



Antimicrobial resistance in *Neisseria gonorrhoeae*, Ireland 2015-2025

Health Protection Surveillance Centre & National Gonococcal Reference Laboratory, SJH.

Based on data from isolates submitted to EURO-GASP

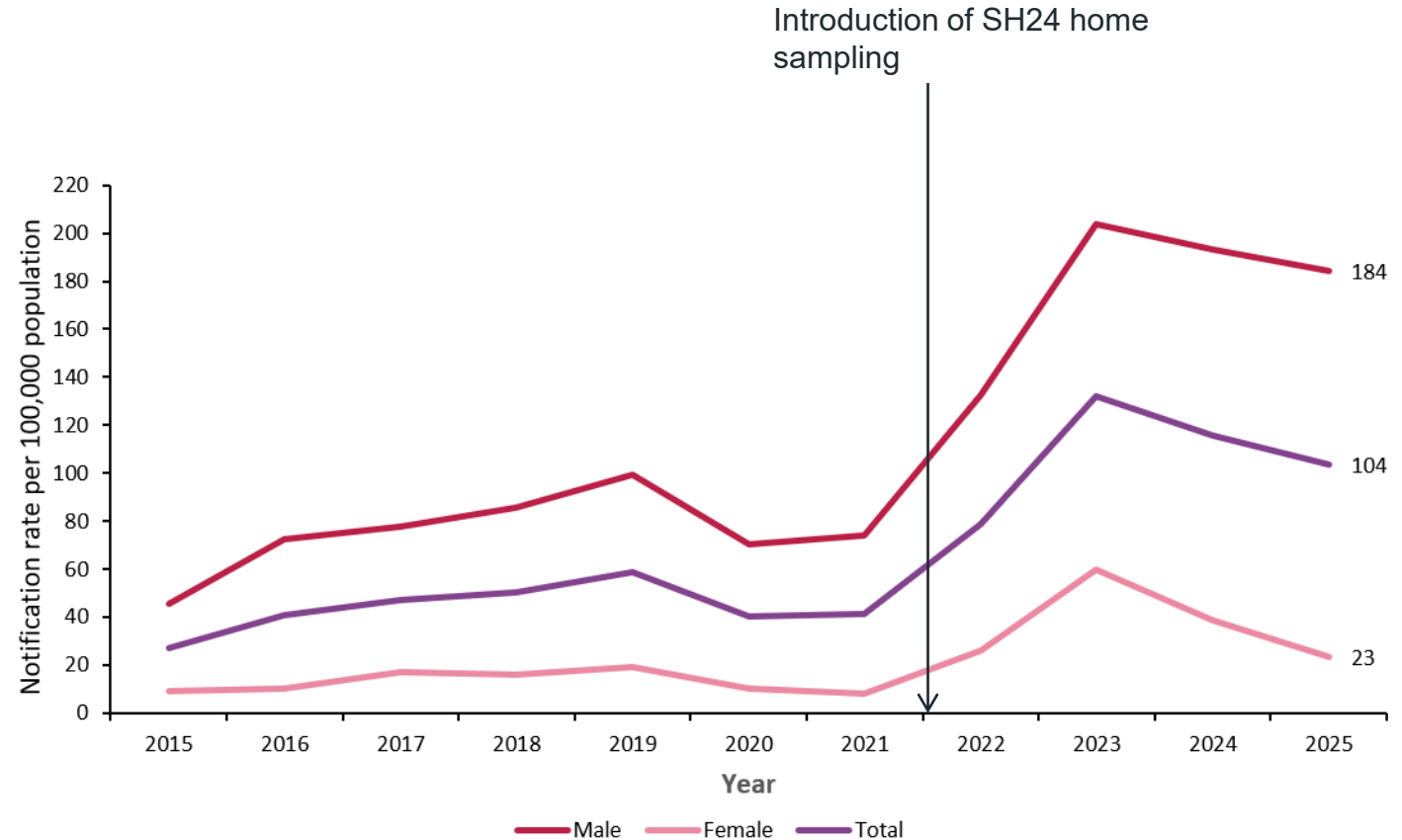


Gonorrhoea in Ireland

Trend in notification rate of gonorrhoea by gender, 2015-2025

There were **5,332** cases of gonorrhoea notified in 2025

Further information on epidemiology of gonorrhoea in 2025 can be found in the [Sexually Transmitted Infections \(STIs\) in Ireland: Trends to the end of 2025 report](#)



Male includes cis male and trans male (where known) and female includes cis female and trans female (where known)

Rates calculated: 2015-2019= 2016 census, 2020-2025= 2022 census

Between 2021 and 2022 free home Sexually Transmitted Infections (STI) sampling was introduced www.sexualwellbeing.ie



Antimicrobial resistance (AMR) in *Neisseria gonorrhoeae*, a World Health Organization priority



- Gonorrhoea infection is becoming increasingly difficult to treat due to the development of antimicrobial resistance to all major drug classes used to treat infection
- The extended spectrum cephalosporin (ESC), ceftriaxone, is the current last remaining option for first-line treatment
- The WHO [Bacterial Priority Pathogen List, 2024](#), includes 15 families of antibiotic-resistant pathogens, grouped into critical, high and medium categories of priority for research and development and for public health measures. *N. gonorrhoeae* has been listed in the **high priority category** due to the emergence of multidrug-resistant strains, which limit treatment options



