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Title:

What do diagnoses of pelvic inflammatory disease in specialist sexual health services in England tell us about chlamydia control?

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ABSTRACT

Background. Pelvic inflammatory disease (PID) is an outcome measure for the evaluation of chlamydia screening programmes. We explore PID diagnoses in specialist sexual health services (SSHS) in England to inform the evaluation of the national chlamydia screening programme (NCSP), which was implemented nationally in 2008.

Methods. We conducted descriptive analyses using data on diagnoses of PID- with and without chlamydia (CT) and/or gonorrhoea (GC)- by age and year of birth, in SSHS between 2009 and 2019 from the GUMCAD database. Rates were calculated per 100,000 females residing in England.

Results. CT screening activity peaked in 2010. The rates of all PID diagnoses decreased between 2009-2019 by 39%. CT-associated PID (CT-PID) declined by 58%, and non-specific PID declined by 37%. GC-PID increased by 34%. CT-PID decreased across all age groups with the highest observed decline, 71%, in 15 to 19-year olds. A dose response relationship was observed between CT-PID rates and screening, with rates lowest in those with the greatest exposure to screening.

Discussion. There was a marked decline in diagnoses of CT-PID, and non-specific PID, at SSHS after the introduction of wide-spread chlamydia screening, whilst GC-PID diagnoses increased. This ecological trend was broadly consistent with what we would have expected to see if widespread screening reduced the incidence of chlamydia-associated PID (and of non-specific PID), as has been observed in randomised controlled trails of screening.

Keywords: chlamydia, chlamydia screening, pelvic inflammatory disease, surveillance.

BACKGROUND:

The National Chlamydia Screening Programme (NCSP) was established in England in 2003 and nationally implemented by 2008 with the aim of controlling chlamydia in young, sexually-active people, where incidence was known to be higher. Together with the introduction of nucleic acid amplification testing (NAAT) technologies from 2003, this resulted in large increases in chlamydia screening and diagnoses: 2.3 million tests were reported in 2010 among 15 to 24 year-olds, equivalent to 44% of females and 24% of males in this age group, if only one test per person.

Pelvic inflammatory disease (PID) encompasses a range of upper genital tract inflammatory disorders in females that result from the spread of microorganisms from the lower to the upper genital tract.[1, 2] Genital infection with *Chlamydia trachomatis* (CT) is one of the principle causes of PID and has been estimated to account for around 35% of cases in females aged 16-24 years decreasing to around 11% in females aged 25-44 years in England.[1-3] Other sexually transmitted infections (STI) which can cause PID include *Neisseria gonorrhoeae* (GC) and *Mycoplasma genitalium.*[1, 2, 4, 5] The importance of PID as an outcome measure for the evaluation of STI control lies not only in its direct impact on health, but also as a precursor of more serious conditions including ectopic pregnancy and infertility.[1, 2, 6] However as the proportion of PID caused by chlamydia decreases with age, changes in all cause PID, which is what is usually reported nationally, tells us little about the effectiveness of chlamydia control programmes.[3, 7]

In England, females with PID can present to primary care, hospital or specialist genitourinary medicine (GUM) and integrated GUM/Sexual and Reproductive Health (SRH)) sexual health services (SSHSs).[3, 6] While it is unclear what proportion of females with PID are diagnosed at SSHs, these services are available free of charge to all females at risk of STIs.[3, 6] Attendance at SSHS increased year on year particularly among asymptomatic males and females requesting screening. It is unknown if this could affect access by symptomatic females. We explore available data about PID diagnoses and associated infections in SSHSs in England to inform evaluation of chlamydia screening.

METHODS:

Data source

We used data from the GUMCAD STI Surveillance System (GUMCAD), the national STI surveillance system in England. It is a pseudo-anonymised patient-level dataset that includes information on all attendances, tests and diagnoses at SSHS in England. Each attendance is reported with demographic information including age, gender, sexual orientation, ethnicity and patient area of residence. Patient records can be linked within, but not across clinics, using a clinic patient number that is unique to each individual.[8, 9]

We included data on all diagnoses of PID- with and without CT and/or GC-, of bacterial vaginosis and of anogenital candidosis made at SSHSs between 2009 and 2019. Counts and rates of diagnoses were calculated for 15 to 34-year olds in five-year age groups, for females only.

Validation and data management

To explore the potential effect of changes in access to (or use of) SSHS over this time, we used data on the total number of female attendances and changes in diagnoses of vaginosis/vaginitis (bacterial vaginosis and candidosis). This measure was chosen as a symptomatic clinical presentation with no active control programme, with the assumption that the frequency of these conditions in the population is relatively stable, and therefore likely – we proposed - reflective of variations in service use for symptomatic conditions. Attendances were used as a measure of access for symptomatic and asymptomatic care.

To investigate the potential impact of changes in service use, indicated by attendance for symptomatic conditions with stable epidemiology, the ratio of CT PID and non-specific PID to any vaginosis/itis diagnoses was calculated.

