

Annual Epidemiological Report

September, 2019

Gonorrhoea in Ireland, 2018

Key Facts

In 2018, 2,405 (50.5/100,000) cases of gonorrhoea were notified in Ireland

- This was a 7% increase compared with 2017 and an 86% increase since 2015
- 84% of cases were male and the rate increased by 10% compared to 2017
- 16% of cases were female and the rate decreased by 6% compared to 2017
- Almost a third of cases were young people aged 15-24 years: a 13% decrease compared to 2017 but a 52% increase since 2015
- A quarter of cases were aged 25-29 years: a 23% increase compared to 2017
- Where mode of transmission was known (66% of all notifications):
 - 65% were men who have sex with men (MSM)
 - 11% were heterosexual males
 - 24% were heterosexual females
- MSM were disproportionately affected by gonorrhoea:
 - The notification rate was 1177 per 100,000 MSM population (18-64 years), equivalent to more than one notification per 100 MSM (1.2%), and double the rate reported in 2015
- The highest age-standardised notification rate (ASNR) was in HSE East (89/100,000), which was significantly higher than the national rate
- Antimicrobial resistance is an ongoing threat to the management of gonorrhoea infection nationally and internationally
 - One case of ceftriaxone resistant gonorrhoea and seven cases of high level azithromycin resistant gonorrhoea were notified in Ireland during 2018
- The nationally recommended dose of ceftriaxone for treatment of gonorrhoea has doubled to ceftriaxone 1g intramuscularly. With this higher dose of ceftriaxone, dual therapy with oral azithromycin is no longer recommended

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Introduction

Background

Gonorrhoea, caused by the bacterium *Neisseria gonorrhoeae* (*N. gonorrhoeae*), is the second most commonly reported sexually transmitted infection (STI) in Ireland. Gonorrhoea may cause genital, rectal, pharyngeal and conjunctival infections and may often be asymptomatic, particularly in females. Gonorrhoea increases the risk of HIV transmission and may lead to fertility problems if untreated. The rise in antimicrobial resistant gonorrhoea, that has been seen globally, highlights the need for effective gonorrhoea prevention strategies (1).

Gonorrhoea has been a notifiable disease in Ireland since 1948 (2). From early 2013, case-based information on laboratory and clinical notifications have been collated in the Computerised Infectious Diseases Reporting system (CIDR). Prior to this, information on gonorrhoea was collected nationally in aggregate format, from STI clinics and general practitioners (GPs) via Departments of Public Health.

Epidemiology

There were 2,405 notifications of gonorrhoea in Ireland during 2018, a 7% increase compared with 2017 when 2,249 cases were notified. The notification rate increased to 50.5 per 100,000 population in 2018 from 47.2/100,000 in 2017. The increase in notification rate in 2018 continues the increasing trend in gonorrhoea notifications that has been seen particularly since 2015, increasing by 86% during that time period (Figure 1). A summary of the key data for 2018 is presented in Table 1.

Figure 1. Trend in gonorrhoea notification rate (per 100,000) by sex in Ireland, 1995 – 2018

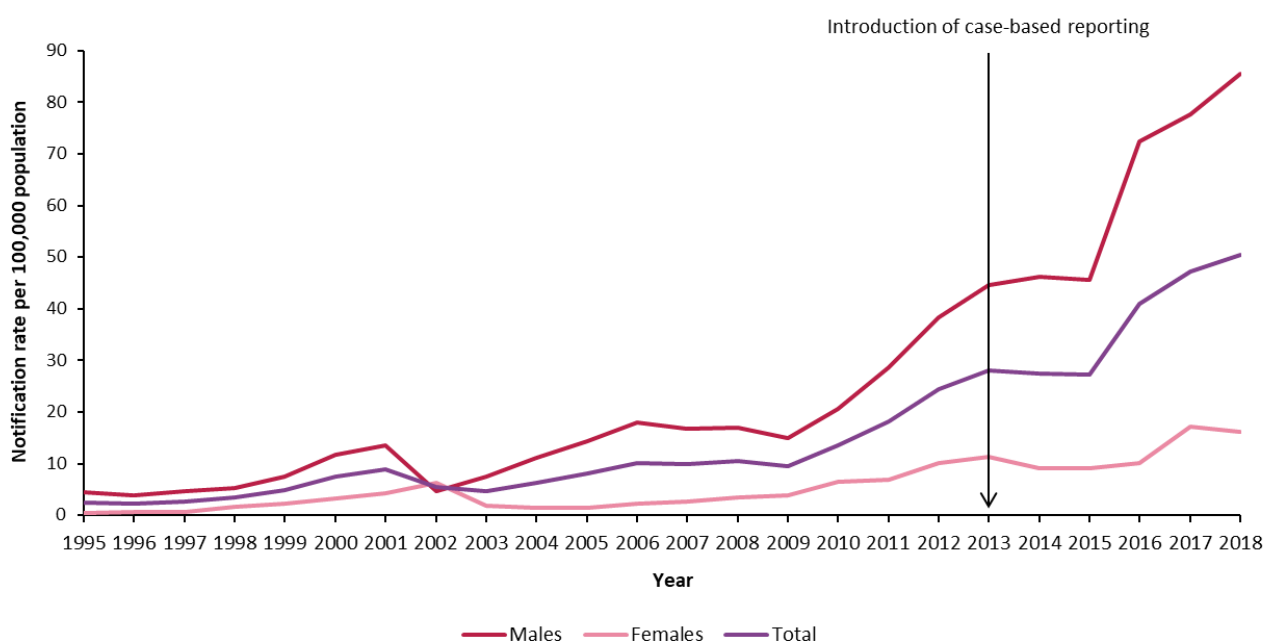


Table 1. Summary of gonorrhoea cases in Ireland, 2018 (n=2,405)

