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(RESEARCH ARTICLE)

A RETROSPECTIVE STUDY, DETERMINING THE LEVELS OF REPORTED CONFIRMED GONORRHOEA CASES IN EUROPEAN COUNTRIES FROM 2001 – 2023

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ABSTRACT

Gonorrhoea is a common sexually transmitted infection (STI) observed in all continents caused by *Neisseria gonorrhoeae.*

This research was aimed at understanding the continental status of Gonorrhoea in Europe. Data was obtained from the atlas on the site of the European Centre for Disease Prevention and Control (ECDC) surveillance atlas of infectious diseases. Using specific parameters, data was obtained for the years 2001 – 2023.

Results showed that Gonorrhoea reported cases was higher in Northern Europe compared to Southern Europe from 2011-2023. The Netherlands and France showed a steady increase in Gonorrhoea reported confirmed cases within the first decade at a rate of two folds and eight folds respectively. A further fourfold increase observed in Netherlands from 2011-2023, While France had over threefold increase within same duration.

These increases within each period analysed poses a threat as it could mean a possible similar increase in the present decade in both countries. Thus, detailed analysis is required to ascertain factors predisposing to this multiplying increase and strategies/new policies tackling the Gonorrhoea rate must be deployed to foster healthier nations.

Of particular epidemiological interest is the country of Romania that showed a continuous decline over the years analysed. Which is a key finding in this research. Thus, the strategies, policies and therapeutic measures applied in Romania needs to be studied to determine how the spread of Gonorrhoea was curtailed.

Keywords: *Neisseria Gonorrhoeae,* Reported Confirmed Gonorrhoea Cases, Europe, Sexually Transmitted Infection (STI), Retrospective Study

1 INTRODUCTION

Gonorrhoea is a common sexually transmitted infection (STI) observed in all continents caused by *Neisseria gonorrhoeae.*

A retrospective study analysed data collected between May 2021 and July 2023, inclusive of sociodemographic, sexual behaviour, and clinical data from 139 male participants in Poland. Molecular polymerase chain reaction (PCR) tests were conducted for *Neisseria gonorrhoeae* (NG), *Chlamydia trachomatis* (CT), *Mycoplasma genitalium*, and *Trichomonas vaginalis*. Of the participants, 36% tested positive for at least one STI, with the urethra being the most common site of infection. NG and CT were observed to be the most prevalent infections (Kadylak et al, 2024).

In Central Europe, 440 patients were tested for prevalence of STIs at extragenital sites, who presented at the STI outpatient clinic of a tertiary centre. The most frequently detected extragenital pathogen was *Neisseria gonorrhoeae* (Kogler et al, 2025)

Prevalence and risk factors of Gonorrhoea were as well detected amongst rural Nepali women. A cross-sectional study was done in a sample of 1177 postpartum women engaging in a micronutrient supplementation trial in Nepal. *N gonorrhoeae* was detected in 2.3% of women tested. Lower abdominal pain, pain and burning on urination, and vaginal discharge was associated with Gonorrhoea infection (Christian et al, 2005).

Also, among 3,698 male patients tested in Hong Kong (2014–2015), chlamydia/gonorrhoea coinfection was the commonest among all coinfections (77%) tested (Chung et al, 2023).

Gonorrhoea incidence data in China from 2004 to 2021 were collected through the China Public Health Science Data Centre and National Administration of Disease Prevention and Control. It was observed that a total of 2,289,435 cases of gonorrhoea were reported in China, during the above-mentioned study duration (Chen et al, 2023).

Also, North America Estimated incidence and prevalence of gonorrhoea in the United States was detected and 1,603,473 incident cases of gonorrhoea was estimated in 2019 (Pollock et al, 2023). The burden of gonorrhoea was also reported to increase among men and women aged 15 to 39 years since 2013 (Pollock et al, 2023).

Epidemiological trends and factors associated with the morbidity rate of gonorrhoea in the United States was determined using a CDC-Wonder database analysis. A total of 6,454,097 individuals diagnosed with gonorrhoea between 1996 and 2014 was observed. Individuals aged 19-24 and the black or African American population, were determined to have higher morbidity rates compared to others (Akinboro et al, 2023).

