National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

The impact of COVID-19 and associated measures on STI transmission: chlamydia & gonorrhoea among MSM

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National Institute of Public Health & Environment (RIVM)

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Background

Some of the "side-effects" of COVID-19 pandemic:

- Restrictive measures aiming to reduce COVID-19 transmission
- Perceived threat of COVID-19 & fear to contract COVID-19
- Personnel, facilities, materials devoted to COVID-19 care

- Resulting in:
  - Reductions in numbers of sex partners & sex contacts
    →Reduced STI transmission
  - Major disruption in STI care: STI consultations reduced by 80% in Apr 2020, by 20% in Sept 2020
    →Increased STI transmission

Aim: *To assess whether the indirect effects of the COVID-19 pandemic have led to reduced or increased STI transmission, using a mathematical model.*

Methods

- Model
  - Pair-formation model with two types of casual partners
  - Transmission of C. trachomatis (CT) & N. gonorrhoeae (NG)
- CT & NG:
  - Anogenital infections, symptomatic or asymptomatic
  - After natural recovery or treatment, again susceptible
- Partnerships:
  - Main, one-time casual, short-term casual
  - Different sex frequency & condom use per type of partner
- Low-activity and high-activity MSM:
  - Different numbers of partners, sex frequency, testing rates

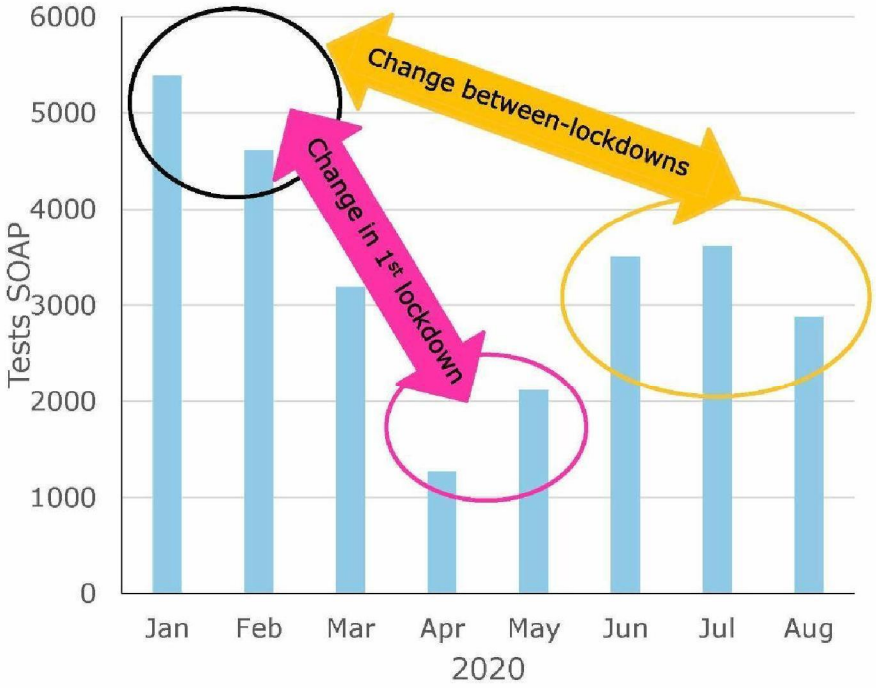
Methods: Time periods

Time periods in the model based on course of COVID-19 pandemic, the related measures in the Netherlands, and how these affected sex behavior & testing:

- Before COVID-19 (until mid-March 2020)
- During COVID-19 pandemic (mid March 2020 - end Aug 2021)
  - 1st lockdown: mid March – end May 2020
  - Between-lockdowns: June – mid Oct 2020
  - 2nd lockdown: mid Oct 2020 – end Feb 2021
  - After-lockdowns: Mar – Aug 2021
- After COVID-19 (from September 2021 onwards)
  - Hypothesized levels of sex behavior & testing "returned" to levels before COVID-19

Changes in sexual behavior & testing with magnitude similar to strictness of measures

Methods: Changes in STI testing



Decline in testing:

MSM with symptoms:
50%, during 1st lockdown;
10%, between-lockdowns;
20%, during 2nd lockdown;
10%, post-lockdown.

