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CURRENT NOTES

ECDC rapid risk assessment on MERS-CoV cluster in South Korea

49/2401 As of 15 June 2015, the MERS-CoV cluster in South Korea had led to 150 cases, including one non-fatal case in Hong Kong and 15 deaths (WHO Western Pacific Regional office figures at http://www.wpro.who.int/outbreaks_emergencies/wpro_coronavirus/en/). According to an updated risk assessment from the European Centre for Disease Prevention and Control (ECDC), while this is the largest cluster of MERS-CoV seen outside the Arabian Peninsula, it follows the pattern of transmission in Saudi Arabian hospitals when extended nosocomial transmission was observed, and is thus not unexpected.

ECDC's latest assessment continues to conclude that the current MERS-CoV outbreak poses a low risk to the EU. It highlights the importance of rapid consideration of MERS-CoV and strict adherence to infection control measures in healthcare settings, as well as suggesting raising travellers' awareness of the presence of MERS-CoV in the Middle East and in South Korea.

The outbreak so far does not represent an increased risk of infection for travellers or visitors to South Korea. However, EU citizens travelling to the Middle East and South Korea need to be aware of the presence of MERS-CoV in these areas, especially in healthcare facilities, as continued exposure in affected healthcare facilities cannot be excluded. Travellers who have visited healthcare facilities in the Middle East and South Korea who develop respiratory symptoms up to 14 days after return should seek medical attention, indicating their travel history.

The ECDC risk assessment once again reasserts the importance of international surveillance for MERS-CoV cases among travellers. Rapid efforts to contain nosocomial clusters in the Middle East and South Korea are vital to prevent broader transmission. Rigorous implementation of infection prevention and control measures in hospitals is essential to interrupt transmission and prevent clusters of infection. Detecting rare imported cases early on is a challenge that highlights the need for adequate infection prevention and control measures for all patients showing symptoms of acute respiratory infection.

Additional information on clinical presentation, further details on epidemiological features of the cluster, and knowledge of MERS-CoV genetic sequences are required to confirm these conclusions. In addition, more details on the potential exposure in the community

of the index case would help to elucidate the potential source of the infection and the cause of the high number of secondary cases. [Source: ECDC News Release, 11 June 2015. <http://ecdc.europa.eu/en/press/news/Pages/News.aspx>]

Additional travel guidance on MERS-CoV is available for clinicians on TRAVAX (at <http://www.travax.nhs.uk/>) and the general public on fitfortravel (at <http://www.fitfortravel.nhs.uk>).

Clinical guidance is also being updated on the public facing HPS website (at <http://www.hps.scot.nhs.uk/resp/coronavirus.aspx>) and on the NHS clinical resource SHPIR (Scottish Health Protection Information Resource) portal.

Antibiotic resistance in foodborne bacteria

49/2402 Antibiotic resistance in foodborne germs, an ongoing public health threat, continued to show both positive and challenging trends in 2013, according to human illness data posted online last week by the US Centers for Disease Control and Prevention (CDC). Efforts are underway to curb the injudicious use of antibiotics, but each year, antibiotic-resistant infections from foodborne germs cause an estimated 440,000 illnesses in the United States.

The National Antimicrobial Resistance Monitoring System (NARMS) tracks changes in the antibiotic resistance of six types of common foodborne bacteria found in ill people, retail meats, and food animals. In 2013, NARMS tested more than 5,000 germs from sick people for antibiotic resistance and compared them with previous years' data to assess changes in resistance patterns.

Among the findings in the new NARMS report on human illnesses:

- multidrug resistance (resistance to three or more classes of antibiotics) in *Salmonella* overall was steady, remaining at 10% of infections;
- resistance in some types of *Salmonella* is increasing. For example, multidrug resistance in a common *Salmonella* serotype called I4,[5],12:i:- was 46%, more than double the rate from two years before. In the US, resistance in this serotype to four drugs (ampicillin, streptomycin, sulfonamides, and tetracycline) rose from 18% in 2011 to 46% in 2013. Human illness with this serotype has been linked to animal exposure and consumption of pork or beef, including meats purchased from live animal markets;
- NARMS also tests *Campylobacter*, another germ that is transmitted by food. One in four *Campylobacter* samples from sick people are still resistant to quinolones like ciprofloxacin.