Prevalence of *N. gonorrhoeae* has also been reported in Canada. Gonorrhoea cases in Canada rose from 32.4 per 100 000 in 1992 to 92.3 in 2022. In 2020, 36.9% of gonorrhoea cases in Canada were female (Suarez-Ariza et al, 2026).

One hundred and fifteen MSM aged 16-50 were tested, in a study at Sofia, Bulgaria. The prevalence of *C. trachomatis* was 8.7% in the rectal samples tested, and the prevalence of *N. gonorrhoeae* was 0.9% and 5.2% in the pharyngeal and rectal samples, respectively (Philipova et al, 2022).

The above studies which showed gonorrhoea prevalence in specific research were from different countries in varied continents thus depicting that Gonorrhoea prevalence is a global concern which requires continued attention from researchers and public-health authorities.

A 2025 North Carolina gonorrhoea report concluded that variations in public health policies and population level behavioural norms change the way Gonorrhoea spreads through a population. Formulating effective and targeted interventions to combat gonorrhoea is dependent on understanding population specific dynamics (Bellotti et al, 2025).

With respect to antimicrobial therapy, determining the susceptibility profile of *Neisseria gonorrhoeae* would affect the severity of its global prevalence. The antimicrobial susceptibility of *Neisseria gonorrhoeae* isolates from 6 South American and 13 Caribbean countries engaging in the Gonococcal Antimicrobial Surveillance Program (GASP) from 1990 to 1999, were determined. Penicillin-resistant and tetracycline-resistant *N. gonorrhoeae* isolates were identified.

N. gonorrhoeae with decreased susceptibility to ciprofloxacin and azithromycin were observed also spectinomycin-resistant isolates were identified (Dillon et al, 2006) The study also stated that the GASP program in the Americas and Caribbean has been affected by fluctuations in public interest and funding. The program was also negatively affected by Cutbacks in local and international funding and in technical support. It concluded that improved management of *N. gonorrhoeae* infections is dependent on good public health policy. To be effective, the control should be completed at

the community level. Gonorrhoea control measures were suggested to be integrated into broader national and international public health programs as a public health priority (Dillion et al, 2006).

Mutations associated with sulfonamides (DHPS/R228S) and rifampicin (RNAP/H552N), as well as tetracycline resistance determinants, namely *rpsJ*/V57M and *tet*(M) were identified in a study which sequenced 13 *Neisseria gonorrhoeae* isolates recovered over 12 years in the metropolitan region of São Paulo, Brazil. (Cassu-Corsi et al, 2022)

A review reported that *Neisseria meningitidis* vaccine was observed to also provide some (30–41%) protection against gonorrhoea, since it is genetically closely related to *Neisseria gonorrhoeae* (Ladhani et al, 2025)

So, not only is Gonorrhoea a global concern, drug resistance has been observed to some of its antimicrobial agents thus reducing the available therapy. Which should increase the concern globally. As a result, it is important to assess continental status of gonorrhoea on a long-term basis. Which would aid identify trends per country and at regional level over time, hopefully exposing insights that could lead to interventions aiding the decline of Gonorrhoea prevalence.

This research was therefore aimed at understanding the continental status of Gonorrhoea in Europe. Describing trends in reported confirmed gonorrhoea cases across European countries within a time frame of over 2 decades

2 METHODOLOGY

Data was obtained from the atlas on the site of the European Centre for Disease Prevention and Control (ECDC) surveillance atlas of infectious diseases. On the atlas, the following selection was made:

- Health Topic: Gonorrhoea
- Subpopulation: Disease surveillance
- Subpopulation 2: Confirmed cases, Indicator: reported cases
- Selection using these parameters were made for the years 2001 – 2023 and data was obtained

Out of which 2001-2010 (10-year duration), and 2011-2023 where selected separately and analysed using Excel. Both periods were observed for folds of increase in reported cases as the years increased and to identify unique trends between periods.

North, Central and Southern European countries data were compared to determine region with higher reported confirmed Gonorrhoea cases.

3 RESULTS

United Kingdom recorded the highest level of reported Gonorrhoea confirmed cases compared to all European countries analysed across all years. Showing over 3-fold increases from in 2011 to 2019. No records were shown for recent years after 2019 (77346) for UK.