Individuals who had a diagnosis of non-specific PID and CT on the same day were considered to have CT-associated PID (herein referred to as CT-PID), and those who had a diagnosis of non-specific PID and GC were considered to have GC-PID. PID codes were de-duplicated with a patient only able to have one diagnosis of PID in a 42 day period reflecting the standard duration of an episode of care in SSHS [8, 10]; if there were multiple codes within a 42 day period then a CT/GC PID diagnosis was kept over any non-specific PID diagnosis, and a GC-PID coding was kept over a CT-PID coding.

Chlamydia screening activity data

Pre-2012, community (non-SHSS) chlamydia tests and diagnoses in England were reported using two systems; the NCSP core data return and an aggregate laboratory reporting system. In 2012, these two data sources were replaced by a single laboratory reporting system, the Chlamydia Testing Activity Dataset (CTAD). CTAD now provides detailed reports at national and local levels on chlamydia screening activity in 15-to-24-year olds. Data were extracted for 2009-2019 to show trends in this wider screening activity alongside testing data from SSHS.

Population data

Rates were calculated per 100,000 females residing in England using Office for National Statistics (ONS) mid-year population estimates as denominators.[11]

Birth cohorts

To evaluate the dose response relationship between PID and chlamydia screening, birth-cohort groupings were defined by exposure to widespread screening through the NCSP. The groups were defined as:

- Full exposure: females aged 10 years old or less in 2008 (born after 1997) who should have had the greatest access to screening since sexual debut.

- High exposure: females aged 16 years old or less in 2008 (born between 1992 and 1997) who should have had good access to screening since sexual debut.
- Partial exposure: females aged between 17 and 20 years in 2008 (born between 1988 and 1991) who should have had some access to screening whilst under 20.
- Low exposure: females aged between 21 and 24 years in 2008 (born between 1984 and 1987), who should have had access to screening over 20 years of age.
- Very Low exposure: females aged more than 24 years in 2008 (born between 1976 and 1983), who would only have had access to screening during the initial roll-out phase of the NCSP (from 2003).
- No exposure: females aged more than 33 years in 2008 (born between 1965 and 1975) who would have reached 24 years before any screening was offered through the NCSP.

RESULTS:

Changes in chlamydia testing activity in England

Testing activity in 15-to-24-year olds varied over the time period (2009-2019) with a peak in testing seen in 2010 of around 2.3 million tests. Subsequent years saw a decline with 1.3 million tests recorded in 2019; a 39% decline since 2010. Data by gender were available since 2012 and the percentage decline since 2012 was greater in males than females, 35% and 24%, respectively.

Testing was more stable in SSHS; in 15-to-24-year olds, there were around 580,000 tests carried out in SSHS in 2019 and this was a 2.4% decrease since a peak (n=595,222) in 2014. Testing in females was also stable in SSHS with 372,305 tests in 2019, a negligible increase since 2014 (n=371,821).

Changes in population utilising SHSS

The rate of all age female attendances (including new and follow-up consultations) at SHSS increased by 50% between 2009 and 2019 to 6,275 per 100,000 population: consultation rates increased in 15 to 24-year old and 25 to 34-year old females by 53% and 46%, respectively.

Rates of any vaginosis/itis overall peaked in 2012 at 662 diagnoses per 100,000 female population, before decreasing to 490 per 100,000 in 2019, a drop of 21% between 2009 and 2019.

Trends in PID diagnoses

The rates of PID diagnoses decreased during the study period by 38% although the scale of the decline varied by PID type (Figure 1). CT-PID declined by 58%, and non-specific PID declined by 37%. GC-PID fluctuated but showed an overall increase of 34% between 2009 and 2019 (Figure 1b). During the initial 2009 to 2012 period (during which the NCSP recorded highest levels of screening), CT-PID diagnoses decreased by 36%, and non-specific PID decreased by 4% whilst GC-PID diagnoses increased by 5%.

Figure 1

CT-PID decreased across all age groups (Figure 2); the decline was highest in 15 to 19-year olds, 71%, compared to declines of between 44% and 54% in the older age groups. A similar trend was observed in non-specific PID, as diagnoses decreased in all age groups but more so in the younger age groups, ranging from 60% (in 15-19year olds) to 21% (in 30-34year olds). GC-PID did not follow the same pattern: it also had a decline, though less, of around 6% in the 15 to 19-year olds but increases in 20 to 24, 25 to 29 and 30 to 34-year olds by 22%, 77% and 128%, respectively.

Figure 2

Focusing on the age group eligible for screening, CT-PID declined between 2009 and 2019 with a greater decrease in the 15 to 24-year old age group than the 25 to 34-year olds, 62% and 52% respectively. Both age groups showed a reduction between 2009 and 2012, however the trends post 2012 differ. Diagnoses in the 15 to 24-year old age group reduced consistently post 2012, a decrease of 43% by 2019; whilst there was a decrease of 14% in the 25 to 34-year old age group between 2012 and 2019.

Adjusting for changes in attendance for symptomatic conditions using the ratio of non-specific PID and of CT-PID to any vaginosis/itis diagnoses, the declining trend in CT PID persisted but was lessened (51% for this ratio compared to 58% for the rate, 2009-2019). For both CT-PID and non-specific PID, the decline post 2012 was lessened when this ratio was considered, however the declining trend from 2009 to 2012 remained and the lower rate was maintained after 2012 (Figure 3).