MSM without symptoms:
80%, during 1st lockdown;
35%, between-lockdowns;
50%, during 2nd lockdown;
20%, post-lockdown.

Number of tests from National database of STI clinics in the Netherlands (SOAP); personal communication with 5.1.2e 5.1.2e 5.1.2e (RIVM).

Methods: changes in numbers of casual partners

COVID-19, Sex, and Intimacy Survey (CSIS)

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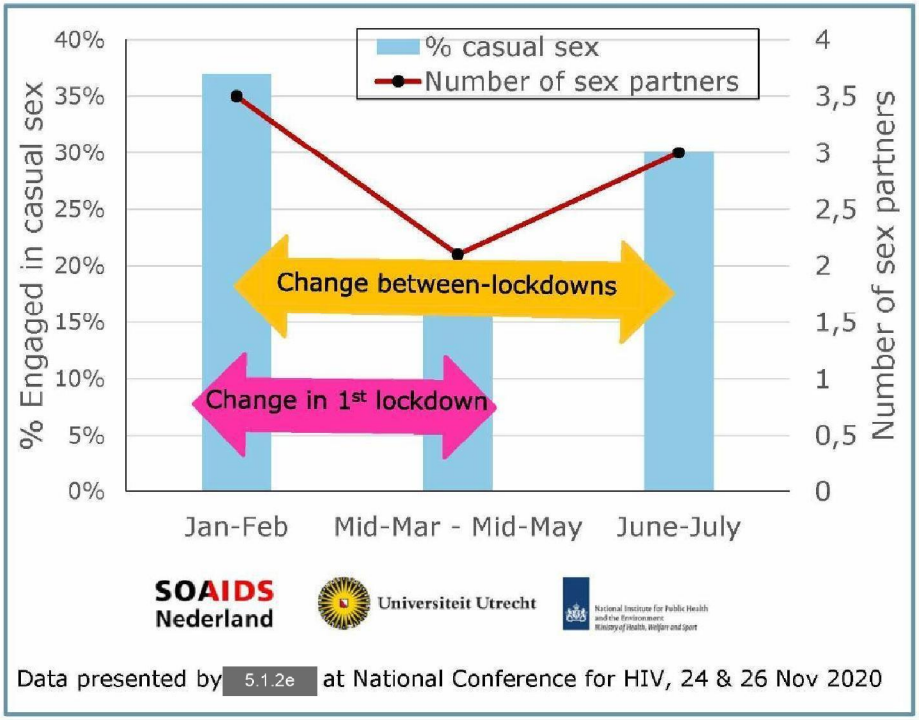


Data presented by 5.1.2e at National Conference for HIV, 24 & 26 Nov 2020

In the model:

Small decline in number of casual partners (based on COVID-19, Sex, & Intimacy Survey, Jan-July 2020):
20-30%, during 1st lockdown;
0-10%, between-lockdowns;
15-25%, during 2nd lockdown;
0-10%, post-lockdown.

Large decline in number of casual partners:
40-60%, during 1st lockdown;
10-30%, between-lockdowns;
35-55%, during 2nd lockdown;
10-30%, post-lockdown

Methods: changes relating to main partnerships

Parameter	Change in parameter, compared to its value before COVID-19			
	1st lockdown	Between-lockdowns	2nd lockdown	Post-lockdown
	13 Mar – 31 May 2020	1 Jun – 13 Oct 2020	14 Oct 2020 – 28 Feb 2021	1 Mar – 31 Aug 2021
Sex frequency between main partners	+25%	+10%	+20%	+10%
Number new main partners per month	-75%	-10%	-70%	-10%