Euro-GASP

European Gonococcal Antimicrobial Surveillance Programme



- Euro-GASP monitors trends in gonococcal antimicrobial susceptibility to detect increasing and emerging antimicrobial resistance and to provide quality-assured data to inform national and international treatment guidelines

[European Gonococcal Antimicrobial Surveillance Programme \(Euro-GASP\) \(europa.eu\)](http://europa.eu)

- Euro-GASP is a sentinel surveillance programme involving centralised or de-centralised antimicrobial susceptibility testing of *N. gonorrhoeae* isolates in participating countries
- EU/EEA Member States participate in Euro-GASP's annual survey conducted over 3-month period (September-November)
- Countries should aim to report AMR and linked epidemiological data for 100 cases (or 10%) of total national notifications and up to 200 cases for countries with a higher number of national notifications



Irish participation Euro-GASP



- Participating since 2010
- Antimicrobial susceptibility testing performed by National Gonococcal Reference Laboratory (NGRL), St James's Hospital (2017-present), Department of Clinical Microbiology St James's Hospital (SJH) (2013-2016), and Public Health England (2010-2012)
- Linked epidemiological data is collated from isolate referral forms, enhanced surveillance forms and clinical notes (where available)
- **Data source:** All isolates received and tested in the NGRL over the Euro-GASP survey period. Most recent data presented in this report are on **326** Irish isolates reported for September - November 2025. They represent **6%** of total national gonorrhoea notifications and **24%** of isolates tested at NGRL in 2025
- This report is based on data submitted to Euro-GASP and does not represent the total antimicrobial resistant profile nationally for 2025



Epidemiological characteristics of individuals with isolates submitted to Euro-GASP by gender and mode of transmission, 2025

	Females	Heterosexual males	gbMSM~	Other/unknown males	Total
Number of individuals (n)	28	32	214	52	326
	n (% of n)	n (% of n)	n (% of n)	n (% of n)	n (% of n)
Age group (years)					
15-19	3 (11%)	1 (3%)	3 (1%)	4 (8%)	11 (3%)
20-24	12 (43%)	10 (31%)	27 (13%)	8 (15%)	57 (17%)
25-29	5 (18%)	7 (22%)	55 (26%)	9 (17%)	76 (23%)
30-34	3 (11%)	7 (22%)	51 (24%)	10 (19%)	71 (22%)
35-39	2 (7%)	2 (6%)	38 (18%)	5 (10%)	47 (14%)
40-44	1 (4%)	2 (6%)	25 (12%)	5 (10%)	33 (10%)
45-49	1 (4%)	2 (6%)	9 (4%)	3 (6%)	15 (5%)
50+	1 (4%)	1 (3%)	6 (3%)	8 (15%)	16 (5%)
Not reported	0%	0%	0%	0%	0%
Median age (Years)	33	28	31	33	30
Age range (Years)	18-63	18-67	17-73	18-67	17-73
Residence					
Dublin	19 (68%)	22 (69%)	176 (82%)	18 (35%)	235 (72%)
Outside Dublin	9 (32%)	10 (31%)	38 (18%)	34 (65%)	91 (28%)
Country of birth					
Ireland	6 (21%)	3 (9%)	62 (29%)	2 (4%)	73 (22%)
Outside Ireland	0%	7 (22%)	86 (40%)	5 (10%)	98 (30%)
Not reported	22 (79%)	22 (69%)	66 (31%)	45 (87%)	155 (48%)

Comparing 2024 and 2025 isolates:

- The proportion of isolates from females has reduced from **12%** in 2024 to **9%** in 2025
- The age distribution of all isolates remains relatively unchanged; the median age has decreased slightly from 31 years in 2024 to 30 years in 2025
- The proportion of isolates from people living in Dublin has decreased from **81%** in 2024 to **72%** in 2025
 - The large proportion of isolates from the Dublin area is not unexpected. The NGRL test samples predominantly from STI clinics in Dublin

~ gbMSM: gay, bisexual and other men who have sex with men

[*Antimicrobial resistance in Neisseria gonorrhoeae, Ireland 2010-2024](#)



Epidemiological characteristics of individuals with isolates submitted to Euro-GASP by gender and mode of transmission, 2025