Number of cases		2,405
Notification rate		50.5/100,000
Sex	Males	2,013 (85.5/100,000) (83.7%)
	Females	391 (16.2/100,000) (16.3%)
	Unknown	1 (0.04%)
	Male-to-female ratio	5.1
Age*	Median age (range)	28 years (16-72 years)
	Median age (Female heterosexual)	21 years
	Median age (Male heterosexual)	24 years
	Median age (MSM)	30 years
	Median age (Unknown mode of transmission)	29 years
Age specific rate[†]	Highest overall	200.4/100,000 (25-29 years)
	Highest among males	362.2/100,000 (25-29 years)
	Highest among females	120.5/100,000 (20-24 years)
Mode of transmission[‡]	Men who have sex with men	1,029
	<i>% where known</i>	64.5%
	Male heterosexual	173
	<i>% where known</i>	10.8%
	Female heterosexual	389
	<i>% where known</i>	24.3%
	Unknown mode of transmission	810
	<i>% of total</i>	33.7%
Multiple STIs	All STIs	657 additional STI notifications
	Most common: chlamydia	526 chlamydia notifications

*Excludes cases where sex was unknown, where age was unknown and those aged ≤14 years (n=3)

†Excludes cases where age and sex were unknown

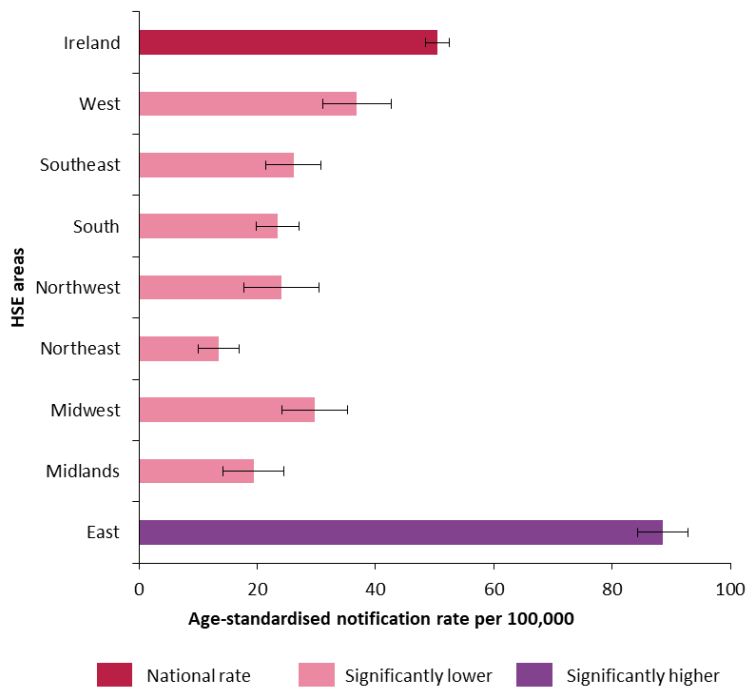
‡Excludes <5 cases with mode of transmission reported as "other"

Geographical distribution

Cases of gonorrhoea were notified by all HSE areas in 2018. See technical note 6 for the list of counties covered by each HSE area. Rates and numbers of cases by HSE area should be interpreted with caution as HSE area is based on the clinic location if information on patient county of residence is not available. Consequently, rates and numbers of cases by HSE area often reflect the location of STI services as well as differences in reporting practices by clinics and clinicians from one area to another (a list of STI clinics is available at <https://www.sexualwellbeing.ie/sexual-health/hse-sti-services-in-ireland.html>).

In 2018 the highest age standardised notification rate (ASNR) was in HSE East (88.6/100,000; 95% CI 84.3-92.8), which was significantly higher than the national rate (50.5/100,000; 95% CI 48.5-52.5). The ASNRs for gonorrhoea were significantly below the national rate in all other HSE areas in 2018 (Figure 2).

Figure 2. Age-standardised notification rate and 95% confidence intervals of gonorrhoea by HSE area* compared with the national rate, 2018 (n=2,404)†