Methods

Percentage change in prevalence in a specific year

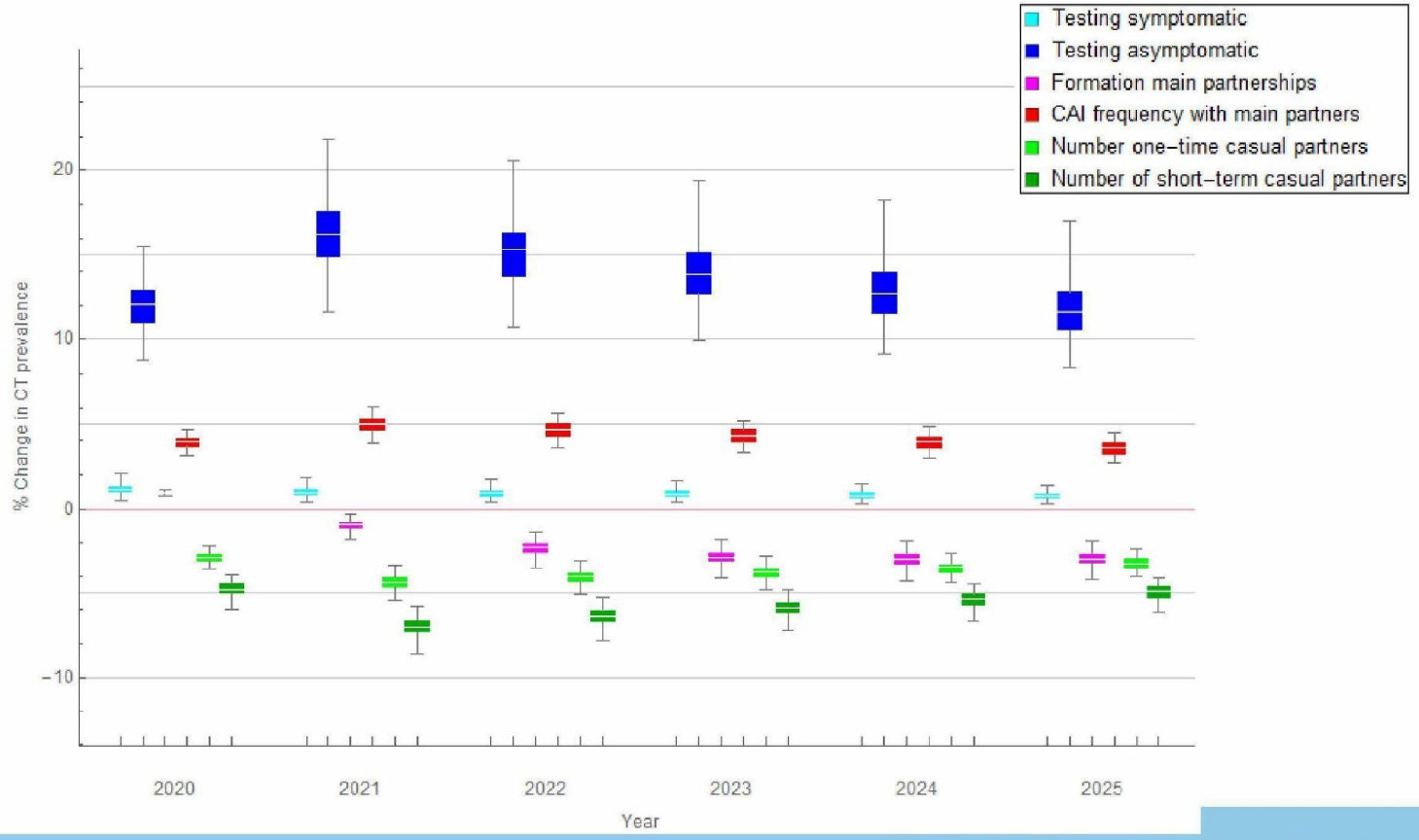
= 100*[F(t)-C(t)]/F(t), where