	Females	Heterosexual males	gbMSM~	Other/unknown males	Total
Number of individuals (n)	28	32	214	52	326
	n (% of n)	n (% of n)	n (% of n)	n (% of n)	n (% of n)
HIV status					
Negative	14 (50%)	20 (63%)	156 (73%)	3 (6%)	193 (59%)
Positive	0%	0%	25 (12%)	1 (2%)	26 (8%)
Not reported	14 (50%)	12(38%)	33 (15%)	48 (92%)	107 (33%)
Site of infection †					
Genital	20 (71%)	28 (88%)	67 (31%)	26 (50%)	141 (43%)
Rectal	3 (11%)	3 (9%)	93 (43%)	17 (33%)	116 (36%)
Pharyngeal	5 (18%)	1 (3%)	54 (25%)	6 (12%)	66 (20%)
Other Site	0%	0%	0%	2 (4%)	2 (1%)
Concurrent STI^					
Chlamydia	6 (21%)	6 (19%)	31 (14%)	6 (12%)	49 (15%)
Syphilis	1 (4%)	0%	6 (3%)	0%	7 (2%)
Mpox	0%	0%	1 (<1%)	0%	1 (<1%)
Mycoplasma genitalium	0%	0%	1 (<1%)	0%	1 (<1%)
Herpes Type 2 (HSV-2)	0%	0%	1 (<1%)	1 (2%)	2 (1%)
Trichomoniasis	1 (4%)	0%	0%	0%	1 (<1%)
Lymphogranuloma venereum	0%	0%	1 (<1%)	0%	1 (<1%)
No concurrent infection	11 (39%)	15 (47%)	131 (61%)	3 (6%)	160 (49%)
Not reported	10 (36%)	11 (34%)	45 (21%)	43 (83%)	109 (33%)
Previous gonorrhoea infection					
Yes	2 (7%)	6 (19%)	107 (50%)	9 (17%)	124 (38%)
No	0%	0%	17 (8%)	0%	17 (5%)
Not reported	26 (93%)	26 (81%)	90 (42%)	43 (83%)	185 (57%)

Note: Direct comparison with previous years is not advised due to lack of completeness in enhanced data

From the available enhanced data, in 2025:

- **8%** of isolates are from individuals who are living with HIV
- **43%** of isolates were obtained from genital swabs
- **15%** of individuals were co infected with chlamydia
- **38%** of individuals had a previous gonorrhoea infection

† Not all individuals are tested for gonorrhoea at each site, and individuals can be infected at more than one site

^ Concurrent STI: another STI diagnosed within 4 weeks of the positive gonorrhoea notification

~ gbMSM: gay, bisexual and other men who have sex with men



Epidemiological antimicrobial resistance definitions

To allow for European comparison, results from antimicrobial susceptibility testing were interpreted in line with Euro-GASP analysis, using breakpoints from the European Committee on Antimicrobial Susceptibility Testing (EUCAST **):

- Cefixime resistance, MIC* >0.125 mg/L
- Ceftriaxone resistance, MIC >0.125 mg/L
- Tetracycline resistance, MIC > 0.5mg/L
- Ciprofloxacin resistance, MIC >0.06 mg/L
- β -lactamase production for detection of high-level penicillin resistance, penicillinase screen positive
- Azithromycin epidemiological cut-off value (ECOFF), MIC >1 mg/L[^]

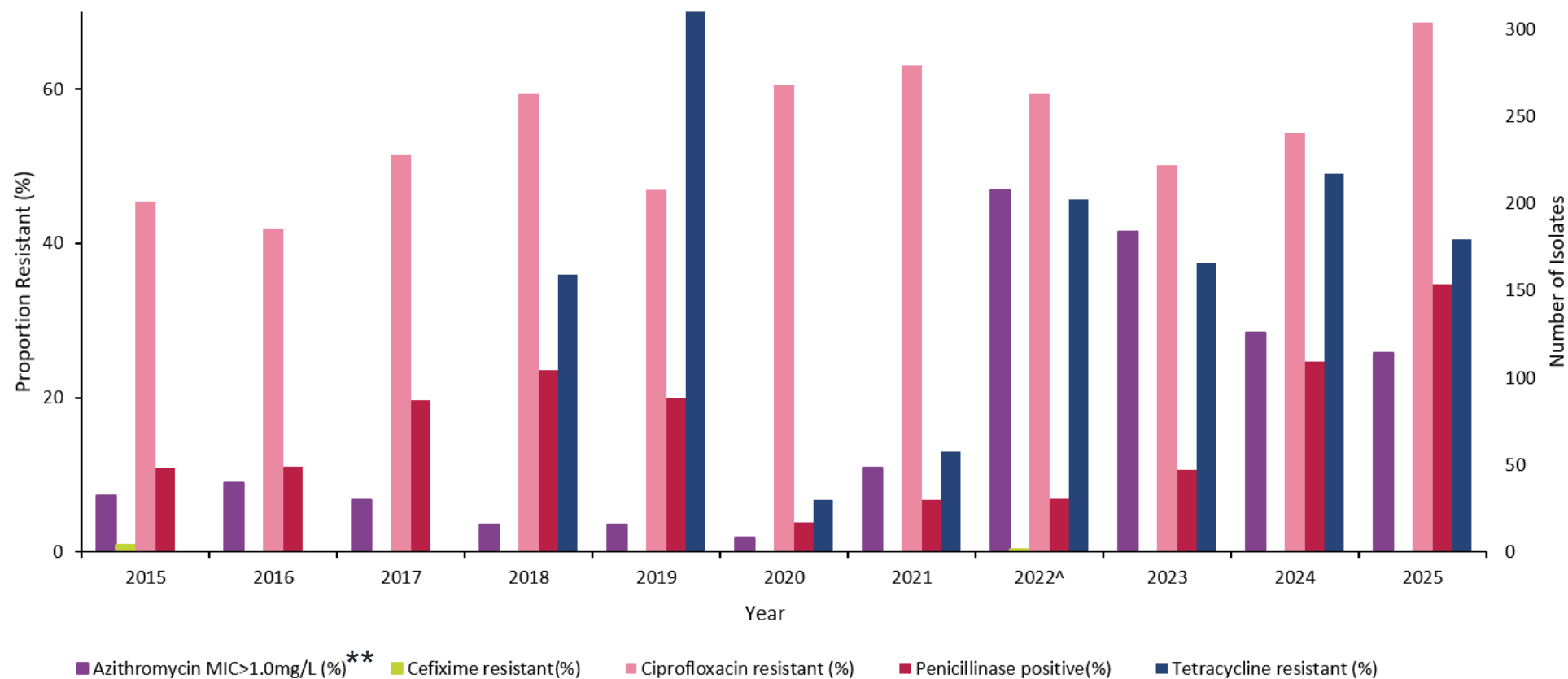
**European Committee on Antimicrobial Susceptibility Testing (EUCAST). 'Breakpoint tables for interpretation of MICs and zone diameters, version 15' [EUCAST](#)