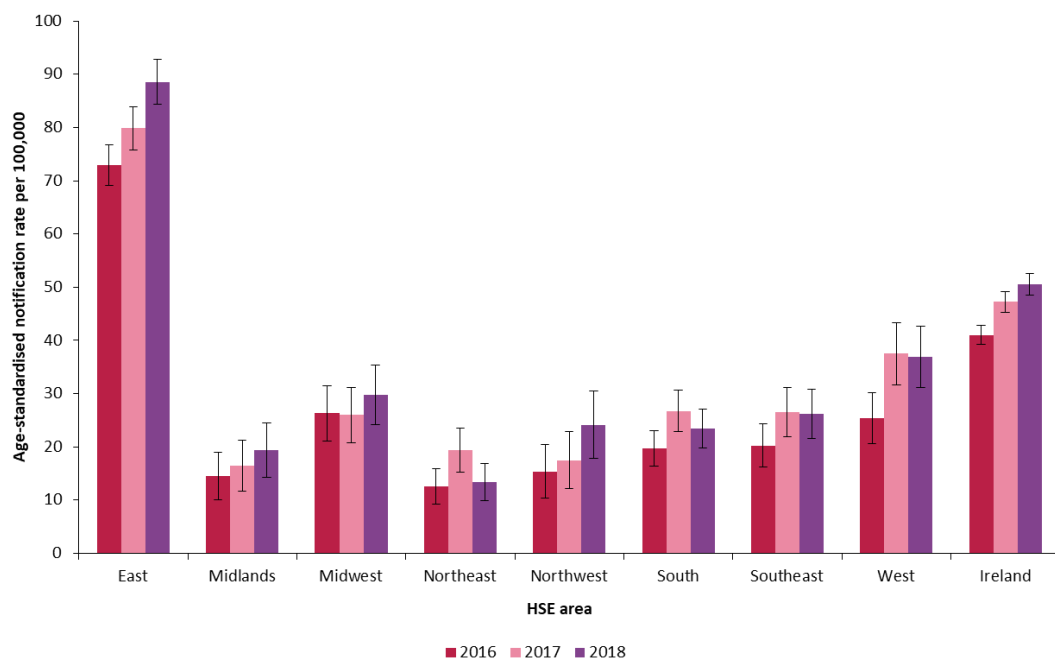


*See technical note 6 for list of counties covered by each HSE area

†Excludes 1 case of unknown age

When compared to the rates of gonorrhoea notification in 2017, there was an 11% increase in ASNR in HSE East in 2018 and there were no significant changes in ASNR in the other HSE areas (Figure 3).

Figure 3. Age-standardised notification rate and 95% confidence intervals of gonorrhoea by HSE area, 2016 – 2018*

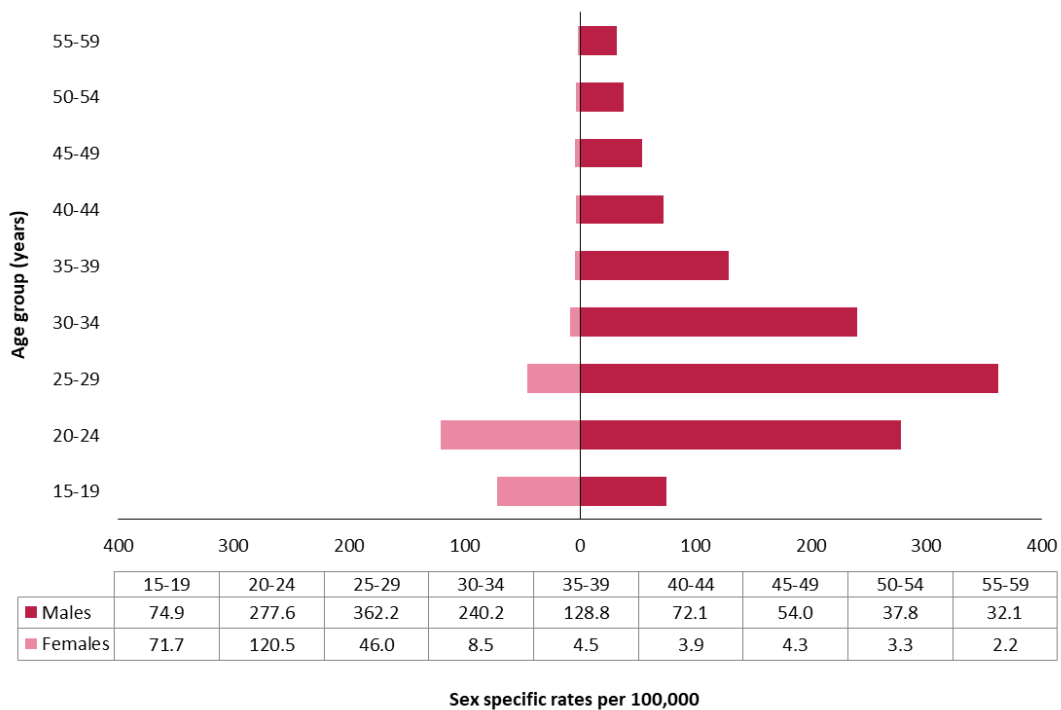


*Excludes 1 case of unknown age in 2016 and 1 case of unknown age in 2018

Age and sex

In 2018, 2,013 (84%) gonorrhoea notifications were among males and 391 (16%) were among females. Sex was unknown for one case. The rate of gonorrhoea notifications among females decreased by 6% from 17.2/100,000 in 2017 to 16.2/100,000 in 2018. The rate among males increased by 10% from 77.6/100,000 in 2017 to 85.5/100,000 in 2018 (Figure 1), continuing the increasing trend of gonorrhoea notifications among males. In 2018, the proportion of cases notified among males increased to 84% from 81% in 2017 and the male-to-female ratio increased to 5.1 from 4.4. Across all HSE areas the male-to-female ratio ranged from 1.2 in HSE Northwest to 8.3 in HSE East.