Figure 3

Trends in NCSP birth cohorts

CT-PID rates were lowest in the cohort with the greatest exposure to the NCSP programme, with each cohort with less exposure showing higher observed rates. In 20 years-olds, the “Full Exposure” cohort had a lower CT-PID rate of 36 per 100,000 population compared to the “High Exposure” and the “Partial Exposure” cohorts, 43 and 61 respectively (Figure 4).

A similar dose-response pattern was observed with non-specific PID rates, but not with GC-PID (Figure 5 in Supplementary Data).

Figure 4

DISCUSSION:

Between 2009 and 2019 PID diagnoses in females attending SSHS decreased by 39% with CT-PID diagnoses decreasing by 58% and non-specific PID by 37%. The proportion of all PID that was CT-PID fell from 14.1% to 9.6% (data not shown). This decline in CT-PID was greatest in females aged 15 to 24-years old (62%) with the greatest decline observed between 2009 and 2011. The decrease in the number of CT-PID cases persisted when the number and types of attendances were controlled for by examining the population based PID rates and adjusting for the annual number of females diagnosed with vaginal candidiasis and/or bacterial vaginosis. The declines in CT-PID and non-specific PID show a dose-response relationship with access to NCSP-driven screening during years of sexually-active, young adulthood.

Strengths

This was a large study which used comprehensive national surveillance data which records all attendances at SSHS in England. All attendances were coded using standardised definitions based on the clinical and/or microbiological diagnosis.[9] The guidelines used in these settings have, since 2005, advised a low index of clinical suspicion when diagnosing PID, particularly in females under 25 years, as the symptoms and signs lack sensitivity and specificity.[2, 12, 13]. Thus, these criteria have remained essentially unchanged over the study period. The fraction of PID associated with CT decreases with increasing age, being greatest in females under 25 years old.[3] In this study we were able to look at changes in CT-PID rates in 15-to-24-year olds and 25-to-34-year olds enabling us to adjust for potential changes in age distribution of female attendees over time.

Access to SSHS has changed over the study time period with the number of attendances increasing.[14, 15] Changes in access i.e. reduction in clinical capacity associated with rising demand for asymptomatic screening could potentially reduce the number of PID attendances. We were able to explore this by examining the changes in PID diagnoses compared to vaginal discharge caused by candidosis and bacterial vaginosis, rates of which should remain constant within the population. Falls in CT-PID were still observed after adjusting for changes in these other diagnoses, although they were not as great.

Limitations

This was an ecological study and although the changes in PID rates were consistent with what one would expect to see if higher levels of screening, as facilitated by the NCSP, were effective it was not possible to infer that the CT-PID rate fall was caused by the NCSP policy and its implementation since 2008. We were not able to analyse changes in PID in the same way prior to 2009 due to changes in data collection. An increase in all PID and CT-PID was observed between 2004 and 2009, however this was alongside increased attendance following the Governments 2004 white paper [16] which identified improving sexual health services as a priority, and was associated with an increase in funding. Similar increases in capacity following service improvements have been reported as the cause of increase in PID rates in SSHS in Australia.[17]

Other studies have looked at changes in PID over time, however, the associated infections were often not available and many studies used rates for females with PID treated in hospital.[6, 7, 18-20] The majority of females diagnosed with PID are managed in an out-patient or community setting with some evidence that CT-PID may have a milder clinical presentation than other causes and thus be less likely to require admission to hospital.[6, 19] In addition, the proportion of PID caused by CT decreases with age.[3] It is thus difficult to use such data to examine the effect of CT control measures when using all PID as an outcome measure.[7]

Nevertheless, our results are not inconsistent with the findings from the following studies. The pooled risk ratio for all cause PID after one year of follow up in females invited to have a chlamydia screening test in four randomised controlled trials was 0.64 (95% CI 0.45, 0.90, I2=20%) after one year.[21] In the recent Australian Chlamydia Control Effectiveness Pilot (ACCEPt) trial the incidence of PID diagnosed in hospital decreased by 1.37 per 100,000 women (95% CI 0.5−26.9).[20] However, there was no change in the incidence of PID diagnosed in clinics.

The NCSP was nationally implemented in 2008 and it is unclear why a drop was only observed from 2009. The official estimated coverage in females (assuming one test per female) increased from 30.9% in 2008/9 to 42.1% in 2010/11 but is likely to be lower as some females will have tested more than once in any given year.[22, 23] The NCSP promotes annual testing which in the first year would only prevent 55-66% of CT-PID cases in those screened.[24] It is possible that any reductions in CT-PID in 2008 and 2009 may have been obscured by the increases in SSHS attendances between 2004-2009 as described above.