*MIC: Minimum Inhibitory Concentration

[^] In January 2019, the EUCAST clinical resistance breakpoint for azithromycin of MIC >0.5 mg/L was replaced with an epidemiological cut-off (ECOFF) value of MIC >1 mg/L



Trends in gonorrhoea antimicrobial resistance in Ireland* (Euro-GASP, 2015-2025)



*EUCAST guidelines, version 15' [EUCAST](#)

**Azithromycin MIC above ECOFF (>1 mg/L)

^1 cefixime resistant isolate in 2022



Trends in gonorrhoea antimicrobial resistance in Ireland* (Euro-GASP, 2015-2025)



Year	Number Isolates tested	AZM-MIC>1.0 mg/L	%AZM-MIC>1.0 mg/L	CFM-R	%CFM-R	CIP-R	%CIP-R	PPNG	% PPNG	Number Isolates tested (TET)	TET-R	%TET-R
2015	110	8	7%	1	1%	50	45%	12	11%	N/A	N/A	N/A
2016	100	9	9%	0	0%	42	42%	11	11%	N/A	N/A	N/A
2017	163	11	7%	0	0%	84	52%	32	20%	9	0	0%
2018	200	7	4%	0	0%	119	60%	47	24%	25	9	36%
2019	200	7	4%	0	0%	94	47%	40	20%	4	3	75%
2020	104	2	2%	0	0%	63	61%	4	4%	15	1	7%
2021	119	13	11%	0	0%	75	63%	8	7%	23	3	13%
2022	294	138	47%	1	0%	175	60%	20	7%	247	113	46%
2023	253	105	42%	0	0%	127	50%	27	11%	253	95	38%
2024	243	69	28%	0	0%	132	54%	60	25%	243	119	49%
2025	326	84	26%	0	0%	224	69%	113	35%	326	194	60%

AZM – MIC >1.0mg/L – above ECOFF; CFM-R, cefixime- resistant; CIP-R, ciprofloxacin-resistant; PPNG, penicillinase positive, TET-R, tetracycline resistance

* EUCAST guidelines, version 15' [EUCAST](#)