Most *Salmonella* and *Campylobacter* infections cause diarrheal illness that resolves within a week without antibiotics. They can also cause infection of the bloodstream and other sites. In more serious infections and when germs are resistant, antibiotics may be ineffective, increasing the chance of a severe illness.

The 2013 NARMS Annual Human Isolates Report is now available at <http://www.cdc.gov/narms/reports/index.html>. [Source: CDC Media Release, 9 June 2015. <http://www.cdc.gov/media/releases/2015/a0609-antibiotic-resistance.html>]

Safe barbecuing - summer 2015

49/2403 As part of its campaign on *Campylobacter* infections, Food Standards Scotland (FSS) has published results of recent research indicating that thousands of Scots unwittingly put their families at risk of falling ill from the dangerous bacterium by overlooking basic food safety practices when barbecuing. Foodborne illness causes around 43,000 infections, 5,800 GP visits and 500 hospital admissions across Scotland every year.

The research also revealed that more than one in four adults (26%) believe washing chicken before it is cooked on a barbecue is the best way to ensure it is safe to eat, but this is a practice that can spread *Campylobacter*, thought to be responsible for more than half the cases of food borne illness in Scotland. Sixteen percent of people who cook meat on a barbecue use the same utensils for raw and cooked meat without washing them in between. Nearly one in five of Scots who cook meat on the barbecue (17%) don't wash their hands after touching uncooked meat and only just over two in five wash their barbecue every time they use it (41%).

A recent survey showed that around three quarters of fresh chickens sold by major retailers are contaminated with *Campylobacter*, yet a third of Scots (32%) could not correctly identify the name of the pathogen that can cause abdominal pain, severe diarrhoea, vomiting and at its worst, in very rare cases, death. [Source: FSS News Release, 12 June 2015. <http://www.foodstandards.gov.scot/news/aiming-reduce-scotland%E2%80%99s-43000-annual-cases-food-borne-illness>]

European countries' air pollutant emissions

49/2404 Air pollutant emissions in the EU continue to exceed legal limits, according to a report from the European Environment Agency (EEA) published on 11 June. Preliminary data for 2013 show that ten EU member states exceeded one or more of their emission ceilings for key pollutants.

Under the National Emission Ceilings (NEC) Directive, EU Member States have individual air pollutant emission limits, or 'ceilings', for sulphur dioxide (SO₂), nitrogen oxides (NO_x), ammonia (NH₃) and non-methane volatile organic compounds (NMVOC). As of 2010, member states should not have exceeded their emission ceilings, but the EEA report 'NEC Directive status report 2014' (available at <http://www.eea.europa.eu/publications/nec-directive-status-report-2014>), which includes preliminary data for 2013 and summarises data for 2010-12, confirms that a number of countries did so for these years.

The four pollutants addressed in the directive harm human health and the environment, causing respiratory illnesses, acidifying soil and surface waters, and damaging vegetation. [Source: EEA Highlights, 11 June 2015. <http://www.eea.europa.eu/highlights/many-european-countries2019-air-pollutant>]

Guide to the COMAH Regulations 2015

49/2405 The Control of Major Accident Hazards (COMAH) Regulations 2015 came into effect on 1 June 2015 and updated guidance on the regulations, also applying from 1 June has recently been published by the Health and Safety Executive (HSE). The COMAH Regulations 1999 have been revoked.

The guidance is for anyone who has duties under the COMAH Regulations 2015, particularly operators of establishments, and also others such as local authorities and emergency planners. The aim of the regulations is to prevent and mitigate the effects on people and the environment of major accidents involving dangerous substances. This guidance on the COMAH Regulations 2015 gives advice on the scope of the regulations and the duties imposed by them.