Finally, CT positivity in females with PID attending SSHS is lower than that estimated through a recent multiparameter evidence (MPES) synthesis.[3, 6] It is unclear why that is but the CT positivity is similar to that observed in Australian SSHSs.[25] This may reflect a low index of suspicion as recommended in the BASHH PID guidelines and would include females with "possible" PID whereas the MPES analysis considered only females with probable or definite PID and used data obtained before the introduction of screening.[6, 26]

Our data and analyses show an ecological trend that is broadly consistent with widespread screening through the NCSP reducing the incidence of CT-PID as observed in previous RCTs.[21] It is of interest that non-specific PID rates also decreased, but to a lesser extent and later than the CT-PID rates with the proportion of CT- PID decreasing from 14.1-9.6% between 2009 and 2019, whilst GC-PID increased. One explanation as discussed by Horner et al in a separate paper in this special supplement is that CT infection of the fallopian tubes can result in a persistent epithelial-to-mesenchymal transition (EMT)

state as a result of epigenetic changes.[27] Such a state is pro-inflammatory and could increase the risk of non-specific PID developing in females whose upper genital tract is colonised by bacterial vaginosis associated bacteria (BVAB).[27, 28] EMT reduces the integrity of the epithelium potentially making it more susceptible to invasion and disease from BVAB .[27] BVAB are the most common cause of non-specific PID.[1, 2, 27] It is likely if CT-PID rates decreased so did upper genital tract CT infection which is not always symptomatic.[6, 27] This would then reduce the subsequent risk of developing PID from any cause.[18, 19, 27] Horner et al argue that this hypothesis merits further investigation as it would increase our understanding of the risks of sequelae associated with chlamydial genital tract infection and thus better inform public health interventions and cost effectiveness models of interventions such as screening and vaccination.[27, 29, 30]

Consideration should be given to investigating whether serology as discussed by Horner elsewhere in this supplement can be used to evaluate whether there is an observable birth cohort effect on CT tubal factor infertility similar to what we have demonstrated for CT-PID.[31] Most females with infertility present years after the inciting infection has resolved and would no longer be detected by nucleic acid amplification testing or other tests for active urogenital infection.[6, 31]

Conclusion

There was a marked decline in diagnoses of CT PID, and non-specific PID, at SSHS after the introduction of wide-spread chlamydia screening, whilst GC-PID diagnoses increased. This occurred despite an increase in attendances at SSHS and alongside a far smaller decline in diagnoses of vaginosis/vaginitis due to bacterial vaginosis and candidosis. Further work is needed, including to explore trends in general practice and hospital admissions, to determine whether the frequency of CT-PID (rates, or more likely as a proportion of all PID) in SHSS might offer a useful national and local metric for the success of chlamydia control.

Ethical statement:

No specific consent was required from the patients whose data were used in these analyses. In its role providing infectious disease surveillance Public Health England has permission to handle data obtained by the GUMCAD STI Surveillance System and the CTAD Chlamydia Surveillance System under Regulation 3 of the Health Service (Control of Patient Information) Regulations 2002.

Potential Conflicts of Interest:

The Authors: No reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest.

Meetings previously presented at:

PH presented early findings at the STI & HIV 2019 World Congress, Joint Meeting of the 23rd ISSTDR and 20th IUSTI, Vancouver, Canada | July 14 – 17, 2019, http://stihiv2019vancouver.com/

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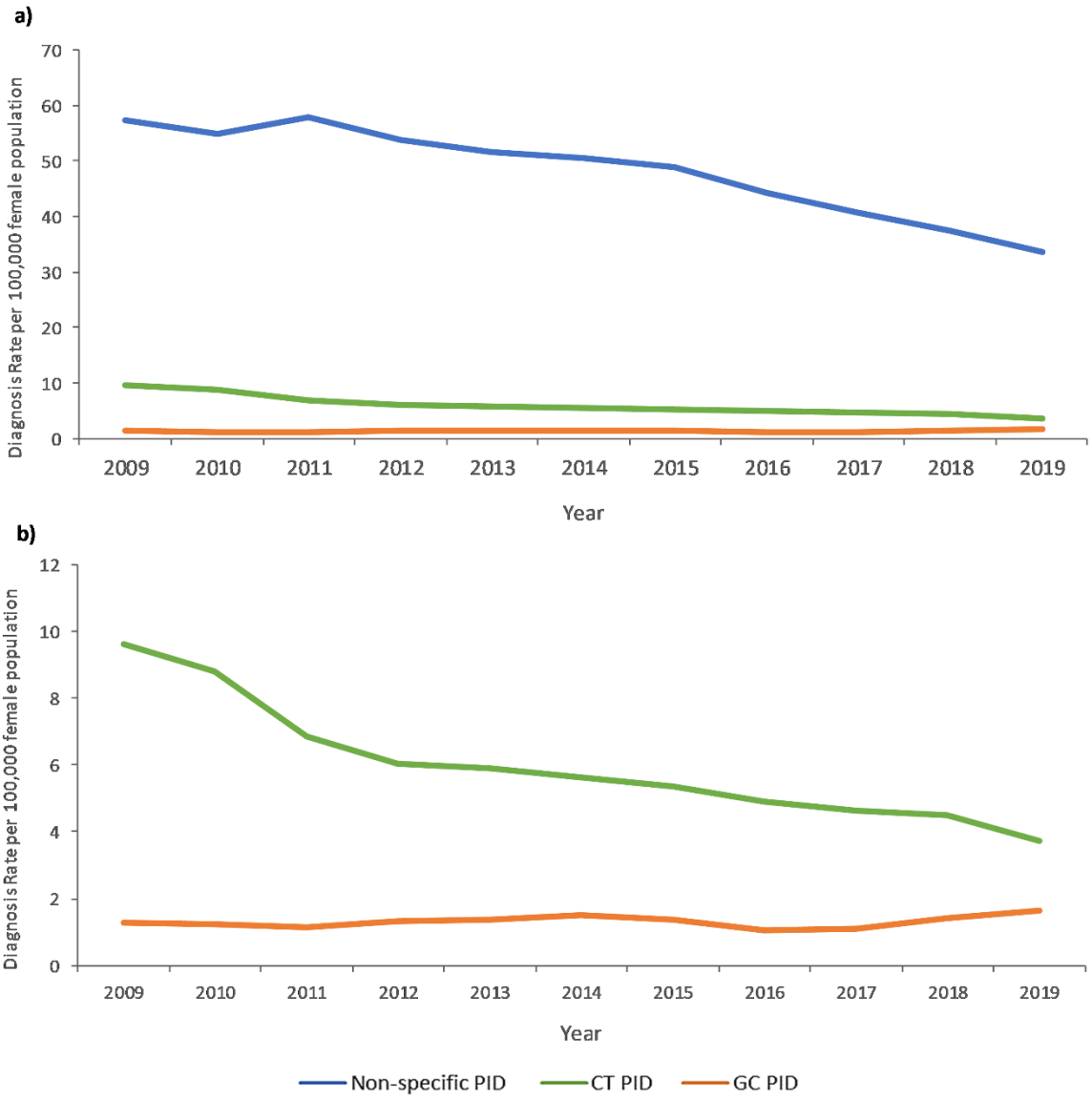