F(t)=prevalence at the end of year t, without COVID-19

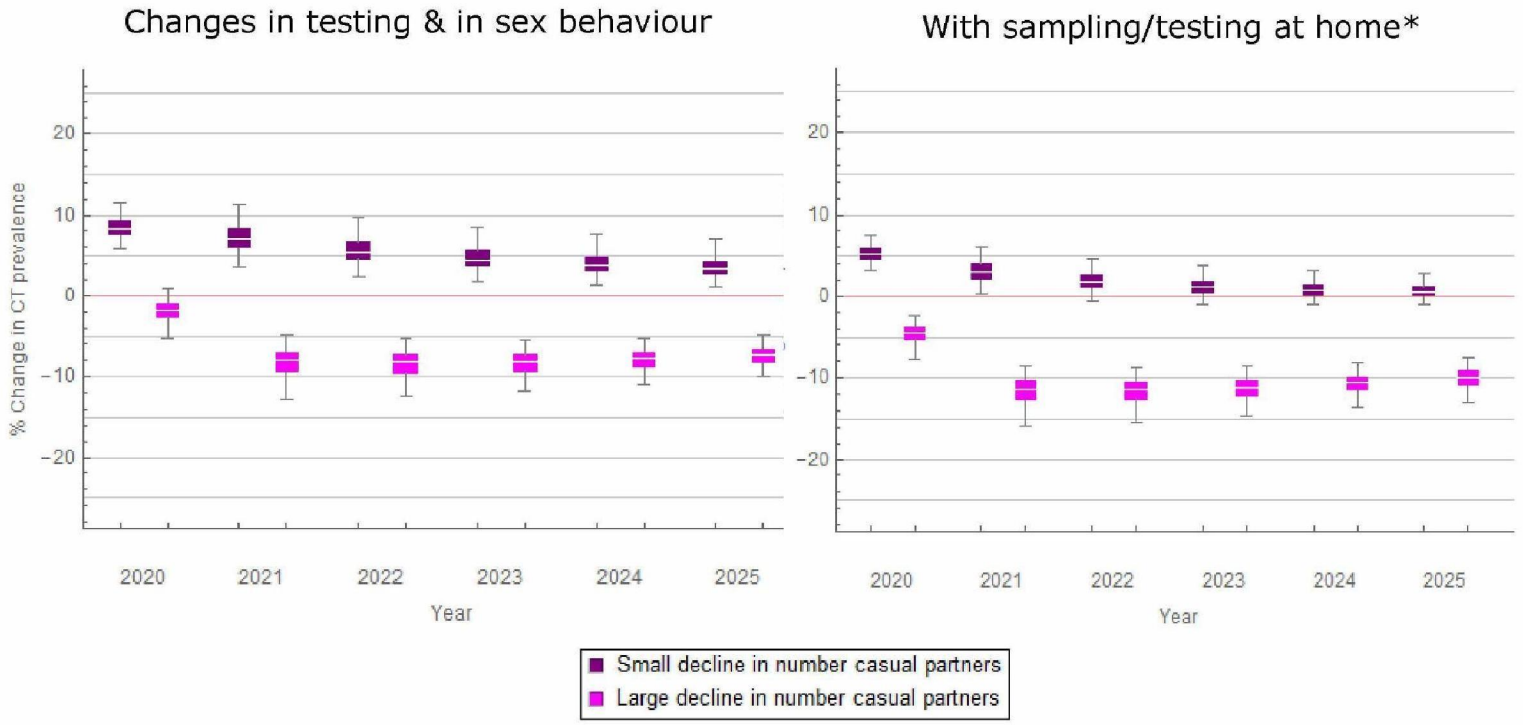
C(t)=prevalence at the end of year t, with COVID-19