Although many duties will be familiar from the 1999 Regulations, the 2015 Regulations contain some new or changed duties including:

- the list of substances covered by the regulations has been updated and aligned to the CLP Regulation;
- some definitions have been changed;
- there are transition arrangements for safety reports;

- for emergency planning, there is a new requirement for co-operation by designated authorities (Category 1 responders, as defined in the Civil Contingencies Act 2004) in tests of the external emergency plan;
- there are stronger requirements for public information including a duty for lower-tier establishments to provide public information. There are provisions for electronic access to up-to-date public information;
- the domino effects duty is broader, including a duty for members of a domino group to co-operate with neighbouring sites to share relevant information;
- stronger requirements for the competent authority on inspection;
- after a major accident local authorities must now inform people likely to be affected.

The guidance can be accessed at <http://www.hse.gov.uk/pubns/books/l111.htm>.

Environmental incidents - SEISS reports

49/2406 The Scottish Environmental Incident Surveillance System (SEISS) recorded the following incidents in the past week:

- On 12 June, Scottish Fire and Rescue Service crews were sent to an incident on the northbound carriageway of the M74 in South Lanarkshire in response to a 999 call received shortly before 10:25am. Appliances were initially mobilised from Lesmahagow, Larkhall and Douglas and firefighters arrived around six minutes later to find a large goods vehicle well-alight on the hard shoulder. A fourth appliance from Lanark and the environmental protection unit from Hamilton were also sent to increase the resources available at the scene. There were no reports of any injuries however the fire produced large amounts of smoke and the motorway was closed in both directions. There are no homes in the vicinity (<http://www.firescotland.gov.uk/news-campaigns/news/2015/06/lorry-on-fire-on-m74-in-south-lanarkshire.aspx>).
- Firefighters tackled a wildfire spanning 500 metres in the Pentland Hills in Midlothian. The emergency services were called to the blaze near Glencorse Reservoir, at Flotterstone off the A702, just before noon on 11 June. The Fire and Rescue Service said wind was causing the fire to spread through trees and grass (<http://www.firescotland.gov.uk/news-campaigns/news/2015/06/crews-are-currently-in-attendance-at-a-wildfire-in-penicuik.aspx>).

For more detailed information on SEISS please refer to the SEISS web-site (<http://www.hps.scot.nhs.uk/enviro/ssdetail.aspx?id=107>) or contact either Ian Henton or Colin Ramsay at HPS on 0141 300 1100.

Syphilis in Scotland 2014: update

Prepared by: A Potts, LA Wallace, D Nicholson, DJ Goldberg

Key points

- In 2014, 159 cases of infectious syphilis were reported to HPS, a small decrease from the 169 reported in 2013. The annual totals observed between 2009 and 2014 represent a decrease on those observed in the four years 2005-2008 when peak numbers of diagnoses were recorded.
- Infectious syphilis was diagnosed in residents of 10 of the 14 NHS boards during 2014.
- A high proportion of cases (75% of those where sexual orientation was known) were recorded among men who have sex with men (MSM).
- Cases continue to be acquired heterosexually (25%), with some being detected via routine screening programmes such as antenatal and blood donor testing.

In this report, the 2014 data from the National Enhanced Surveillance of Infectious Syphilis Scotland (NESISS) are presented. This enhanced surveillance system was established in December 2002 and collates laboratory and clinical information on infectious syphilis.¹ Data are returned from two sources:

- sexual health clinics – clinicians and sexual health advisors across Scotland provide demographic and behavioural information on cases presenting at clinics via a paper form;
- diagnostic laboratories – microbiology staff provide details of positive test results through the Electronic Communication of Surveillance in Scotland System (ECOSS)² and by electronic submission.

