optimal time for an invitation to retest for urogenital chlamydia because this group showed the highest uptake proportion, whereas the median time to retest was shortest and patients had a comparable positivity proportion compared to the 16- and 26-week groups. Moreover, 22% of patients scheduled in the 26-week group retested less than 1 week before their assigned retest moment, indicating that this may be too long.

National guidelines in several countries differ regarding the recommended timing of retesting varying from 3 to 12 months after the initial positive result^{6–9} and also differ regarding the appropriate target population. For example, the UK national guideline

TABLE 3A. Uptake of Retesting Among Patients Assigned to One of 3 Retest Intervals, Study Period May 2012 to December 2013, Sexually Transmitted Infections Clinic Amsterdam, the Netherlands

| | | Assigned to Retest After 8 wk | Assigned to Retest After 16 wk | Assigned to Retest After 26 wk | Total |
|-----------|---|----------------------------------|-----------------------------------|-----------------------------------|-------------|
| | | n (%) | n (%) | n (%) | N (%) |
| Total | | 805 | 703 | 745 | 2253 |
| A | Returned > 1 week before assigned date | 37 (4.6) | 93 (13.2) | 160 (21.5) | 290 (12.9) |
| B | Returned ≤ 1 week before to ≤ 6 weeks after assigned date | 522 (64.8) | 352 (50.1) | 311 (41.7) | 1185 (52.6) |
| C | Returned > 6 weeks after assigned date up to 35 weeks after study inclusion | 61 (7.6) | 29 (4.1) | 7 (0.9) | 97 (4.3) |
| D | Did not return ≤ 35 weeks after study inclusion | 185 (23.0) | 229 (32.6) | 267 (35.8) | 681 (30.1) |
| A + B + C | | 620 (77.0) | 474 (67.4) | 478 (64.2) | 1572 (69.8) |

* P value of categories A, B, C, D.

TABLE 3B. Proportion of Patients Positive for *Chlamydia trachomatis* by Assigned Retest Interval, Study Period May 2012 to December 2013, Sexually Transmitted Infections Clinic Amsterdam, the Netherlands

| | | Assigned to Retest | Assigned to Retest | Assigned to Retest | P | Total N (%) |
|--|---|---------------------|----------------------|----------------------|-------|-----------------|
| | | After 8 wk n (%) | After 16 wk n (%) | After 26 wk n (%) | | |
| Total of all included in the study arm | | 69/805 (8.6) | 52/703 (7.4) | 69/745 (9.3) | 0.436 | 190/2253 (8.4) |
| A | Returned > 1 wk before assigned date | 14/37 (37.8) | 12/92 (13.0) | 36/160 (22.5) | 0.007 | 62/289 (21.5) |
| B | Returned ≤ 1 wk before to ≤6 wk after assigned date | 45/522 (8.6) | 33/349 (9.5) | 33/309 (10.7) | 0.617 | 111/1180 (9.4) |
| C | Returned > 6 wk after assigned date up to 35 wk after study inclusion | 10/90 (16.7) | 7/29 (24.1) | 0/7 (0.0) | 0.305 | 17/96 (17.7) |
| | Total of all retested <35 wk | 69/619 (11.1) | 52/470 (11.1) | 69/476 (14.5) | 0.169 | 190/1565 (12.1) |

In total, 7 patients had a missing or invalid CT test result; therefore, some denominators are smaller than the number of patients with retest uptake.

restricts retesting to young patients under the age of 25 years due to lack of sufficient evidence for retesting patients over 25 years.⁹ We did subgroup analyses by sex and age and observed that the uptake proportion and positivity proportion were comparable between patients younger and older than 25 years. Therefore, we recommend that retesting should not be restricted to young patients only.

A limitation of this study is that we did not collect data on sexual behavior, or partner change, nor did we verify partner treatment between the initial test and retest, so we cannot assess retesting rates in subgroups defined by perceived risk for reinfection. Moreover, we did not include a randomization group of 3 months (12 weeks), although this cutoff point is used in several guidelines^{8,10} and might be a suitable interval for retesting. Because the uptake decreased with prolonged retest intervals and was significantly lower in the 16-week retest group compared with the 8-week group, we advice to invite for a retest to be done no later than 3 months after treatment. On the other hand, the optimal time to detect new infections rather than to detect nonviable material from the initial infection has been debated. A retest of at least 8 weeks after initial diagnosis and treatment has therefore been recommended.¹⁸ In addition, prevention of reinfection by effective partner notification and education to minimize chlamydia infections remain paramount.

Lastly, since this study was performed in a STI clinic setting in the Netherlands serving a high-risk population, the results might not be generalizable to lower risk populations and other regions.

Compared with previously described efforts to retest chlamydia-positive STI clinic clients,^{13,19} we found a high overall retest uptake (70%), especially when the time to invited retest was short (8 weeks). As opposed to these previous studies, in which patients were not offered a choice between self-sampling at home or sampling at the clinic, we offered patients a choice regarding the location of sample collection (home-based vs clinic-based) and in addition, email and/or SMS reminders were sent. This might explain the high uptake in our setting. Of note, the choice for sample collection location was made after patients were told their scheduled retest date. It is of interest that patients assigned to a shorter interval time to retest more often preferred home collection.

In conclusion, this clinical trial regarding the optimal timing of retesting, invitation for retesting 8 weeks after initial treatment appears the optimal time to retest heterosexual patients after initial diagnosis and treatment of urogenital chlamydia infection. Patients assigned to the 8-week group showed the highest uptake proportion, whereas the median time to retest was shortest, and patients had a comparable positivity proportion compared with the 16- and 26-week groups.

TABLE 4. Univariable and Multivariable Logistic Regression Analyses of Determinants Associated With Uptake of Chlamydia Retesting Among Heterosexual Patients With Urogenital Chlamydia; Retested Till 35 Weeks After Treatment Versus not Retested Within 35 Weeks; at the STI Clinic Amsterdam, the Netherlands, May 2012 to December 2013

| | n/N (%) | Univariable OR (95% CI) | P | Multivariable Adjusted OR (95% CI) | P |
|--|------------------|----------------------------|--------|---------------------------------------|--------|
| Sex | | | <0.001 | | <0.001 |
| Male | 646/1014 (63.7) | 1 | | 1 | |
| Female | 926/1239 (74.7) | 1.69 (1.41–2.02) | | 1.73 (1.42–2.09) | |
| Age, y | | | 0.043 | | 0.013 |
| < 21 | 356/534 (66.7) | 1 | | 1 | |
| 21–22 | 346/472 (73.3) | 1.37 (1.05–1.80) | | 1.46 (1.11–1.93) | |
| 23–25 | 408/565 (72.2) | 1.30 (1.00–1.68) | | 1.48 (1.13–1.93) | |
| ≥ 26 | 462/682 (67.7) | 1.05 (0.83–1.34) | | 1.37 (1.05–1.77) | |
| Ethnicity | | | <0.001 | | 0.001 |
| Non-Dutch | 364/574 (63.4) | 1 | | 1 | |
| Dutch | 1208/1679 (71.9) | 1.48 (1.21–1.81) | | 1.43 (1.16–1.76) | |
| Assigned retest interval after chlamydia infection | | | <0.001 | | <0.001 |
| 8 wk | 620/805 (77.0) | 1.87 (1.50–2.34) | | 1.90 (1.51–2.37) | |
| 16 wk | 474/703 (67.4) | 1.16 (0.93–1.44) | | 1.17 (0.94–1.46) | |
| 26 wk | 478/745 (64.2) | 1 | | 1 | |

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