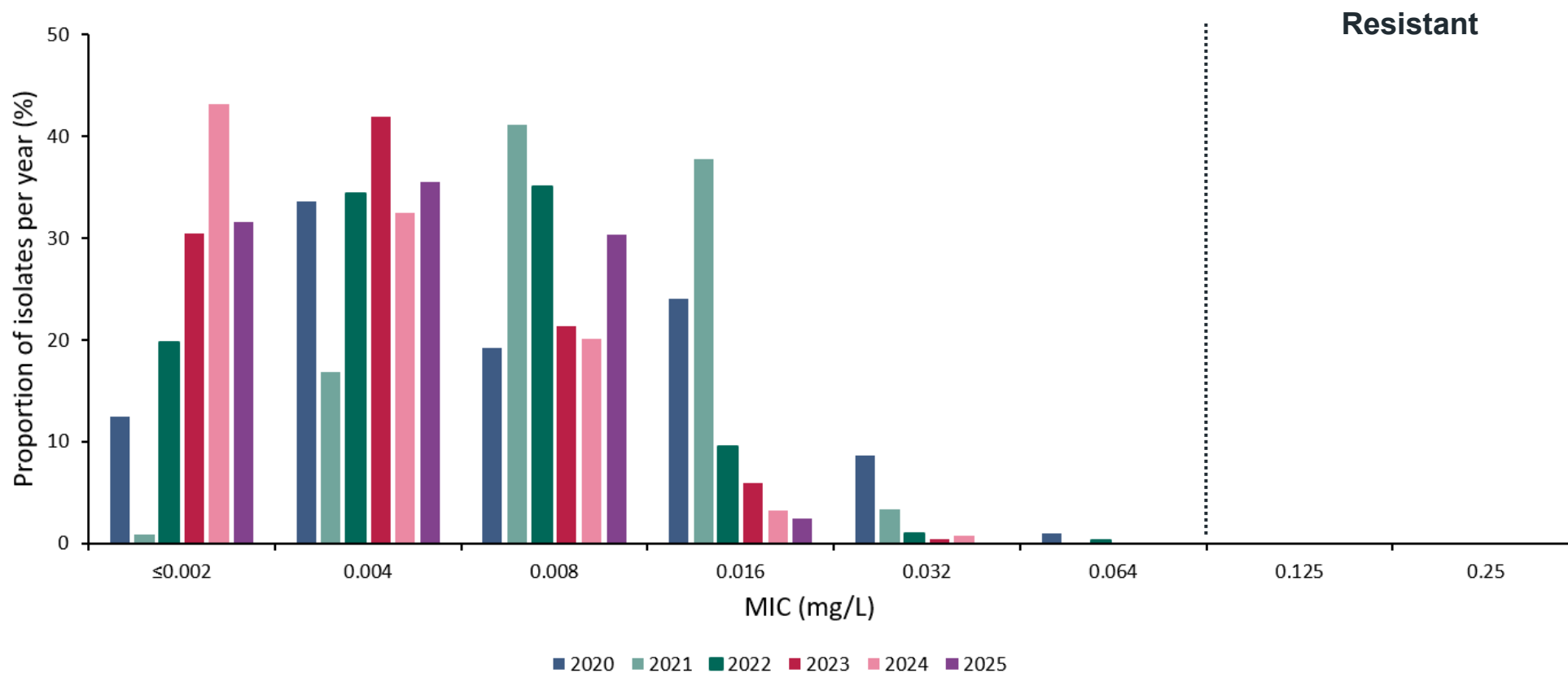
Cefixime and Ceftriaxone



- Ceftriaxone is the only recommended empirical monotherapy for treatment of gonorrhoea at present (for treatment guidelines, see [Gonorrhoea - HSE.ie](https://www.hse.ie/eng/health/sexual_health/gonorrhoea_treatment_guidelines.htm))
- The [WHO](https://www.who.int/) have warned of the rising global levels of Extended Spectrum Cephalosporin (ECS) resistant gonorrhoea. Although, in Ireland ESC resistant isolates continue to be rare
- There have been 4 isolates with resistance to Ceftriaxone and Cefixime reported in Ireland since 2015. These were reported in 2018 (n=1), 2023 (n=1), 2024 (n=1) and 2025 (n=1)
 - All 4 ESC resistant isolates were reported outside the Euro-GASP study period (Sept-Nov) and are therefore not included in trend tables and graphs



Trends in Ceftriaxone MIC (mg/L) among gonococcal isolates in Ireland, (Euro-GASP, 2020-2025)



The line indicates the threshold for antimicrobial resistance according to EUCAST guidelines