Details from both sources are matched at Health Protection Scotland (HPS) and entered into the NESISS database.¹

2014 cases

A total of 159 cases of infectious syphilis were reported during 2014, a small decrease from the number seen in 2013 (169). This represents a crude incidence ratio of 3.6 per 100,000 population; 0.8 per 100,000 for females and 6.2 per 100,000 for males. Of the 159 cases, 18 (11%) were female and 141 (89%) were male. Of the male cases, 112 (79%) were MSM, 11 of whom identified themselves as bisexual, 20 (14%) were heterosexual, and for nine (6%) there were no data on sexual orientation (Table 1 and Figure 1). The median age of cases in 2014 was 30 years, a decrease from 2013 when the median age was 36 years.

Most cases were diagnosed at sexual health clinics in NHS Greater Glasgow & Clyde (50/159, 31%) and NHS Lothian (46/159, 29%). In addition, 19 cases were reported from NHS Tayside, 17 from NHS Lanarkshire, eight from NHS Fife and NHS Grampian and five or fewer from NHS Ayrshire & Arran, NHS Dumfries & Galloway, NHS Forth Valley and NHS Highland (Figure 2).

TABLE 1: Number of cases of infectious syphilis in Scotland by NHS board of diagnosis and treatment and sexual orientation, 2005-2014

Year	NHS board	Female	Male heterosexual	MSM	Unknown	Total
2005	Greater Glasgow & Clyde	5	9	54	4	72
	Lothian	2	6	93	0	101
	Rest of Scotland	6	4	33	2	45
	Sub Total	13	19	180	6	218
2006	Greater Glasgow & Clyde	3	5	87	7	102
	Lothian	6	7	62	2	77
	Rest of Scotland	5	8	45	1	59
	Sub Total	14	20	194	10	238
2007	Greater Glasgow & Clyde	4	14	89	6	113
	Lothian	4	4	72	1	81
	Rest of Scotland	6	12	39	4	61
	Sub Total	14	30	200	11	255
2008	Greater Glasgow & Clyde	9	7	79	4	99
	Lothian	2	6	70	1	79
	Rest of Scotland	9	17	53	3	82
	Sub Total	20	30	202	8	260
2009	Greater Glasgow & Clyde	4	5	43	6	58
	Lothian	10	14	53	3	80
	Rest of Scotland	12	11	26	3	52
	Sub Total	26	30	122	12	190
2010	Greater Glasgow & Clyde	3	4	25	4	36
	Lothian	3	7	62	7	79
	Rest of Scotland	4	7	24	5	40
	Sub Total	10	18	111	16	155
2011	Greater Glasgow & Clyde	1	3	53	4	61
	Lothian	6	8	61	3	78
	Rest of Scotland	7	8	31	1	47
	Sub Total	14	19	145	8	186
2012	Greater Glasgow & Clyde	2	5	63	0	70
	Lothian	5	8	74	2	89
	Rest of Scotland	10	8	27	2	47
	Sub Total	17	21	164	4	206
2013	Greater Glasgow & Clyde	2	6	43	2	53
	Lothian	2	8	52	0	62
	Rest of Scotland	13	14	25	2	54
	Sub Total	17	28	120	4	169
2014	Greater Glasgow & Clyde	1	3	46	0	50
	Lothian	6	6	31	3	46
	Rest of Scotland	11	11	35	6	63
	Sub Total	18	20	112*	9	159

* includes 11 bisexual males

FIGURE 1: Number of cases of infectious syphilis diagnosed at GUM clinics in Scotland by sexual orientation and quarter year, 2005-2014