Figure 1 a) All-age PID diagnosis rates per 100,000 female population between 2009-2019 for non-specific PID, CT-PID and GC-PID b) CT-PID and GC-PID rates per 100,000 female population between 2009-2019 presented on smaller scale.

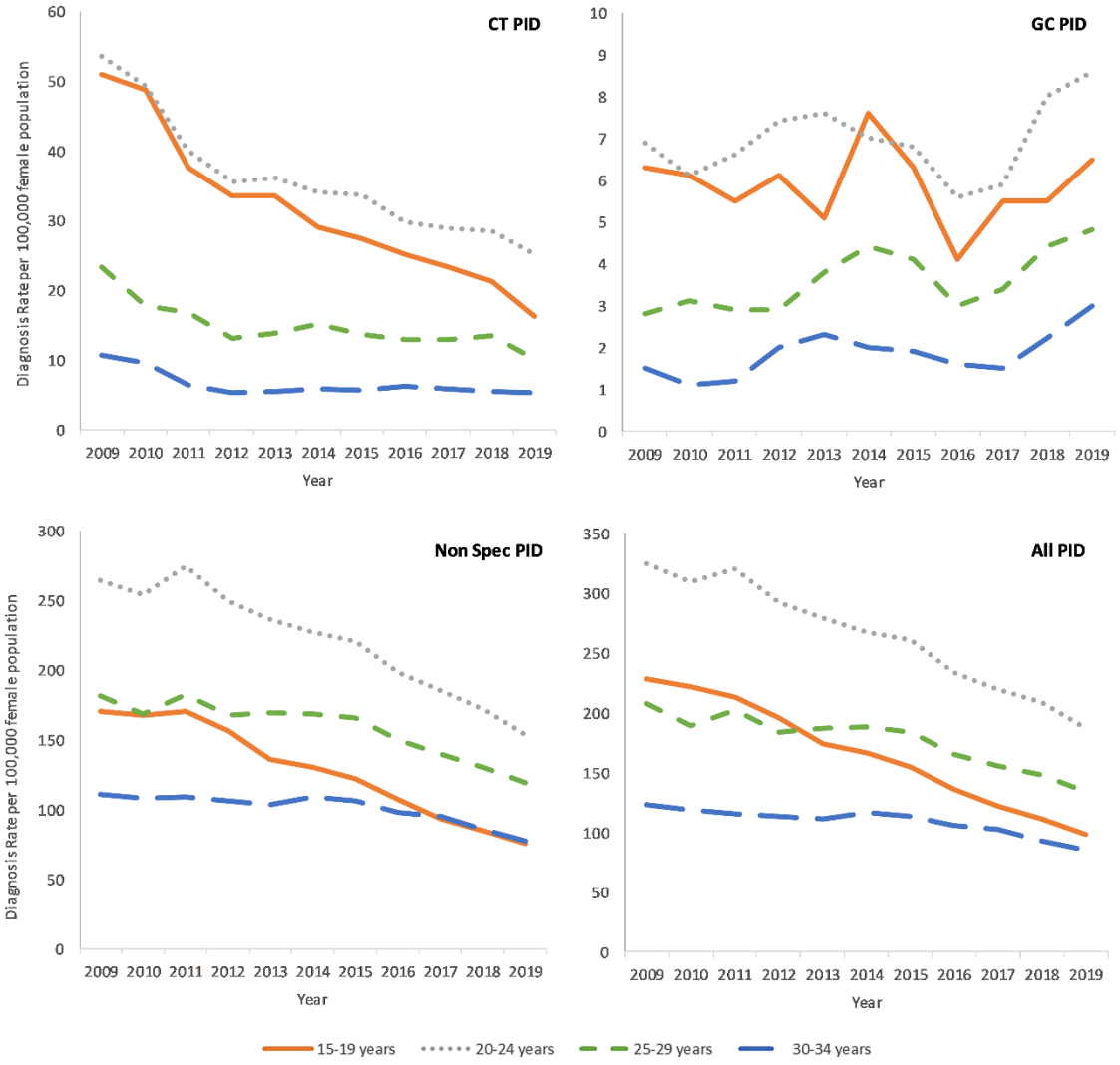

Figure 2 PID diagnosis rates per 100,000 female population between 2009-2019 for CT-PID, GC-PID, non-specific PID and all PID by age group, 15-19 years, 20-24 years, 25-29 years and 30-34 years.

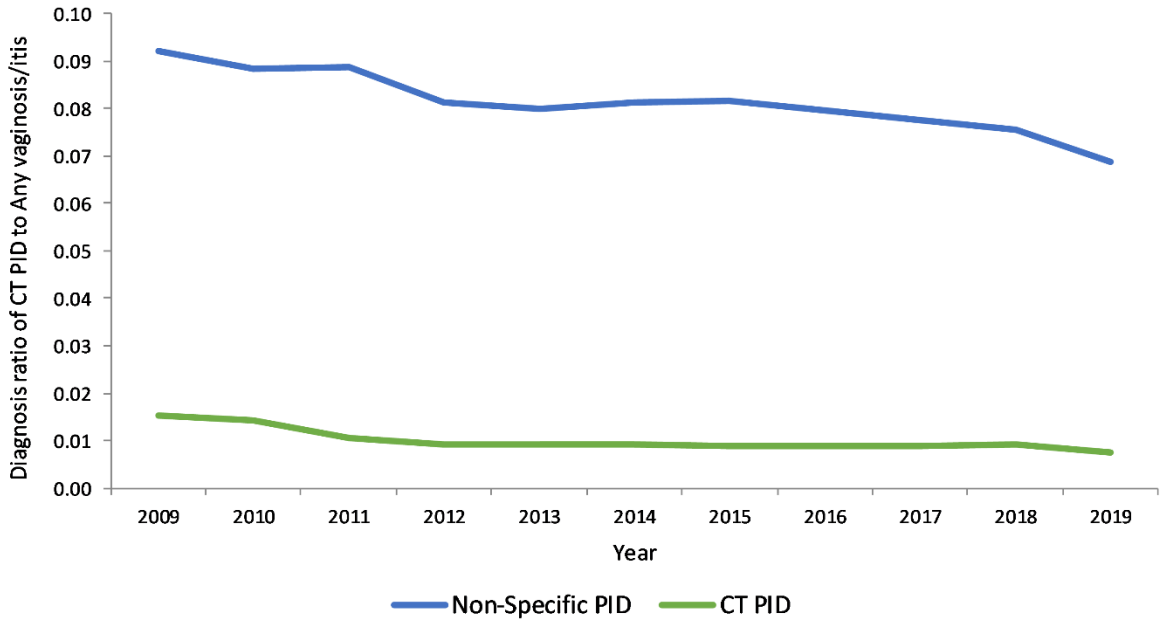

Figure 3 Diagnosis ratio of all-age non-specific PID and CT-PID to any vaginosis/itis in females between 2009-2019