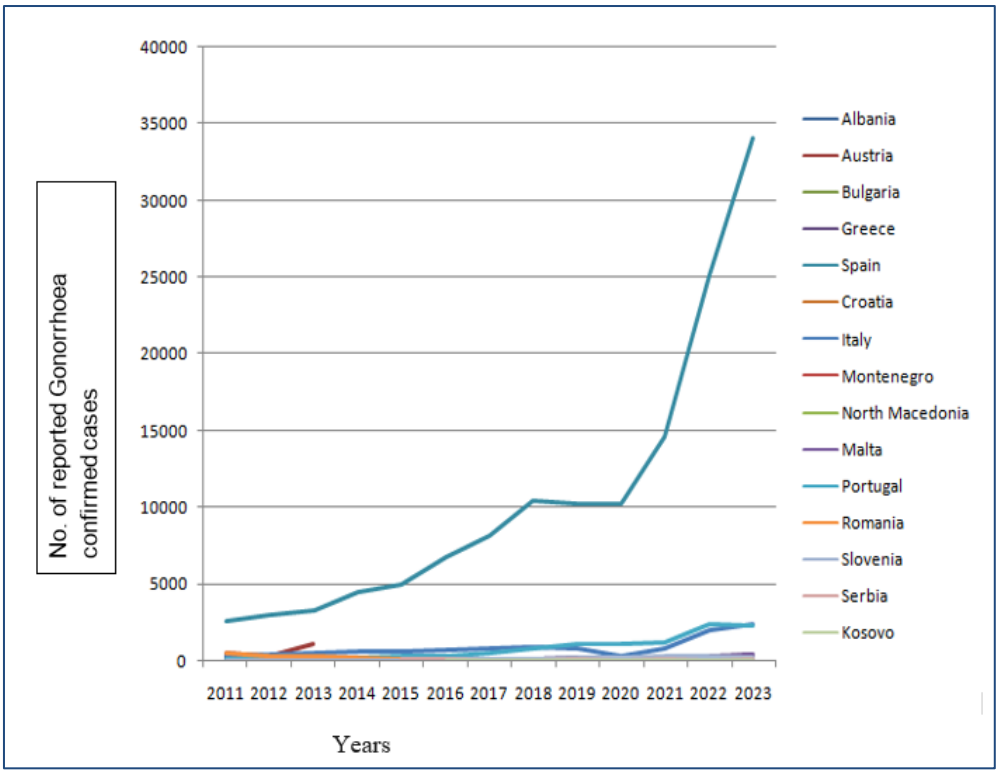


Figure 1: Number of reported confirmed Gonorrhoea cases in Southern European countries 2011-2023