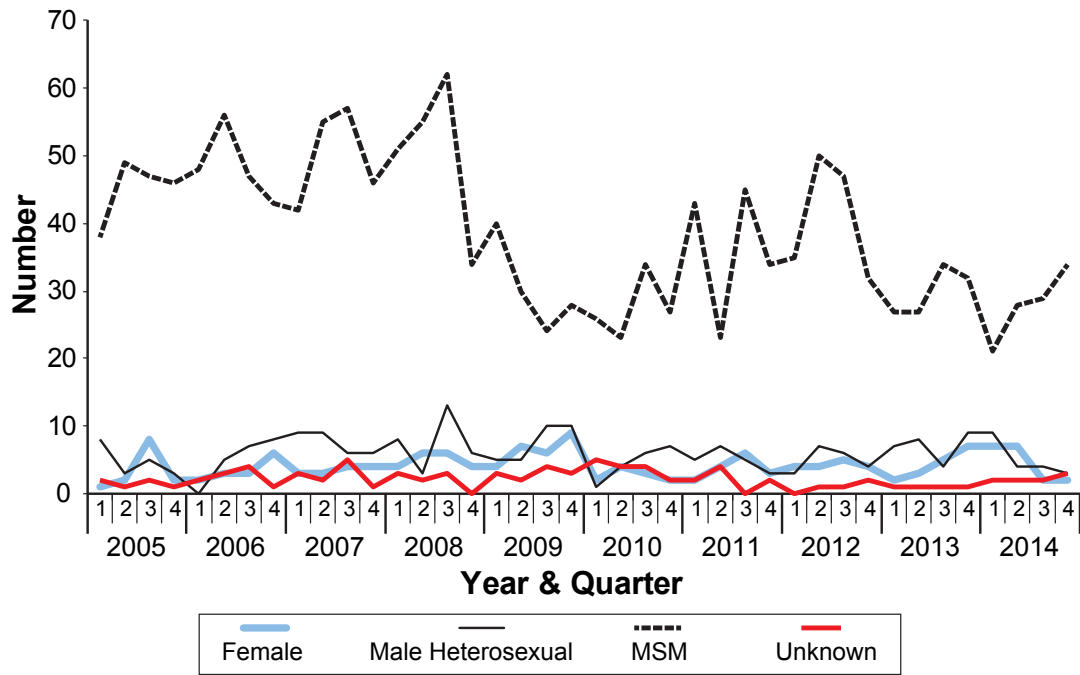


FIGURE 2: Number of infectious syphilis cases diagnosed in Scotland in 2014 by NHS board
 FIGURE 2a: By NHS boards of diagnosis and treatment

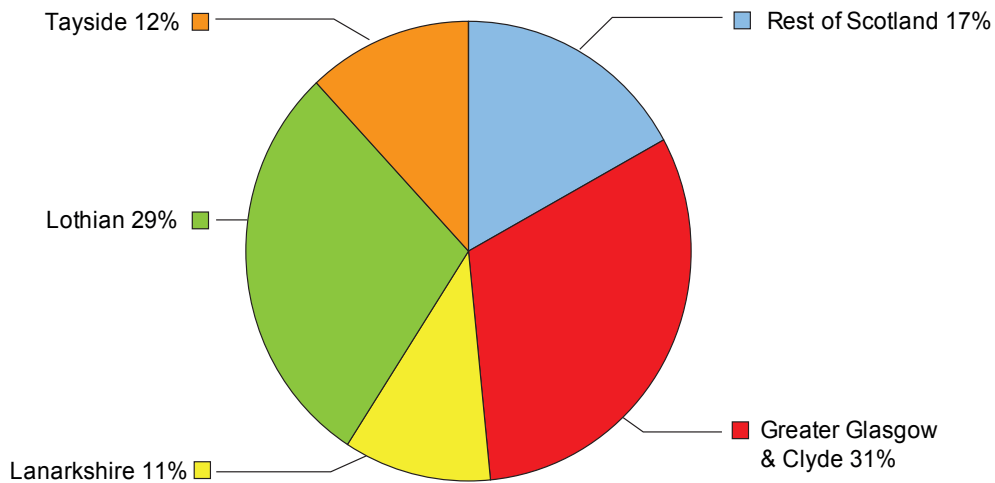
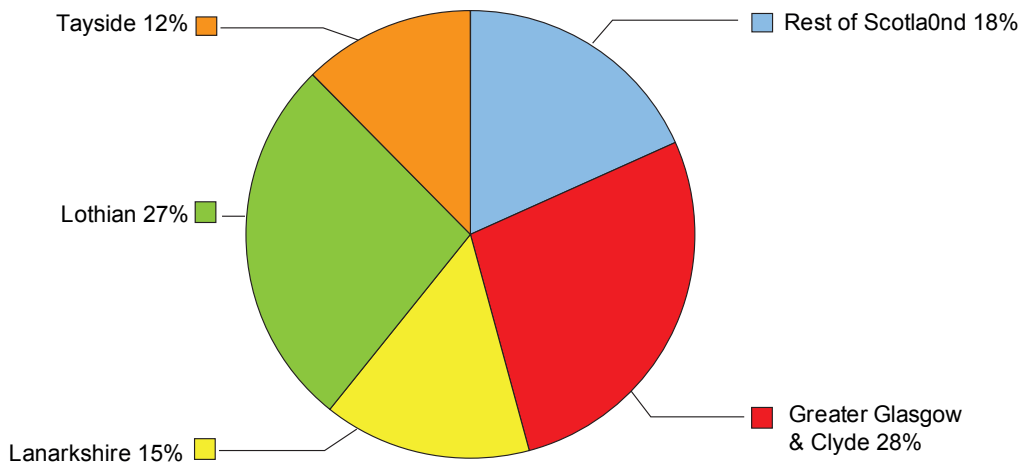