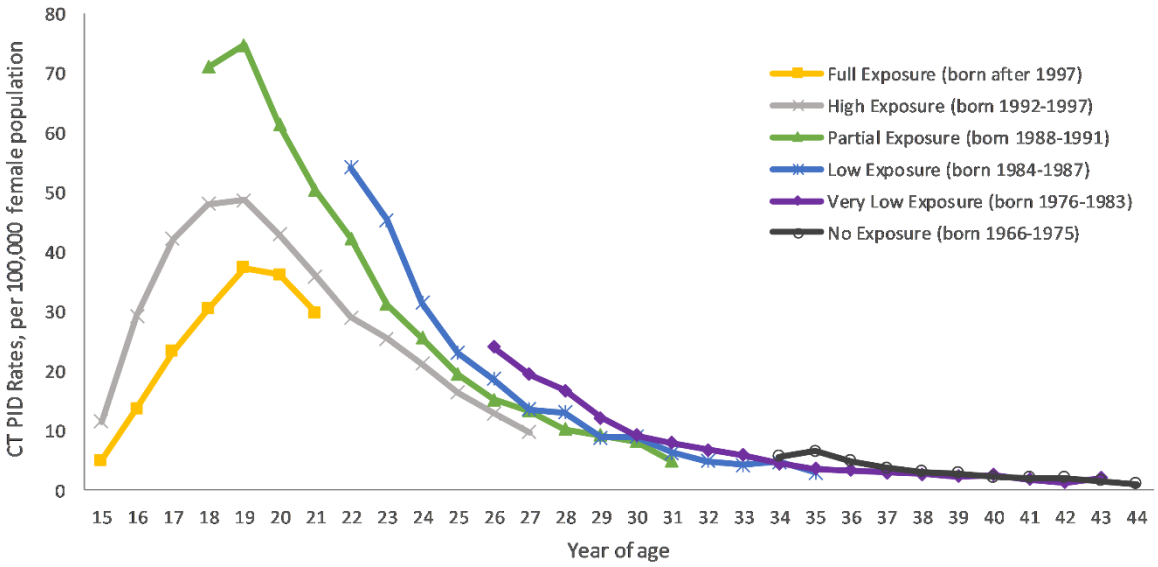

Figure 4 CT-PID rates per 100,000 female population aged 15 to 44 years old by year of age and birth-cohort with varying exposure to widespread chlamydia screening through the NCSP, 2009-2019

Supplementary Figure

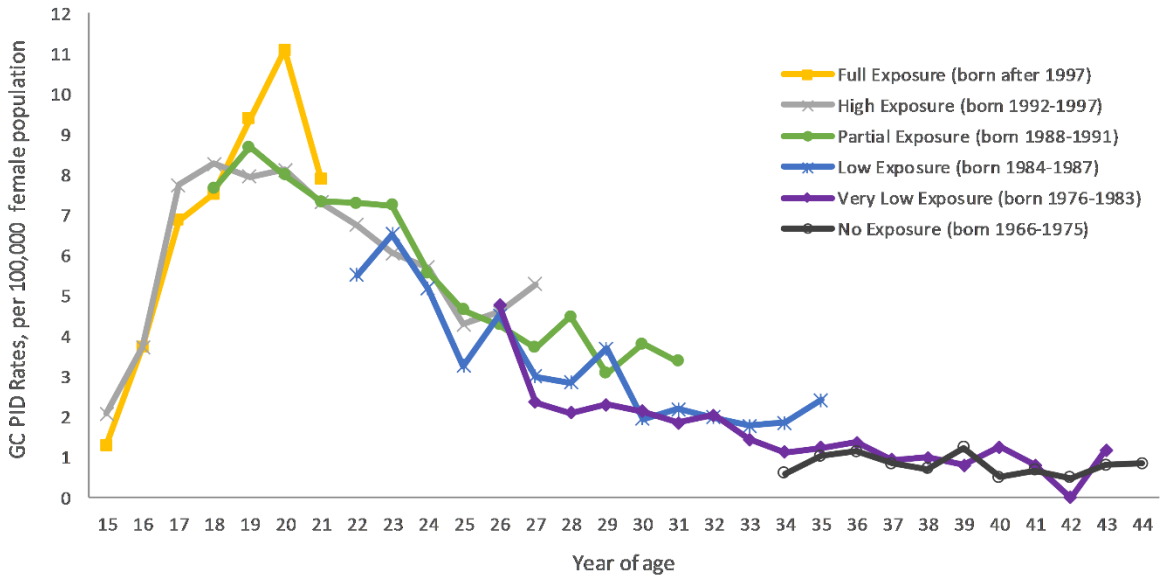

Figure 5 GC PID rates per 100,000 female population aged 15 to 44 years old by year of age and birth-cohort with varying exposure to widespread chlamydia screening through the NCSP, 2009-2019

Supplementary Table 1- data for Figure 1. All-age PID diagnosis rates per 100,000 female population between 2009-2019 by type for non-specific PID, CT-PID and GC-PID

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Non-specific PID	57.2	54.8	57.9	53.8	51.5	50.5	48.8	44.3	40.7	37.5	33.6
CT-PID	9.6	8.8	6.9	6.0	5.9	5.6	5.4	4.9	4.6	4.5	3.7
GC-PID	1.3	1.2	1.1	1.3	1.4	1.5	1.4	1.1	1.1	1.4	1.6

Supplementary Table 2- data for Figure 2. PID diagnosis rates per 100,000 female population between 2009-2019 for CT-PID, GC-PID, non-specific PID and all PID by type and age group, 15-19 years, 20-24 years, 25-29 years and 30-34 years.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