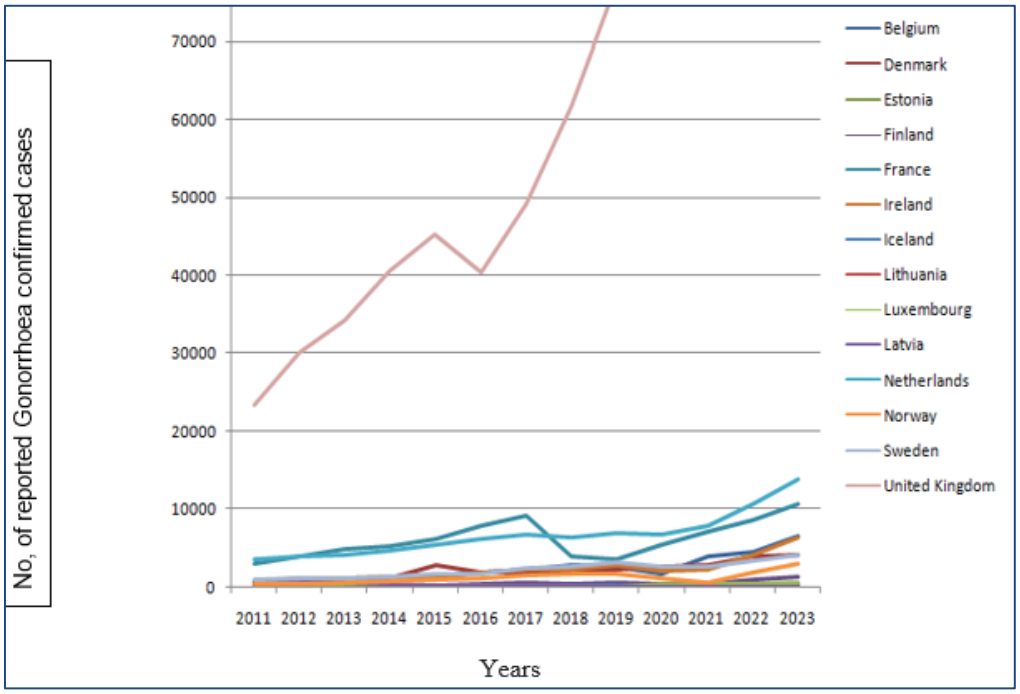


Figure 2: Number of reported confirmed Gonorrhoea cases in Northern European countries 2011-2023

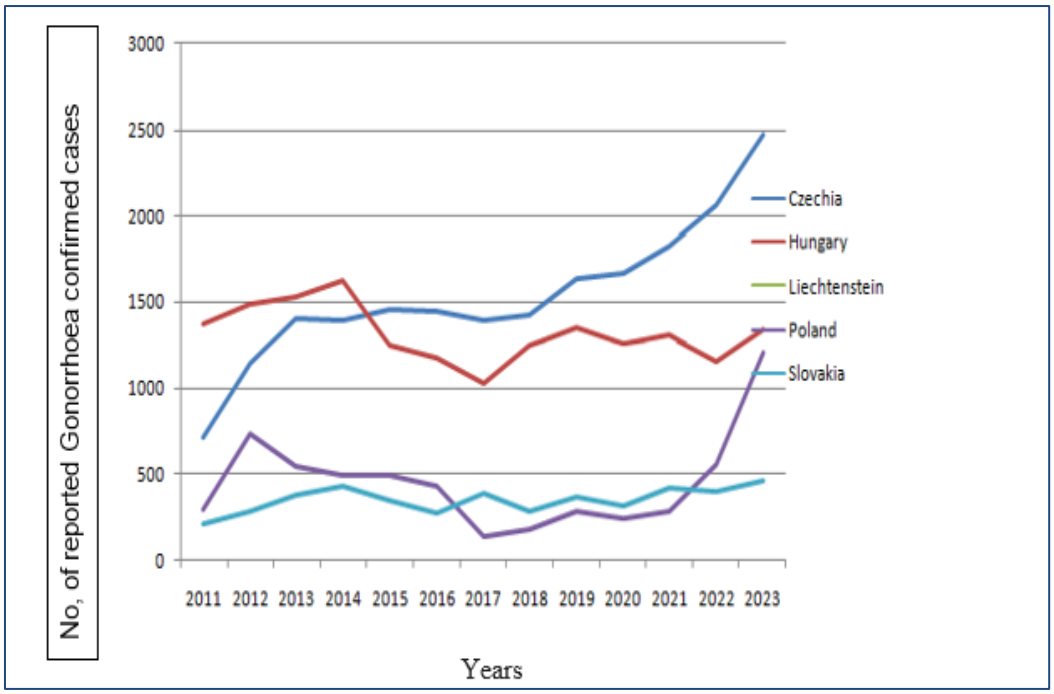


Figure 3: Number of reported confirmed Gonorrhoea cases in Central European countries 2011-2023