Figure 4. Gonorrhoea notification rate by age group and sex in Ireland, 2018 (n=2,388*)



*Excludes cases of unknown sex (n=1), cases of unknown age (n=1) and cases aged ≤14 years or ≥60 years (n=15)

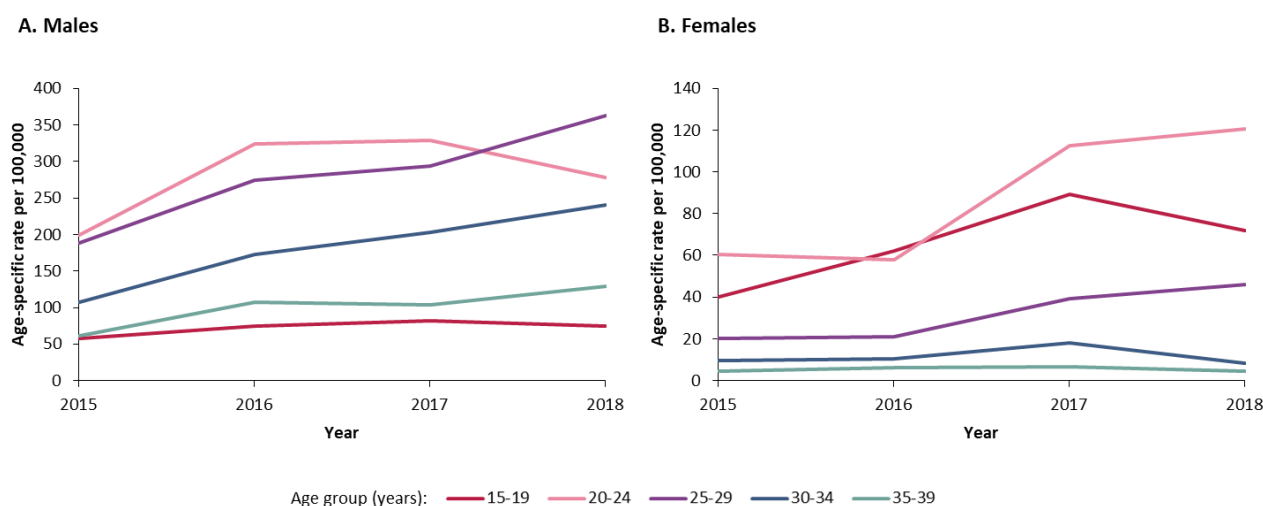
Young people were a key population affected by gonorrhoea in 2018. Thirty two percent (n=768) of gonorrhoea notifications were in young people aged 15-24 years, giving a rate of 133.2/100,000 population. This represented a 13% decrease in gonorrhoea notifications among young people, compared with 149.9/100,000 in 2017 but a 52% increase from 87.7/100,000 in 2015. A quarter of cases (n=596) in 2018 were notified among the 25-29 year age group, a 23% increase compared to 2017.

In 2018 the highest rate among males was in the 25-29 year age group (362.2/100,000), followed by the 20-24 year age group (277.6/100,000). Among females in 2018, the highest rate was in 20-24 year olds (120.5/100,000), followed by 15-19 year olds (71.7/100,000). The rate was higher among males than females in all age groups (Figure 4).

The trend among males differed from the time period between 2015 and 2017, when the highest rate was in the 20-24 year age group. The rate among males aged 20-24 years decreased by 18% in 2018 compared with 2017, while the rate in the 25-29 year age group increased by 23% (Figure 5A). Among females, the 20-24 year age group were also the group most affected in 2017 and the rate among this group has doubled since 2016 (Figure 5B).

The median age of all cases (excluding those ≤ 14 years) was 28 years, increased from 27 years in 2017. The median age among males was 29 years, increased from 28 years in 2017. Females tended to be younger with a median age of 21 years, unchanged from 2017.

Figure 5. Trend in notification rate of gonorrhoea by age group (15-39 years) in (A) males and (B) females in Ireland, 2015 – 2018