15-19											
Non-specific PID	170.6	167.0	170.5	156.4	135.9	130.1	121.5	107.2	93.1	84.9	75.3
CT-PID	51.0	48.7	37.5	33.4	33.5	29.1	27.3	25.1	23.2	21.2	16.2
GC-PID	6.3	6.1	5.5	6.1	5.1	7.6	6.3	4.1	5.5	5.5	6.5
All PID	227.9	221.8	213.6	195.9	174.5	166.7	155.0	136.4	121.9	111.6	98.1
20-24											
Non-specific PID	264.4	254.2	273.9	249.3	236.0	226.7	220.6	198.1	184.6	172.2	153.2
CT-PID	53.5	49.3	39.9	35.5	36.0	34.0	33.7	29.7	28.8	28.5	25.1
GC-PID	6.9	6.1	6.6	7.4	7.6	7.0	6.8	5.6	5.9	8.0	8.6
All PID	324.7	309.5	320.5	292.1	279.6	267.7	261.1	233.3	219.3	208.7	186.9
25-29											
Non-specific PID	181.4	168.4	182.4	167.5	169.7	168.4	165.6	150.0	139.5	129.9	119.3
CT-PID	23.3	17.8	16.7	13.1	13.9	15.1	13.7	12.8	12.8	13.5	10.1
GC-PID	2.8	3.1	2.9	2.9	3.8	4.4	4.1	3.0	3.4	4.4	4.8
All PID	207.5	189.4	202.0	183.6	187.5	187.9	183.4	165.8	155.7	147.8	134.1
30-34											
Non-specific PID	111.1	107.9	108.5	106.5	103.4	109.1	106.0	98.0	95.2	85.7	77.2
CT-PID	10.6	9.6	6.3	5.2	5.4	5.8	5.6	6.2	5.9	5.5	5.2
GC-PID	1.5	1.1	1.2	2.0	2.3	2.0	1.9	1.6	1.5	2.2	3.0
All PID	123.2	118.6	115.9	113.8	111.1	116.9	113.5	105.9	102.7	93.4	85.4