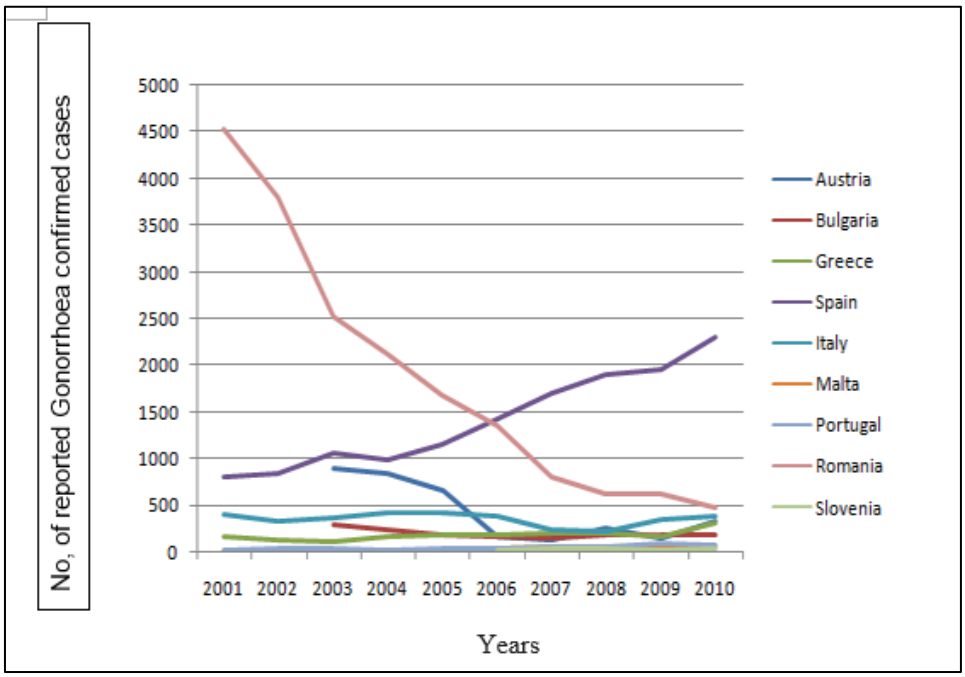


Figure 4: Number of reported confirmed Gonorrhoea cases in Southern European countries 2001-2010

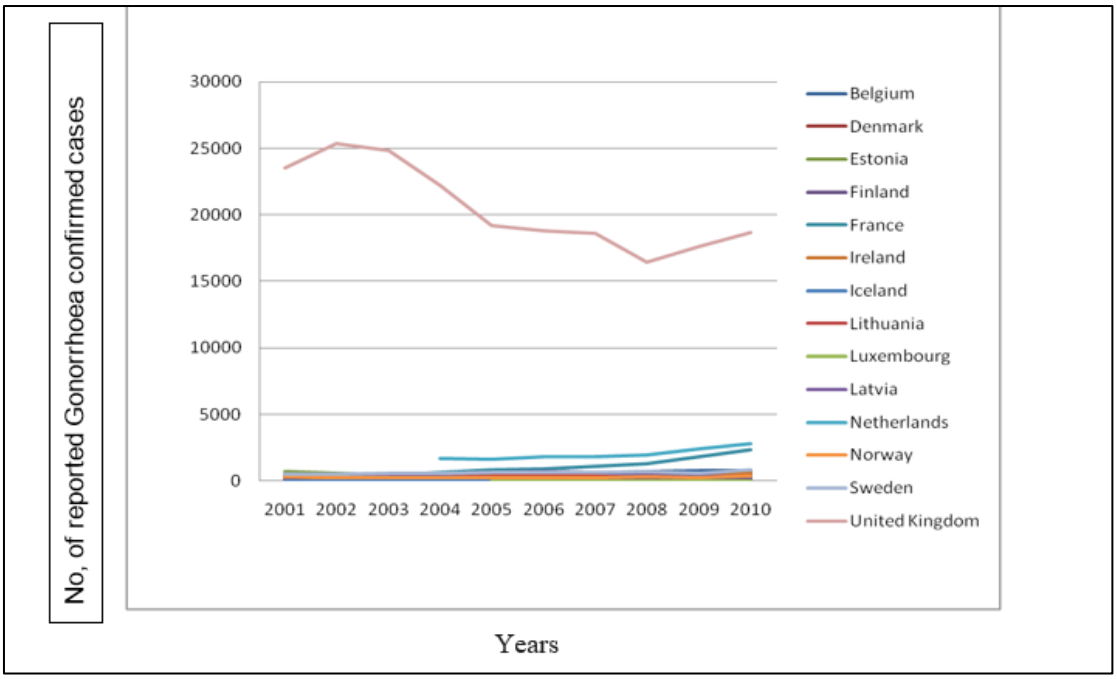


Figure 5: Number of reported confirmed Gonorrhoea cases in Northern European countries from 2001-2010