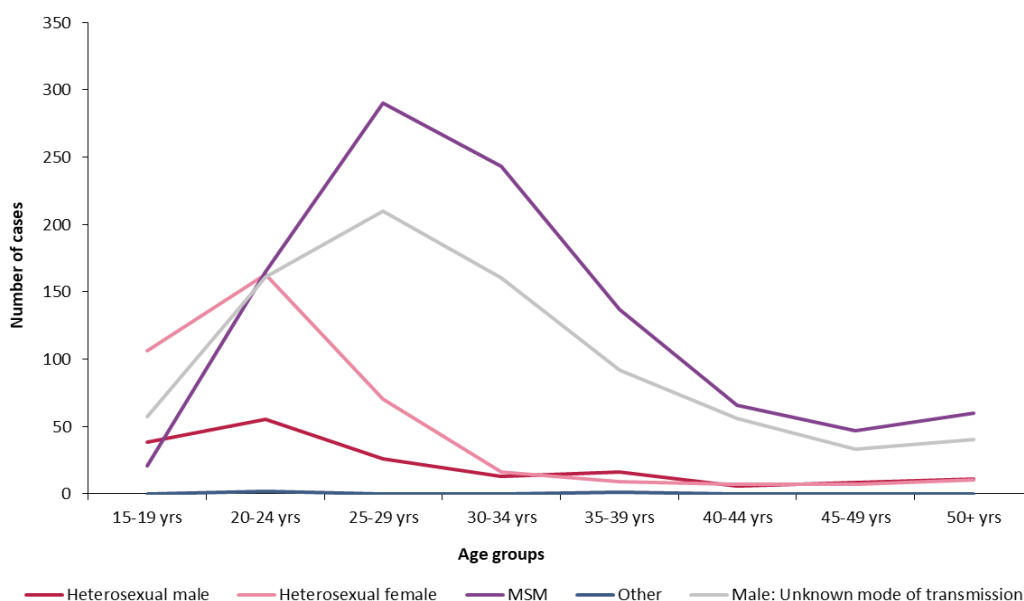


Mode of transmission

Mode of transmission was available for 66% (n=1,595) of cases in 2018, a reduction from 2017 when mode of transmission was available for 68% of cases. Of the cases where mode of transmission was known in 2018, 65% (n=1,029) were reported as MSM, an increase from 61% (n=925) in 2017. Where mode of transmission was available in 2018, heterosexual transmission was reported in 35% (n=562; 173 males and 389 females), a decrease from 39% in 2017 (n=593; 177 males, 415 females and 1 case of unknown sex).

MSM tended to be older than heterosexual males and females, with a median age of 30 years compared to 22 years among heterosexuals (males 24 years and females 21 years). This was an increase from a median age of 29 years for MSM and 21 years for heterosexuals in 2017. The median age of heterosexual females was unchanged at 21 years in 2017 and 2018 but the median age of heterosexual males increased from 22 years in 2017. Those with unknown mode of transmission in 2018 (n=810; 809 males and 1 unknown sex) had a median age of 29 years (Figure 6).

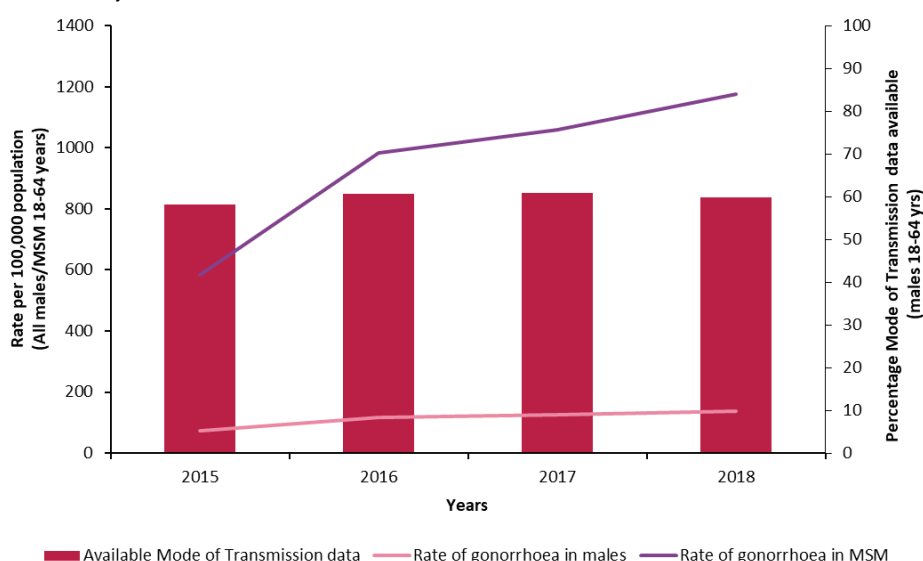
Figure 6. Gonorrhoea notifications by age group and mode of transmission in Ireland, 2018 (n=2,402*)



*Excludes cases of unknown age, unknown sex and those aged ≤14 years (n=3)

For calculation of the rate of gonorrhoea notification per 100,000 of the MSM population compared to all males, analysis was restricted to males aged 18-64 years (see technical note 7). The rate of gonorrhoea notification in males (aged 18-64 years) increased by 10% from the rate in 2017 to 137.4/100,000 in 2018. The rate of gonorrhoea notification among MSM (aged 18-64 years) was over eight times higher than among all males and increased by 11% from 1058.3/100,000 in 2017 to 1176.8/100,000 (or 1.2 per 100 MSM) in 2018. This continues the increasing rate among MSM which has doubled since 2015 (Figure 7).

Figure 7. Gonorrhoea notification rates in MSM aged 18-64 years compared to all males aged 18-64 years* in Ireland, 2015 – 2018