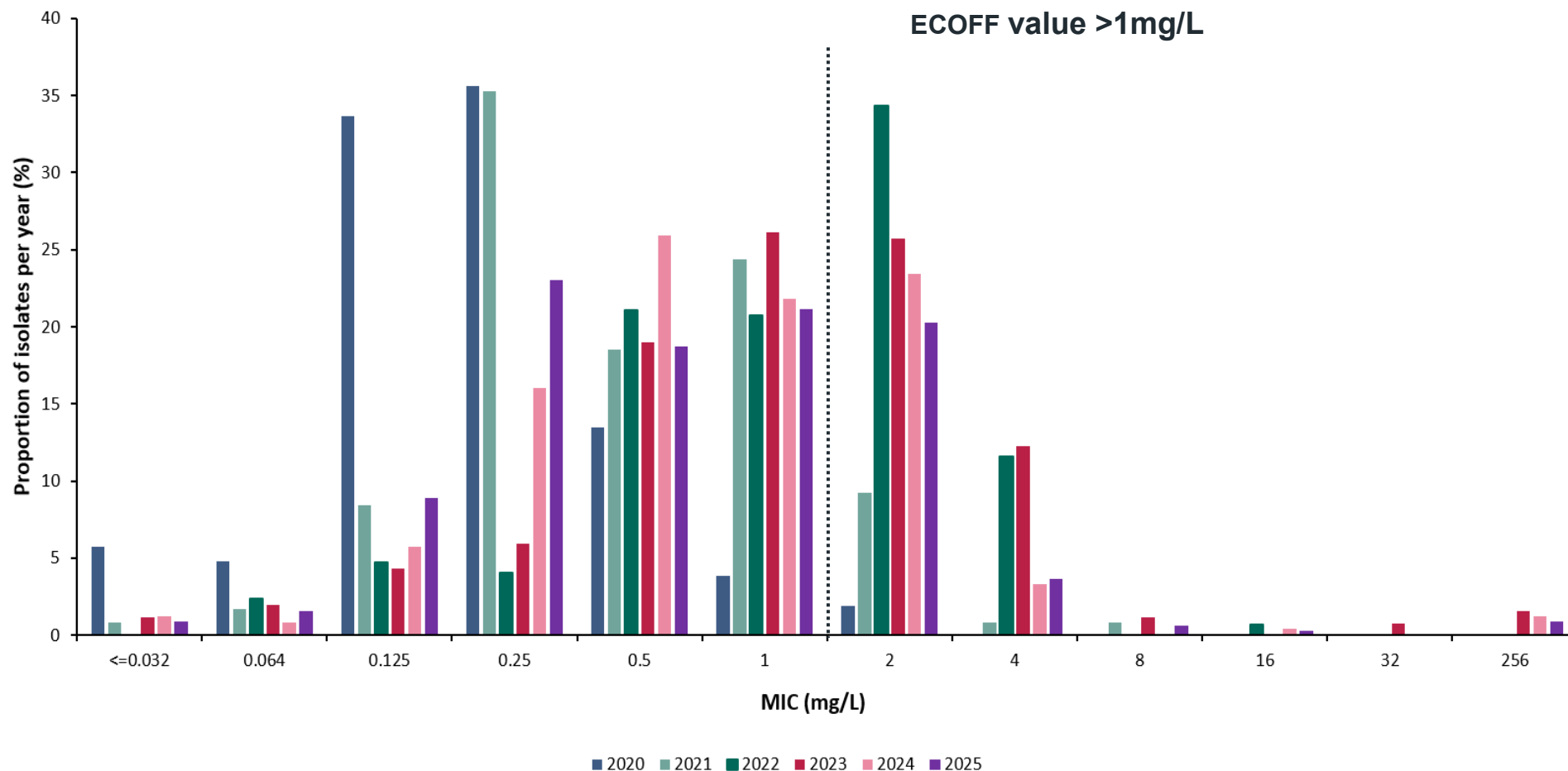
Azithromycin

- Dual therapy including azithromycin is no longer recommended as first-line treatment for gonorrhoea
 - for treatment guidelines see [Gonorrhoea - HSE.ie](https://www.hse.ie/eng/health/azithromycin_gonorrhoea_treatment_guidelines.htm)
- In January 2019, The European Committee on Antimicrobial Susceptibility Testing (EUCAST) removed the clinical resistance breakpoint of >0.5mg/L for azithromycin treatment of gonorrhoea
 - Use of the Epidemiological Cut-Off Value (ECOFF) of >1.0mg/L is now recommended.
- The proportion of isolates exhibiting MICs above the ECOFF decreased from **28%** in 2024 to **26%** in 2025
- The percentage of female isolates with azithromycin resistance decreased from **39%** in 2024 to **32%** in 2025
- The percentage of gbMSM isolates with azithromycin resistance decreased from **72%** in 2024 to **60%** in 2025
- Although there has been a decrease in proportion of isolates exhibiting MICs above the ECOFF again in 2025, the increase above 2020 levels may reflect use of azithromycin for non-genital infections
- Isolates with MICs above the ECOFF by sex and mode of transmission in 2025:

Male	%
Total Male	25%
gbMSM	60%
Heterosexual males	12%
Males where mode of transmission not known	28%
Female	
Total Female	32%



Trends in Azithromycin MIC (mg/L) among gonococcal isolates in Ireland (Euro-GASP, 2020-2025)



The line indicates the ECOFF value >1mg/L



Tetracycline

- Due to widespread antimicrobial resistance, tetracycline is no longer recommended as a treatment for gonorrhoea
- Doxycycline Post-Exposure Prophylaxis (Doxy-PEP) is a tetracycline-class antibiotic which is used to reduce the risk of acquiring syphilis and chlamydia. While high preexisting tetracycline resistance in *N. gonorrhoeae* renders Doxy-PEP relatively ineffective for gonorrhoea, its use may increase selective pressure on *N. gonorrhoeae* and other bacterial species. Monitoring trends in tetracycline resistance helps inform clinical guidelines for treatment and prophylaxis use and ensures antimicrobial stewardship
- The proportion of isolates resistant to tetracycline increased from **49%** in 2024 to **60%** in 2025
- The proportion of female isolates with tetracycline resistance remains unchanged at **39%** in 2025
- The proportion of gbMSM isolates with tetracycline resistance increased from **69%** in 2024 to **75%** in 2025
- Isolates resistant to Tetracycline by sex and mode of transmission in 2025:

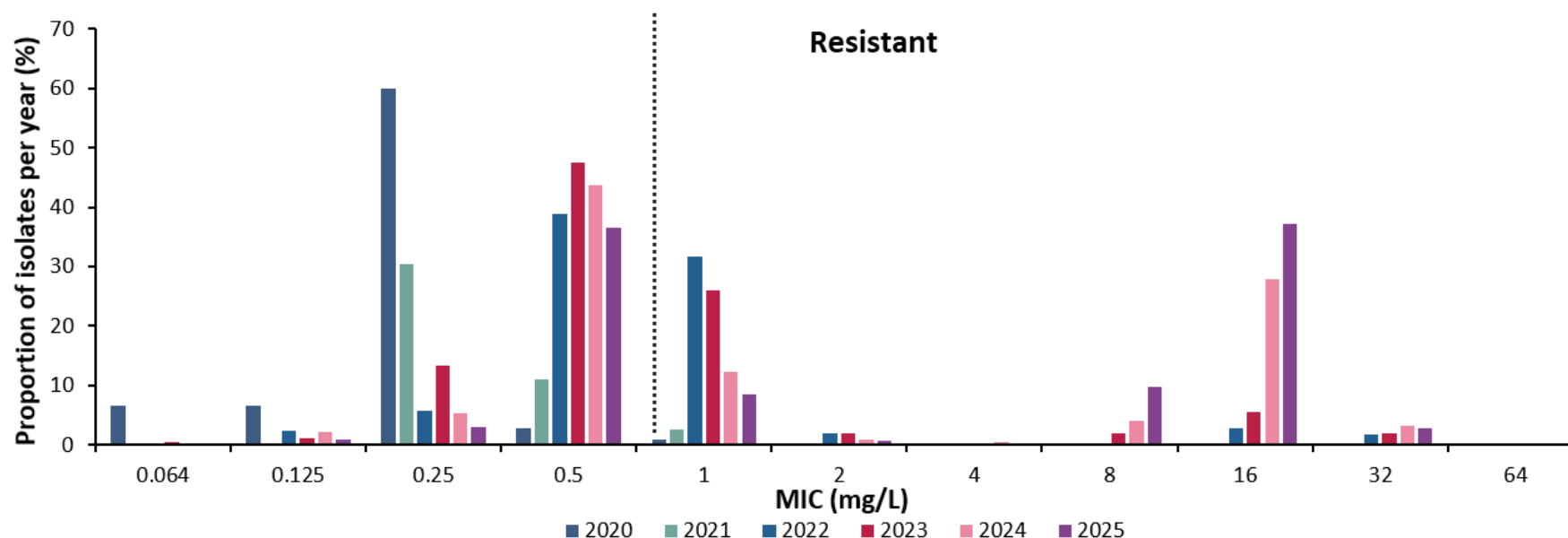
Male	%
Total Male	62%
gbMSM	75%
Heterosexual males	8%
Males where mode of transmission not known	16%
Female	
Total Female	39%



Trends in Tetracycline MIC (mg/L) among gonococcal isolates in Ireland (Euro-GASP, 2020-2025)



- The European Committee on Antimicrobial Susceptibility Testing (EUCAST) updated the resistance breakpoint to > 0.5mg/L for tetracycline treatment of gonorrhoea in 2023. Interpretation using the new breakpoint was retrospectively applied for analysis of trends in tetracycline resistance



	2020	2021	2022	2023	2024	2025
Number of isolates	104	219	298	253	243	326
Number of isolates tested for Tetracycline Resistance*	15	23	248	253	243	326

The line indicates the threshold for antimicrobial resistance according to EUCAST guidelines

* Routine tetracycline surveillance was formally incorporated into Euro-GASP in 2023. Consequently, before 2023, not all gonococcal isolates in Ireland were tested for tetracycline resistance



Other antimicrobial resistance detected among gonococcal isolates in Ireland



- Ciprofloxacin may be recommended for treatment of gonorrhoea in cases of cephalosporin allergy, if the isolate is known to be quinolone sensitive
 - The proportion of isolates resistant to ciprofloxacin increased from **54%** in 2024 to **69%** in 2025
 - The proportion of female isolates with ciprofloxacin resistance increased from **57%** in 2024 to **73%** in 2025
 - The proportion of gbMSM isolates with ciprofloxacin resistance increased from **70%** in 2024 to **72%** in 2025

- Isolates resistant to ciprofloxacin by sex and mode of transmission in 2025:

Male	%
Total Male	68%
gbMSM	72%
Heterosexual males	10%
Males where mode of transmission not known	17%
Female	
Total Female	73%

- Production of β -lactamase confers high level resistance to penicillin
 - **35%** of isolates produced β -lactamase (i.e. penicillinase screen positive) in 2025, an increase compared to **25%** of isolates in 2024



Key points summary



These data have important implications for the clinical management of gonorrhoea in Ireland:

In 2025:

- Gonorrhoea notifications have declined from a peak of 6,802 cases in 2023 to 5,332 cases in 2025. Despite this decrease, notification numbers remain 90% higher than pre-COVID-19 levels, when 2,805 cases were notified in 2019
- Data submitted to Euro-GASP represent 6% of total gonorrhoea notifications nationally
- One case of extended spectrum cephalosporin resistant *N. gonorrhoeae* was reported outside the study period (Sept-Nov 2025)
- Azithromycin reduced susceptibility (ECOFF above MIC >1 mg/L) was identified in **26%** of isolates, compared with **28%** in 2024
- Tetracycline resistance (MIC >0.5 mg/L) was present in **60%** of isolates, an increase from **49%** in 2024
- Ciprofloxacin resistance (MIC >0.06 mg/L) was present in **69%** of isolates, an increase from **54%** in 2024
- β -lactamase production (penicillinase screen positive) was present in **35%** of isolates, an increase from **25%** in 2024



Public health implications and key recommendations



Recommendations for Policy

- The development of comprehensive public sexual health services that are appropriately funded and resourced to meet sexual health needs, should be supported

Recommendations for Clinicians

- Clinicians should ensure that all cases of gonorrhoea are managed according to national guidelines and that samples for culture and antimicrobial susceptibility testing are taken as recommended in the [national guidelines](#)
- Possible cases of treatment failure should be reported to the HPSC. The [treatment failure form](#), enhanced [Euro-GASP Surveillance form](#) and the [protocol for surveillance of ceftriaxone resistant gonorrhoea](#) and [Surveillance of High Level Azithromycin Resistant \(HL-AziR\) Gonorrhoea](#) can be found on the HPSC website