FIGURE 2b: By NHS boards of residence



In 2014, the majority of infections (101/159, 64%) were presumed to have been acquired through contacts in Scotland (Table 2). This observation is similar to those of previous years.

TABLE 2: Number of cases of infectious syphilis in Scotland in 2014 by presumed location of infection acquisition and sexual orientation

Presumed location of infection	Female	Male heterosexual	MSM*	Unknown	Total
Scotland	14	13	70	4	101
UK (not Scotland)	1	2	11	0	14
Europe (not UK)	1	1	9	0	11
World (not Europe)	0	3	8	0	11
Multiple locations	0	0	4	0	4
Unknown	2	1	10	5	18
Total	18	20	112	9	159

* includes 11 bisexual men

The stage of infection was identified in 147/159 (92%) of infections (Table 3). Of these 147 cases, 65 (44%) were primary infection, 38 (26%) were secondary infection and 44 (30%) were early latent infections.

Of the 159 cases, 19 (12%) were HIV positive, 124 (78%) were HIV negative and, for 16, HIV status was unknown. This is a lower proportion of HIV positive cases than in 2013 (20%).

TABLE 3: Number of cases of infectious syphilis reported in Scotland in 2014 by stage of infection and sexual orientation

Stage	Female	Male heterosexual	MSM*	Unknown	Total
Primary	5	6	52	2	65
Secondary	2	6	28	2	38
Early latent	10	8	25	1	44
Unknown	1	0	7	4	12
Total	18	20	112	9	159