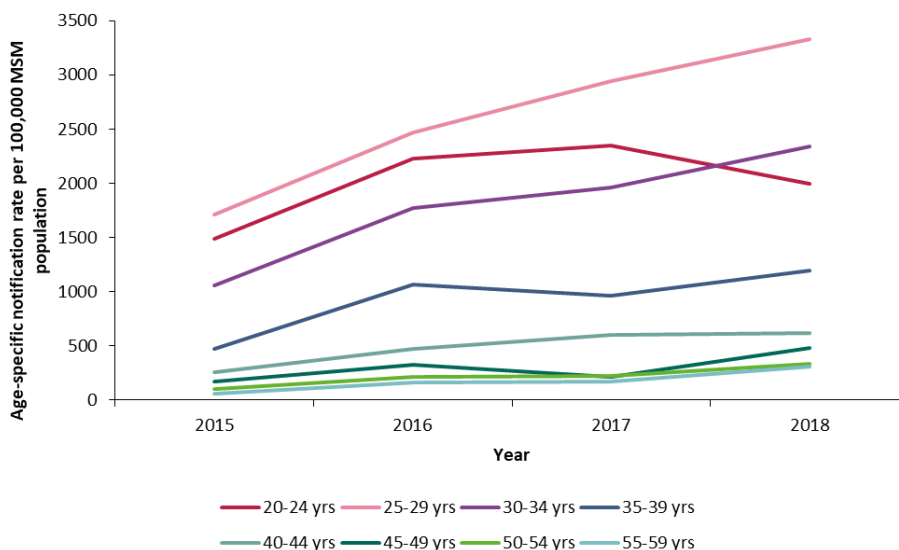


*See technical note 7 for information on calculation of MSM population data

Among MSM the highest rate was in 25-29 year olds which continued to increase in 2018. The rate among other older age groups, 30-34 and 35-39 years, also increased in 2018, while the rate among the 20-24 year olds decreased in 2018 (Figure 8).

These data should be interpreted with caution given the high level of missing data, however the completeness of mode of transmission data has been approximately stable since 2015, while the rate among MSM has continued to increase.

Figure 8. Gonorrhoea notification rates in MSM by age group in Ireland, 2015 – 2018*†



*See technical note 7 for information on calculation of MSM population and age-specific notification rate data

†Excludes MSM aged <20 years and ≥60 years

Region of birth

Region of birth was available for 34% (n=809) of gonorrhoea cases in 2019, a slight increase compared to 32% completeness in 2017. The proportion of patients who reported Ireland as their country of birth decreased to 71% in 2018 from 76% in 2017. The proportion of patients who reported Latin America as their region of birth was 12% in 2018, increased from 8% in 2017 but similar to 13% reported in 2016.

Table 2. Gonorrhoea notifications in Ireland by region of birth, 2018 (n=809)

Region of birth	n*	%†
Ireland	575	71.1
Latin America	98	12.1
Western Europe	52	6.4
Central & Eastern Europe	33	4.1
Asia & the Middle East	17	2.1
Africa	17	2.1
Other‡	17	2.1
Total	809	100.0

*Number of cases

†Percentage of cases where region of birth was known

‡Other regions of birth included United States of America, Canada, Australia and New Zealand

Site of infection

Specimen type was used as a proxy for site of infection and was available for 73% (n=1,764) of cases in 2018. However, laboratories typically only report the first specimen type to CIDR and so specimen type does not represent all cases or all sites of infection.

Genital sites were the most frequently reported first site of infection among males (51% of all male cases where specimen type was available; n=744). Pharyngeal infections and rectal infections were reported in 29% (n=430) and 24% (n=353) of cases where specimen type was available among males, respectively. Additionally, 19% (n=373) of all cases among males were positive for gonorrhoea from either a pharyngeal or rectal sample, identified through a method of pooling samples from these sites for nucleic acid amplification testing (NAAT). Among females, genital sites were the first reported site of infection in 78% (n=227) of all female cases where specimen type was reported. Pharyngeal infection was reported in 24% (n=70) of cases among females where specimen type was reported.

Over a quarter (28%; n=500) of cases where specimen type was known in 2018 were reported as pharyngeal infections which has important implications for treatment of infection as the pharynx is believed to be a reservoir for antimicrobial resistant *N. gonorrhoeae* (3). Infection at two sites was reported in 68 cases (60 males and eight females). Infection at three sites was reported in six cases (all male). Other sites of infection (including conjunctival) were reported in four cases.

Multiple STIs

Since the start of 2013, case-based data on notifiable STIs (except ano-genital warts and non-specific urethritis) have been reported via CIDR from all HSE areas. This has allowed linkages to be made between different incidences of infection for the same patient, facilitating the reporting of multiple infections and providing a clearer understanding of the burden of STIs and repeat infections.

Among those who were diagnosed with gonorrhoea in 2018 there were 657 additional notifications of STIs (excluding HIV, Hepatitis B and Hepatitis C) notified in the same year: 122 among females, 533 among males and two among cases where sex was unknown.

Chlamydia was the most frequently reported other STI (n=526), followed by syphilis (n=82), genital herpes simplex (n=31) and LGV (n=14) among those diagnosed with gonorrhoea in 2018. Additional STIs notified in those diagnosed with gonorrhoea during 2018 included sexually transmitted shigellosis and trichomoniasis. Among cases diagnosed with gonorrhoea in 2018, there were 176 previous notifications of gonorrhoea in 2017. Finally, of those diagnosed with gonorrhoea in 2018, 1% (n=30) were also diagnosed with HIV in 2018 and a further 4% (n=87) had been diagnosed with HIV prior to 2018.

There were some limitations to these data, however, as full patient identifiers were not provided for all cases, which makes it difficult to link different incidences of infection for the

same patient. Therefore the number of additional STIs diagnosed in 2018 were likely to be an underestimate. Furthermore, the use of more automated systems for processing chlamydia notifications on CIDR in HSE East may affect the estimates of concurrent chlamydia infections among people with gonorrhoea in 2018.