Recommendations for Public Health

- Surveillance of AMR in *N. gonorrhoeae* is crucial for monitoring national and international trends in antimicrobial resistance. Strengthening *N. gonorrhoeae* and *N. gonorrhoeae* AMR surveillance should be a priority to safeguard existing antimicrobial drugs and deliver effective public health measures
- Incomplete enhanced surveillance data for *N. gonorrhoeae* notifications limits the interpretation of disease trends. Improving the completeness of enhanced data would support more effective monitoring of transmission patterns and epidemiological trends
- A focus on prevention of gonorrhoea should be maintained through promotion of public health messages on safer sex and regular testing for STIs

Initiatives to improve data collection and completeness

- HPSC along with colleagues in Public Health and the Gay Men's Health Service (GMHS) Participated in an ECDC proof of concept project to develop a process within GMHS that extracted data contained in electronic health records (EHR) link these data to laboratory results and forward to public health for analysis and national surveillance. This successful project has informed the design of the new Outbreak, Case and Incident Management and Surveillance System (OCIMS)



Public health implications and key recommendations (3)



Recommendations for Laboratories

- Current submissions to EuroGASP only include isolates tested at the NGRL during Sept-Nov annually. Expansion of surveillance to increase submissions from regional laboratories and expand to year round surveillance would increase understanding of AMR in *N. gonorrhoeae* at a national level and is recommended by ECDC
- All laboratories should ensure isolates are tested for susceptibility to ceftriaxone and azithromycin, the recommended antimicrobials for first and second-line use in the treatment of gonorrhoea infection. Ciprofloxacin or cefixime may be considered as alternative options (only if shown to be sensitive on MIC testing, and where ceftriaxone is unsuitable)
- Laboratories should ensure isolates are also tested for susceptibility to tetracycline. It is important to monitor tetracycline resistance in *N. gonorrhoeae* in light of the evolving role and use of doxycycline as post-exposure prophylaxis for STIs (DoxyPEP)
- Isolates suspected of resistance to ceftriaxone should be submitted to the NGRL for confirmation, determination of antibiogram and molecular analysis



Further information



Further information on gonorrhoea and gonorrhoea antimicrobial resistance can be found on the HPSC website

[Gonorrhoea](#)

National Gonococcal Reference Laboratory, SJH

[National Gonococcal Reference Laboratory | St James's Hospital](#)

National guidelines for the prevention and control of gonorrhoea and for managing the impact of antimicrobial resistance in *Neisseria gonorrhoeae*

[AMR Gonorrhoea Guidance](#)

National framework for sexual health and wellbeing

[National Sexual Health Strategy, 2025 – 2035](#)

ECDC response plan to control and manage the threat of MDR and XDR gonorrhoea

[ECDC response plan](#)

The Man2Man campaign for gbMSM

[Man2Man.ie](#)

The HSE Sexual Health Programme (SHP)

[Sexualwellbeing.ie](#)

This report is based on data submitted to Euro-GASP's annual survey conducted over 3-month period (September-November) and does not represent the total antimicrobial resistant profile nationally for 2025

Slide 2: Gonorrhoea in Ireland

- Please note that the information from previous years is updated on an ongoing basis in the Computerised Infectious Disease Reporting (CIDR) system, and so information on previous years represents our current understanding and most up to date data as of 3rd March 2025 and may not correspond exactly with what was reported in previous annual reports. Similarly, data for 2025 may be updated further in due course and will be reported on in subsequent annual reports.
- 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.

Abbreviations

- gbMSM: gay, bisexual and other men who have sex with men
- Trans female: Assigned sex at birth is male and gender identity is female
- Trans male: Assigned sex at birth is female and gender identity is male



Technical notes (2)



Tetracycline

- The European Committee on Antimicrobial Susceptibility Testing (EUCAST) updated the resistance breakpoint to $> 0.5\text{mg/L}$ for tetracycline treatment of gonorrhoea in 2023. Interpretation using the new breakpoint was retrospectively applied for analysis of trends in tetracycline resistance in this report
- In 2022, Euro-GASP requested participating countries to submit tetracycline resistance data where available. Ireland submitted tetracycline susceptibility results for 248 of 298 isolates. Routine tetracycline surveillance was formally incorporated into Euro-GASP in 2023. Consequently, before 2023, not all gonococcal isolates in Ireland were tested for tetracycline resistance. Where tetracycline susceptibility results were available for 2017-2021 isolates, these results have been included in this report

Azithromycin

- In January 2019, EUCAST replaced the azithromycin clinical resistance breakpoint ($\text{MIC} > 0.5\text{ mg/L}$) with an epidemiological cut-off value (ECOFF) of $\text{MIC} > 1\text{ mg/L}$. This change was made because clinical outcomes for isolates with MIC values between 0.5 mg/L and 1.0 mg/L were too variable to reliably classify them as clinically resistant

Completeness in enhanced data

- Available enhanced data for gonorrhoea can vary considerably from year to year. Data quality is impacted by Regional Departments of Public Health and STI clinic resources. Findings should be interpreted with caution and direct comparison with previous years is not advised



Acknowledgements



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