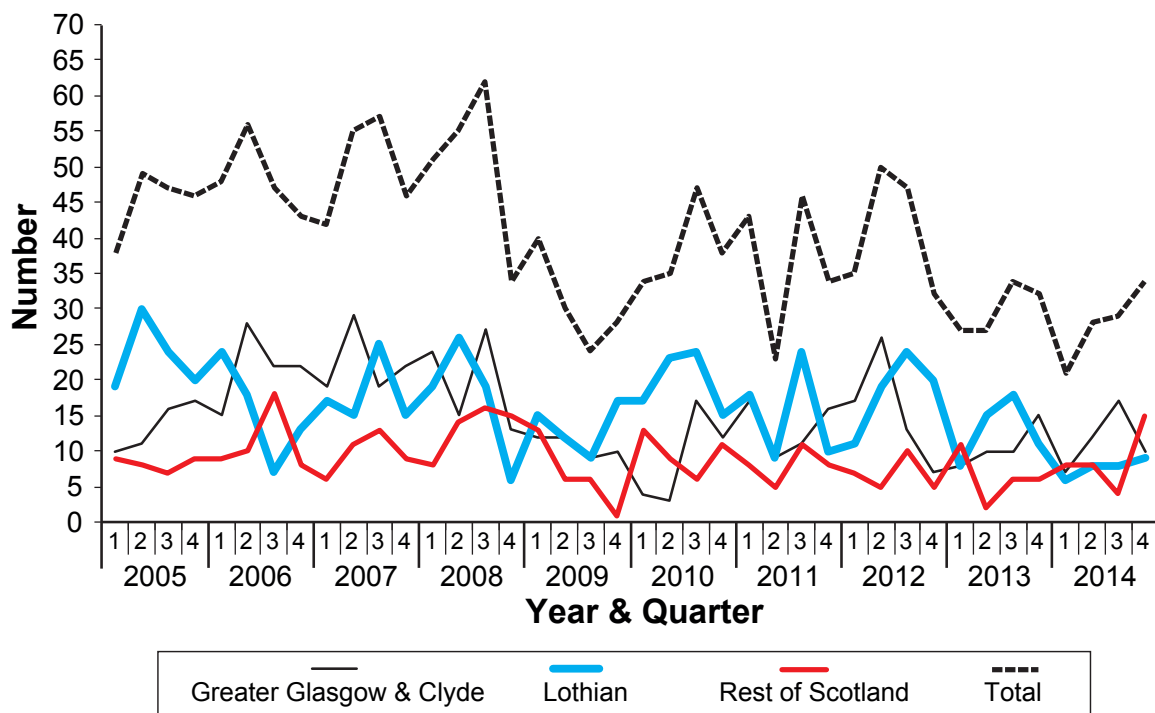
* Include 11 bisexual men

MSM cases in 2014

In 2014, 112 cases of infectious syphilis were diagnosed among MSM, compared with 120 in 2013, 164 in 2012 and 146 in 2011. Incidence by quarter year and NHS board of diagnosis is shown in Figure 3. Quarterly totals are similar for every quarter compared with 2013. However, this masks an increase in quarterly totals in 2014 for NHS Glasgow & Clyde in both quarters 2 and 3 compared with 2013, and a decrease in quarterly totals for all quarters in 2014 for NHS Lothian compared to 2013.

The men were aged between 18 and 74 years, with median age 31 years. The median age is lower than that reported in 2013 when the highest median age was recorded (38.5 years) and lower than that in most years (2005-2014) except 2012 (29 years).

FIGURE 3: Number of cases of infectious syphilis among MSM in Scotland by NHS board of diagnosis and treatment and quarter year, 2005-2014



In 2014, as in previous years, most of the diagnoses in MSM (77/112, 69%) were made in Greater Glasgow & Clyde and Lothian NHS board areas (Table 1 and Figure 3). Limited place of residence information (postcode sector) is available for 107 cases, indicating that syphilis infection was present in patients living in 10 of the 14 NHS boards. Of the 46 men diagnosed in NHS Greater Glasgow & Clyde, 38 were residents of Greater Glasgow & Clyde and the remainder were residents of two other NHS boards; and of the 31 diagnosed in NHS Lothian, 28 were residents of Lothian and the remainder were residents of two other NHS boards.

Disease stage was recorded for 105 cases: 52 (49%) had primary, 28 (26%) secondary and 25 (23%) early latent syphilis (Table 3). From the information available, at least seven MSM in 2014 are known to have had at least one previous episode of syphilis during the past eleven years of monitoring.