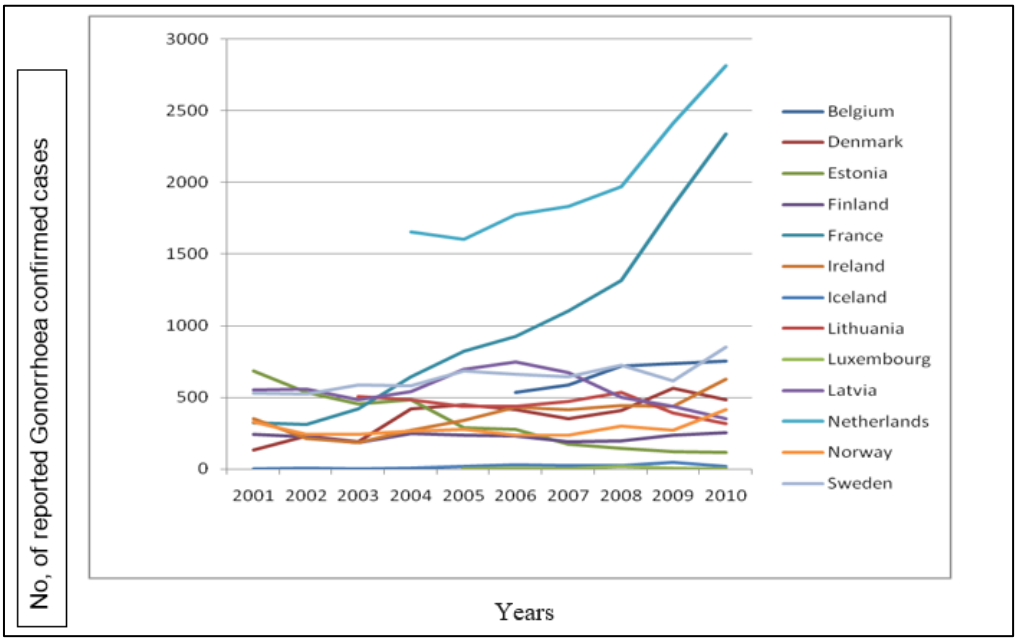


Figure 6: Number of reported confirmed Gonorrhoea cases in Northern European countries without United Kingdom from 2001-2010

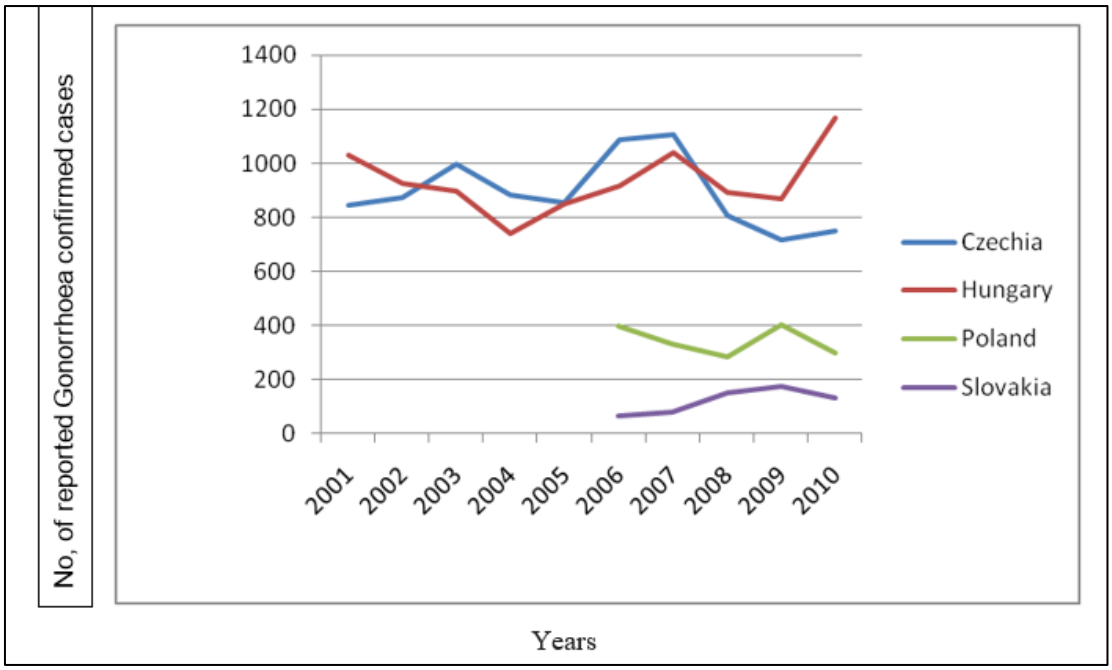


Figure 7: Number of reported confirmed Gonorrhoea cases in Central European countries from 2001-2010