Results: chlamydia

Impact of individual changes on chlamydia prevalence

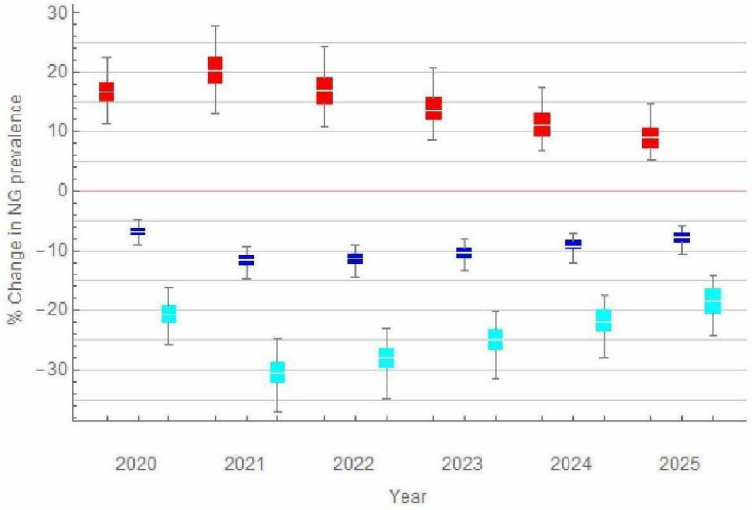


Results: chlamydia

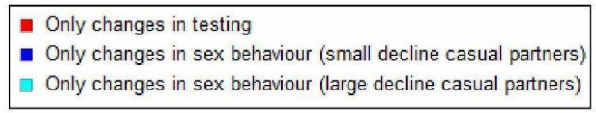


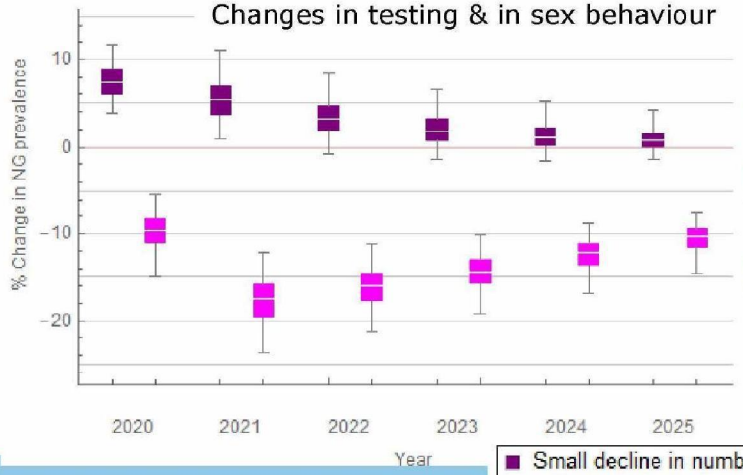
* A quarter of the tests not carried out at STI clinics or GPs were carried out elsewhere (home sampling/testing)