Supplementary Table 3- data for Figure 3. Diagnosis ratio of all-age non-specific PID & and CT-PID to any vaginosis/itis in females between 2009-2019.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Non-specific PID	0.015	0.014	0.011	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.008
CT-PID	0.092	0.089	0.089	0.081	0.080	0.081	0.081	0.079	0.078	0.076	0.069

Supplementary Table 4- data for Figure 4. CT-PID rates per 100,000 female population aged 15 to 44 years old by year of age and birth-cohort with varying exposure to widespread chlamydia screening through the NCSP, 2009-2019.

Age	Full Exposure (born after 1997)	High Exposure (born 1992-97)	Partial Exposure (born 1998-91)	Low Exposure (born 1984-87)	Very Low Exposure (born 1976-83)	No Exposure (born 1966-75)
15	5.0	11.6	-	-	-	-
16	13.6	29.3	-	-	-	-
17	23.3	42.2	-	-	-	-
18	30.4	48.0	70.9	-	-	-
19	37.3	48.6	74.7	-	-	-
20	36.1	42.9	61.3	-	-	-
21	29.7	35.9	50.3	-	-	-
22	-	29.0	42.2	54.1	-	-
23	-	25.5	31.1	45.3	-	-
24	-	21.2	25.5	31.4	-	-
25	-	16.3	19.4	22.9	-	-
26	-	12.9	15.2	18.6	24.0	-
27	-	9.8	13.3	13.6	19.4	-
28	-	-	10.2	13.0	16.8	-
29	-	-	9.2	8.8	12.2	-
30	-	-	8.2	8.9	9.2	-
31	-	-	4.9	6.3	8.0	-
32	-	-	-	4.8	6.8	-
33	-	-	-	4.2	5.9	-
34	-	-	-	4.8	4.5	5.6
35	-	-	-	2.9	3.6	6.5
36	-	-	-	-	3.3	4.8
37	-	-	-	-	3.0	3.8
38	-	-	-	-	2.7	3.1
39	-	-	-	-	2.3	2.9
40	-	-	-	-	2.6	2.2
41	-	-	-	-	1.8	2.0
42	-	-	-	-	1.3	2.0
43	-	-	-	-	2.1	1.6
44	-	-	-	-	-	1.1

"-" ages not within cohort group

Supplementary Table 5- data for Supplementary Figure 5. GC-PID rates per 100,000 female population aged 15 to 44 years old by year of age and birth-cohort with varying exposure to widespread chlamydia screening through the NCSP, 2009-2019.

Age	Full Exposure (born after 1997)	High Exposure (born 1992-97)	Partial Exposure (born 1998-91)	Low Exposure (born 1984-87)	Very Low Exposure (born 1976-83)	No Exposure (born 1966-75)
15	1.3	2.1	-	-	-	-
16	3.7	3.7	-	-	-	-
17	6.9	7.7	-	-	-	-
18	7.5	8.3	7.6	-	-	-
19	9.4	7.9	8.7	-	-	-
20	11.1	8.1	8.0	-	-	-
21	7.9	7.3	7.3	-	-	-
22	-	6.7	7.3	5.5	-	-
23	-	6.1	7.2	6.5	-	-
24	-	5.7	5.6	5.2	-	-
25	-	4.3	4.6	3.2	-	-
26	-	4.6	4.3	4.5	4.8	-
27	-	5.3	3.7	3.0	2.4	-
28	-	-	4.5	2.8	2.1	-
29	-	-	3.1	3.7	2.3	-
30	-	-	3.8	1.9	2.1	-
31	-	-	3.4	2.2	1.8	-
32	-	-	-	2.0	2.0	-
33	-	-	-	1.8	1.4	-
34	-	-	-	1.9	1.1	0.6
35	-	-	-	2.4	1.2	1.0
36	-	-	-	-	1.4	1.1
37	-	-	-	-	0.9	0.8
38	-	-	-	-	1.0	0.7
39	-	-	-	-	0.8	1.2
40	-	-	-	-	1.2	0.5
41	-	-	-	-	0.8	0.7
42	-	-	-	-	0.0	0.5
43	-	-	-	-	1.2	0.8
44	-	-	-	-	-	0.8

"-" ages not within cohort group