Patient type

Patient type (reflecting the service at which the patient was diagnosed) was available for 98% (n=2,362) of gonorrhoea cases in 2018. Sixty percent of gonorrhoea notifications in 2018 were from STI clinics, compared with 34% of cases diagnosed in general practice. Females were more likely to be diagnosed in general practice; more than half of female cases (52%) were diagnosed by GPs compared with 31% of cases among males; while 65% of male cases were diagnosed in an STI clinic, compared with 37% of cases among females (Table 3).

Table 3. Gonorrhoea notifications by sex and patient type in Ireland, 2018 (n=2,404*)

Patient type	Male		Female		Total	
	n [†]	% [‡]	n	% [§]	n	%
Emergency department	5	0.2	5	1.3	10	0.4
General Practice	617	30.7	204	52.2	821	34.2
Hospital (inpatient)	2	0.1	5	1.3	7	0.3
STI clinic (outpatient)	1300	64.6	143	36.6	1443	60.0
Other	57	2.8	23	5.9	80	3.3
Unknown	32	1.6	11	2.8	43	1.8
Total	2,013	100.0	391	100.0	2,404	100.0

*Excludes 1 case of unknown sex

†Number of cases

‡Proportion of all male cases

§Proportion of all female cases

||Proportion of all cases

Antimicrobial resistance in *N. gonorrhoeae* in Ireland

Antimicrobial resistance in *N. gonorrhoeae* is recognised as a global threat to public health and the World Health Organization (WHO) has warned that gonorrhoea may become untreatable in the future due to antimicrobial resistance (4). Resistance to the first-line antibiotics used for the treatment of gonorrhoea has typically developed shortly after the introduction of those antibiotics for the treatment of infection and the extended spectrum cephalosporin (ESC) class of antibiotics, such as ceftriaxone, are currently the last remaining option for empirical treatment of infection (3).

Prior to December 2018, the national guidelines recommended dual therapy with ceftriaxone and azithromycin for treatment of gonorrhoea. On the advice of the clinical subgroup of the National Forum on Antimicrobial Resistance in *N. gonorrhoeae*, the

recommended dose of ceftriaxone for treatment of uncomplicated anogenital and pharyngeal gonorrhoea in adults (without cephalosporin allergy) doubled to ceftriaxone 1g intramuscularly. With this higher dose of ceftriaxone, dual therapy with oral azithromycin is no longer recommended (5). Azithromycin had been thought to act as a barrier to the development of ceftriaxone resistance but increasing levels of azithromycin resistance threatened the success of the dual therapy regimen.

High level azithromycin resistant (HL-AziR) gonococcal isolates are not susceptible to azithromycin and exhibit *in vitro* azithromycin minimum inhibitory concentrations (MIC) ≥ 256 mg/L. Enhanced surveillance is carried out on cases of HL-AziR gonorrhoea in Ireland to detect outbreaks, to collate information on the epidemiology of cases of HL-AziR gonorrhoea and to use this information to guide treatment and management of gonococcal infection in Ireland.

During 2018 there were seven cases of HL-AziR gonorrhoea reported in Ireland (six males and one female), an increase from five cases reported during 2017 (6). There was no known epidemiological link between the cases. Cases had a median age of 25 years (range 19-35 years). Site of infection was reported as genital in six cases and pharyngeal in one case. Six cases were reported as symptomatic and one case was asymptomatic. Two cases were concurrently infected with chlamydia. Among the male cases, mode of transmission was reported as heterosexual for five cases and MSM for one case. All cases reported Ireland as their country of birth. Data on antibiotics prescribed for the treatment of infection were available for all cases; the dual therapy regimen of ceftriaxone with azithromycin was used in six cases and ceftriaxone alone was used in one case. Where Test of Cure data were available (n=3) all tests were negative, indicating the infection had been successfully treated.

In addition to the cases of HL-AziR gonorrhoea reported in Ireland in 2018 there was also one case of ceftriaxone resistant gonorrhoea reported in Ireland in 2018, in a heterosexual male linked with travel to Asia (7, 8). There have been no reported cases of treatment failure in Ireland to date.

More detailed reports on trends in gonorrhoea antimicrobial resistance in Ireland are available on the HPSC website: <https://www.hpsc.ie/a-z/sexuallytransmittedinfections/gonorrhoea/amrgonorrhoea/surveillance-reports/>

Discussion and Recommendations

National data show that there was a 7% increase in gonorrhoea notifications in 2018 compared with 2017. The percentage increase seen in 2018 continues the increasing trend in gonorrhoea notifications, which have increased by 86% since 2015. Data from England, Scotland and Northern Ireland show increases in gonorrhoea notification rates of 26%, 24% and 30%, respectively, in 2018 compared with 2017 (9-11). Globally rising rates of gonorrhoea infection are causing concern, particularly in the context of the threat of untreatable gonorrhoea.

The overall increase seen nationally could be mainly attributed to a 10% increase among males, while the notification rate among females decreased slightly in 2018, compared to 2017. Young people and MSM remained key populations that were affected by gonorrhoea in 2018.

Young people, aged 15-24 years, were disproportionately affected by gonorrhoea; with almost a third of cases notified among this group in 2018. Encouragingly, the proportion and rate of notifications among this age group decreased in 2018, compared to 2017, however the rate has increased by 52% since 2015. National sexual health awareness campaigns, such as the #respectprotect campaign that was launched by HSE Sexual Health and Crisis Pregnancy Programme (SHCPP) to engage young people on social media platforms and to promote safer sex and the importance of regular testing for STIs, play a key role in sexual health promotion among young people.