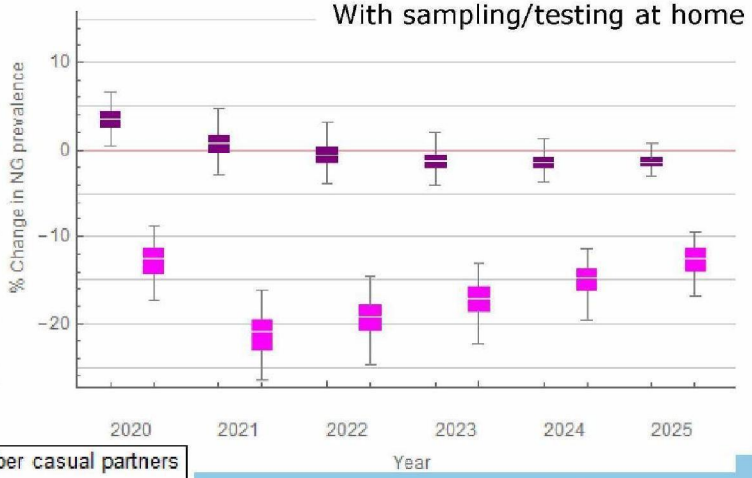
Results: gonorrhoea

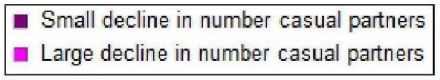


Only changes in testing or only changes in sexual behavior





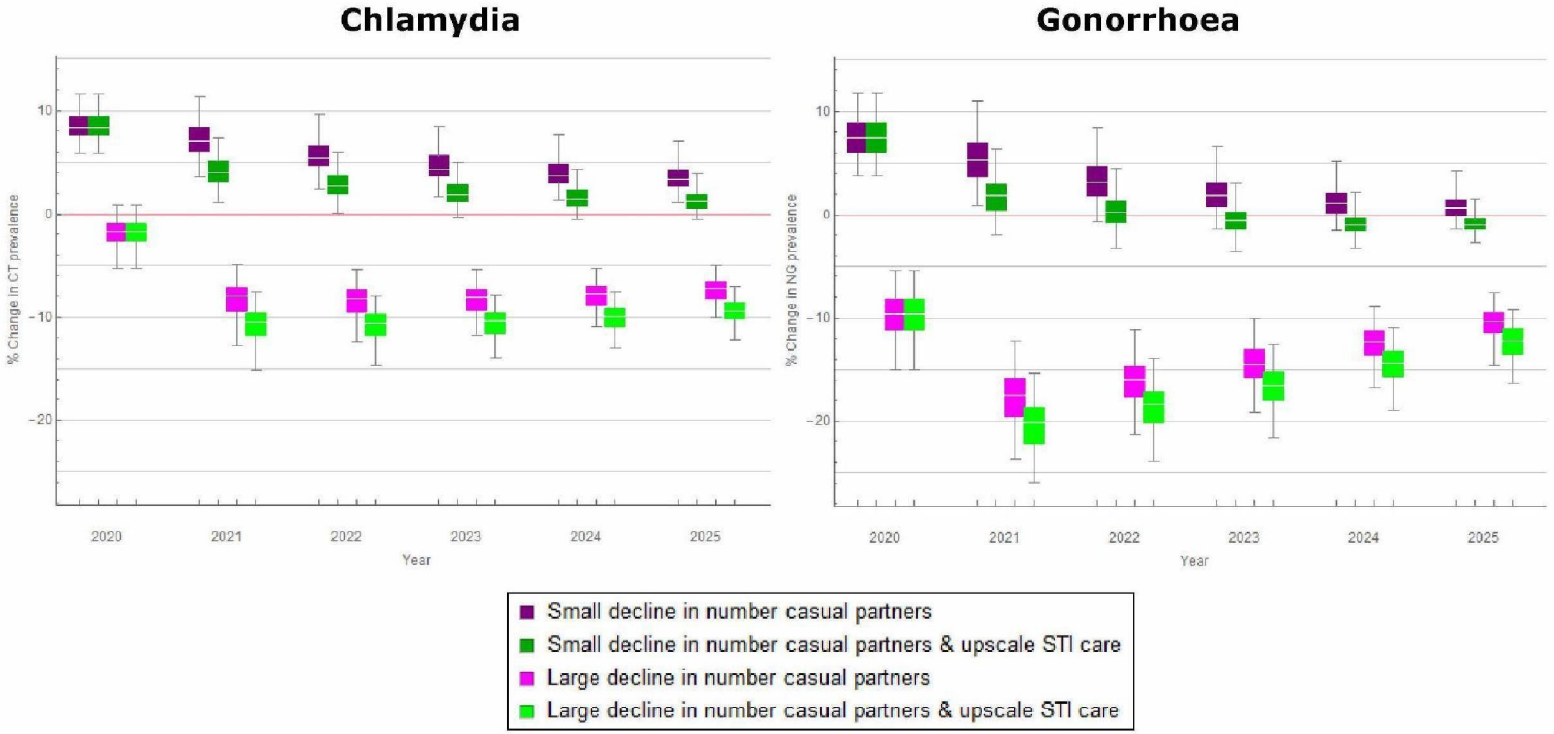




Results

Upscale STI care in March 2021

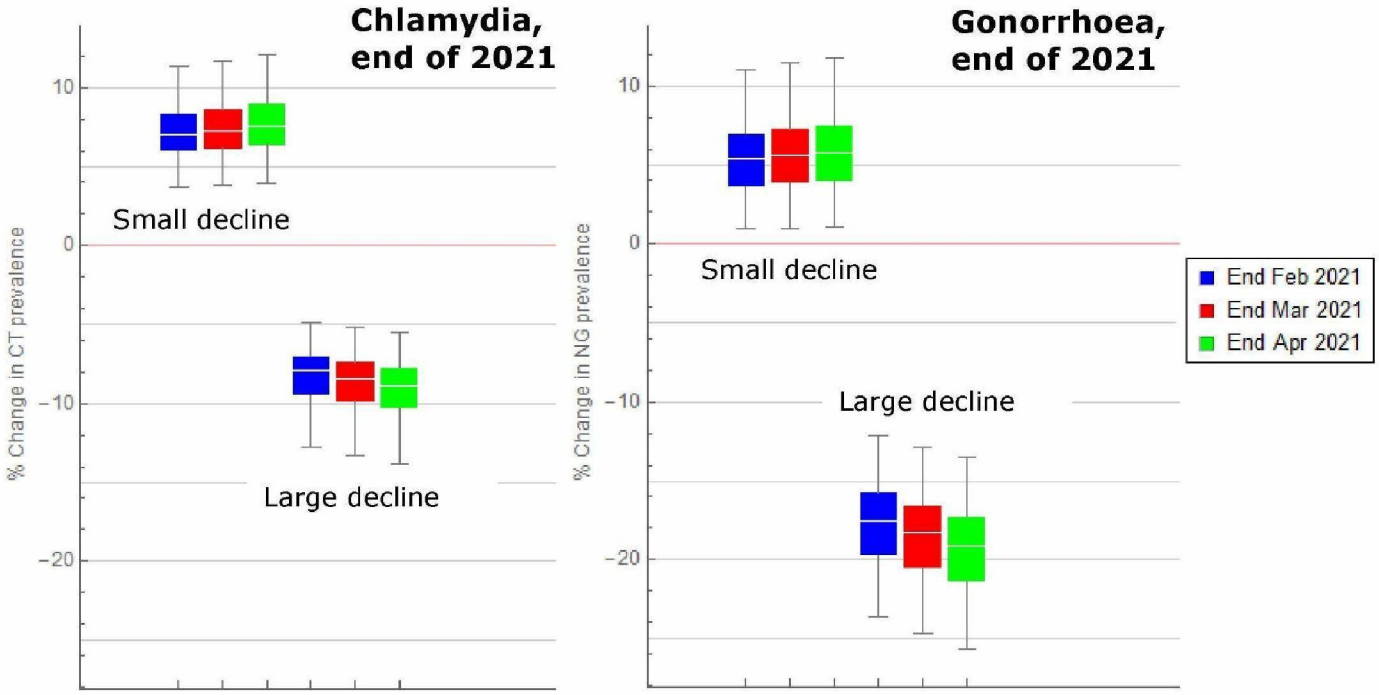
STI testing rates after March 1, 2021 are as before COVID-19



Results

Extension of 2nd lockdown

Assuming 2nd lockdown extended until end of February, March or April 2021



Discussion

- Seasonality in sexual behavior may explain part of the difference in number of casual partners in data Mar-Jul 2020 vs. Jan-Feb 2020
- Unknown:
  - No data for sexual behavior and STI testing after August 2020
  - No data relating to formation and dissolution of main partnerships or sex frequency within main relationships.
  - Unknown when the 2nd lockdown will end
  - Unknown whether & when sexual behaviors and testing will return to levels similar to those before COVID-19 pandemic
- Age or other medical factors indicating high risk for COVID-19 complications were not taken into consideration.

Conclusions

- Decrease in number of casual partner:
  - Small -> increase in CT and NG prevalence
  - Large -> decrease in CT and NG prevalence
  - Changes in prevalence at least 4 years after end of COVID-19 measures
- If home-testing replaced some of the tests that were not carried out at healthcare facilities, the increase in CT & NG prevalence may be reversed 2-3 years after the end of the measures
- Upscaling STI care from March 1, 2021 (to levels as before COVID-19) can limit the increases in prevalence

Acknowledgements

RIVM

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U. Utrecht & UNSW Sydney

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Thank you