Fig 7 and Fig 3 which displayed the prevalent trends of Gonorrhoea in Central European countries from 2001- 2010 & 2011 - 2023 respectively, showed increase in Czechia and Poland in Fig 3 as the years increased. Czechia had a 3-fold prevalence increase from 2011 to 2023. No data was observed for Poland and Slovakia from 2001 - 2006

Spain had the highest reported case count at 2023 (34071), showing over 10 folds increase from 2011-2023.

Excluding Spain and UK, Figure 1&2 showed Gonorrhoea was higher in Northern Europe compared to Southern Europe from 2011-2023.

Romania showed a steady decrease as observed in figure 4 from 4529 - 479 within the first decade observed and continued in later years reaching a level of 30 in year 2023.

As can be observed in figure 6 The Netherlands and France showed a steady increase in Gonorrhoea prevalence within the first decade observed, of 2-fold and 8-fold respectively.

This increase continued in later years, 4-fold increase observed in Netherlands from 2011-2023, While France had over 3-fold increase within same duration.

4 DISCUSSION

Gonorrhoea being a sexually transmitted disease with a Global occurrence, thus necessitating research in rate of reported confirmed cases with increase in years. This research showed that UK Gonorrhoea rate is vastly higher than other European countries though this result may not necessarily reflect the diseased cases being vastly higher than other European countries as it could be that UK with its technological advancement has a better filing system thus better health reporting system compared to other European countries. The UK increased Gonorrhoea prevalence has earlier been stated in previous publications (Davis et al, 2025).

Spain had next highest levels of reported confirmed Gonorrhoea cases which was in line with earlier research. A previous review publication stated that the journey map of patients with suspected STI required to obtain adequate diagnosis and treatment, is not well known in Spain. It also stated that one of the most serious difficulties of STI lies in the availability of the microbiological tests necessary for their diagnosis, and the increased cost of implementing the latest generation of molecular techniques and the difficulties of transporting samples (Romero et al, 2023). These limitations could potentially contribute to the increased levels of reported confirmed Gonorrhoea cases in Spain observed in this research

Though technological advancement with increase in years could reflect as increased data as years increase. It is still noteworthy that countries like The Netherlands and France have shown over 2-fold increase within each period

analysed which could mean a possible similar increase in the present decade thus detailed analysis is required to ascertain factors predisposing to this multiplying increase and strategies/new policies tackling the Gonorrhoea rate must be deployed to foster healthier nations.

Of particular epidemiological interest is the observed decline in reported cases in the country of Romania that showed a continuous decline over the 23 years analysed. Which is a key finding in this research. Thus, the strategies, policies and therapeutic measures applied in Romania needs to be studied to understand how the spread of Gonorrhoea was curtailed. Future research should investigate changes in screening, diagnosis, treatment, reporting surveillance coverage and public health interventions that contributed to the observed trend in Romania.

A Spain study also stated that gender, transmission route and origin should be considered when implementing preventive programmes for Gonorrhoea (Diaz 2013), Earlier research also identified the need for STI screening for asymptomatic adolescents (Berzosa et al, 2025)

5 CONCLUSION

In conclusion, reported Gonorrhoea cases varied substantially across European countries during the study period, with marked increases observed in several countries and a notable decline in Romania. Future studies should use population adjusted notification rates and investigate the contribution of testing practices, surveillance systems, sexual health interventions and antimicrobial resistance to observed trends

Research limitation

It is important to note that confirmed cases number can be affected by a number of factors including country size, gonorrhoea testing strategies. Diagnostic capacities and surveillance system of the country.

No data was available or UK post the year 2019

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript

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