The increase in the proportion of cases reported among 25-29 year olds in 2018, compared to 2017, was likely to have been driven by increases among MSM in this age group. The completeness of mode of transmission data was comparable in 2017 and 2018 but the proportion of cases notified as MSM, where mode of transmission was known, increased in 2018 and the notification rate among MSM increased by 11% to more than one per 100 MSM (or 1% of MSM), continuing the increasing trend among MSM since 2015. Increases in gonorrhoea and other STIs and HIV among MSM were addressed by the National MSM HIV/STI Increase Response Group, which met between 2016 and 2018 and coordinated intervention and health promotion strategies, such as condom distribution, peer outreach and comprehensive HIV and STI testing (12). This work is being continued by the MSM Health Committee coordinated by SHCPP.

Continued improvements in completeness of mode of transmission data are essential to more accurately describe the burden of disease nationally and to inform health promotion interventions. Close surveillance of gonorrhoea trends is especially important as the number of gonorrhoea infections with resistance to first-line antibiotics is a growing threat (13). As recommended in the national guidelines for the prevention and control of gonorrhoea and for minimising the impact of antimicrobial resistance in *N. gonorrhoeae*, mode of transmission information may inform clinical and laboratory policy on culturing and antimicrobial susceptibility testing of isolates from patients in key populations (14). The national guidelines, published in 2017, provide guidance on the clinical, laboratory and public health management of gonorrhoea infection and on the gonorrhoea prevention strategies that can be employed to reduce the risk of antimicrobial resistance in gonorrhoea. A National Multidisciplinary Forum on antimicrobial resistance in gonorrhoea was convened in 2018 and is working to review international and national data and to provide guidance on prevention and management of gonorrhoea in Ireland.

Technical notes

1. Data were analysed by date of notification on CIDR.
2. Data for this report were extracted from CIDR on 1st of August, 2019, and were correct at the time of publication.
3. Please note that the information from previous years is updated on an ongoing basis in CIDR, and so information on previous years represents our current understanding and most up to date data as of 1st August, 2019, and may not correspond exactly with what was reported in previous annual reports. Similarly, data for 2018 may be updated further in due course and will be reported on in subsequent annual reports.
4. While efforts are made to remove duplicate records from these data, it is not always possible to link and remove all duplicate records and some patients or disease events may be counted more than once.
5. Percentages are rounded to the nearest whole number in the text and are provided to one decimal place in the tables.
6. The counties covered by each HSE area are as follows: HSE East (ERHA): Dublin, Kildare & Wicklow; HSE Midlands (MHB): Laois, Longford, Offaly & Westmeath; HSE Midwest (MWHB): Clare, Limerick & Tipperary North; HSE Northeast (NEHB): Cavan, Louth, Meath & Monaghan; HSE Northwest (NWHB): Donegal, Leitrim & Sligo; HSE South (SHB): Kerry & Cork; HSE Southeast (SEHB) Carlow, Kilkenny, Tipperary South, Waterford & Wexford; HSE West (WHB): Galway, Mayo & Roscommon.
7. For calculation of the rate of gonorrhoea notifications per 100,000 MSM population, the MSM population was calculated as 6% of the Irish male population aged between 18 and 64 years (Census 2016), as estimated by the Healthy Ireland survey, which is a nationally representative survey. For calculation of the rates among MSM by age group the direct method was used (see technical note 8) and the MSM population was calculated as 6% of males per age group.
8. Age standardised notification rates were calculated using the direct method in which the national population was taken as the standard population. Population data were taken from Census 2016 from the Central Statistics Office (www.cso.ie). Data were aggregated into the following age groups for analysis: 0-4 years, 5-9 years, 10-14 years, 15-19 years, 20-24 years, 25-34 years, 45-54 years, 55-64 years and ≥65 years.

Further information

Further information on free sexual health services can be found at:

- <https://www.sexualwellbeing.ie/sexual-health/hse-sti-services-in-ireland.html>

Further information on gonorrhoea and general sexual health can be found at:

- <https://www.sexualwellbeing.ie/>
- <http://man2man.ie/> (resource for gay and bisexual men and other men who have sex with men in Ireland)

Further information on treatment of gonorrhoea can be found at:

- <https://www.hse.ie/eng/services/list/2/gp/antibiotic-prescribing/conditions-and-treatments/genital/gonorrhoea/>

Previous reports on gonorrhoea can be found on the HPSC website at:

- <https://www.hpsc.ie/a-z/sexuallytransmittedinfections/gonorrhoea/>

Information and guidance on gonorrhoea antimicrobial resistance can be found on the HPSC website at:

- <https://www.hpsc.ie/a-z/sexuallytransmittedinfections/gonorrhoea/amrgonorrhoea/>

Keep up to date with STI reports on the HPSC website at:

- <https://www.hpsc.ie/a-z/sexuallytransmittedinfections/publications/stireports/>
- <https://www.hpsc.ie/a-z/sexuallytransmittedinfections/publications/stireports/stiweeklyreports/>

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Report prepared by:

Aoife Colgan and Derval Igoe, September 2019.

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