HIV status was known for 106 men at the time of their syphilis diagnosis: 18 (17%) reported being HIV positive. Of those who were co-infected, information was available about likely mode of transmission for 12 men. Two of these 12 (17%) indicated that oral sex (which may be perceived as a 'safe' alternative to penetrative sex) was the likely route of transmission (Table 4). For all MSM who provided information about likely route of transmission (86/112 cases), 28% (24/86) described oral sex as the most likely route of transmission.

TABLE 4: Number of cases of infectious syphilis among MSM* reported to HPS in 2014 by HIV status and whether oral sex was the likely route of acquisition of infection

HIV status	Oral sex only - YES	Oral sex only - NO	Unknown	Total
Positive	2	10	6	18
Negative	21	51	16	88
Unknown	1	1	4	6
Total	24	62	26	112

*includes 11 bisexual men

Place where infection was acquired was recorded for 102 men. Of these, 70 (69%) reported that the likely place of acquisition was Scotland and a further 11 (11%) were presumed to have acquired their infection elsewhere in the UK (Table 2). Four men reported multiple possible locations for acquisition, in three cases including a Scottish location.

The social venues and networks used to meet partners are outlined in Table 5. Data are available from 21 MSM who acquired their infection in Scotland, indicating that the internet and phone apps are the most popular means of meeting partners. Venues for meeting partners including bars/clubs and saunas have not changed in recent years, but the frequency of use has fallen this year.

TABLE 5: Means of meeting partners in Scotland, described by 70 MSM with presumed infection acquisition in Scotland in 2014

Means	Number reporting use
Internet (including phone apps)	12
Other (regular partner/casual partner/friend)	2
Sauna	3
Bars and/or Clubs	2
Multiple methods	2
Not known	49

In 2014, of 112 MSM syphilis cases, 99 provided an estimate of the number of sexual partners in the three months prior to diagnosis. These 99 cases reported 440 sexual contacts, varying between one and more than 20 contacts during the three-month period (Table 6), with the majority (78/99, 79%) reporting fewer than five partners. The percentage of contacts traced was highest for those cases with fewest partners. For those reporting fewer than five contacts, 65% of contacts were traced, while only 30% of contacts could be traced for those who reported between 10 and 20 contacts.

TABLE 6: Number of contacts for cases of infectious syphilis among MSM* reported to HPS in 2014

Number of contacts per case	Number of cases	Total contacts	Total contacts traced	Proportion of contacts traced
1	33	33	26	79%
2	23	46	39	85%
3	15	45	24	53%
4	7	28	10	36%
5-9	10	62	34	55%
10-20	9	121	36	30%
>20	2	105	1	1%
Total	99	440	170	39%

Heterosexual cases in 2014

In 2014, there were 38 cases of infectious syphilis in those who acquired the infection through heterosexual intercourse, 18 being female and 20 male (Table 1 and Figure 1). The median age of the female cases was 25 years and, of the male cases, 26 years. Of these 38 cases, 18 were aged under 25 years (47%; nine females and nine males). This is a fall in the proportion of those under 25 years when compared to the last two years (51% in 2013 and 59% in 2012).

Most of the heterosexual cases were born in the UK (28/38, 74%) and acquired their infection in Scotland (27/38, 71%, Table 2). Heterosexual cases were diagnosed in six NHS board areas,

with more than five cases being diagnosed in each of NHS Lanarkshire, NHS Lothian and NHS Tayside.

Information about stage of infection was available for 37/38 individuals (97%) in 2014 (Table 3). Of these, 11 cases (29%) had primary infection; eight cases (21%) had secondary infection; and 18 (52%) had early latent infection. Since 2007 almost half of the cases have been diagnosed at the primary stage of infection and the 2013 (42% primary) and 2014 (29% primary) data represent a fall in this proportion. There were no known previous episodes of syphilis among the 38 heterosexual cases, most of whom were HIV-negative.

From the data available on source of referral or reason for testing, at least seven cases were referred for testing from one of the routine screening programmes (either through blood donation screening or the antenatal testing programme). A further five cases were referred for testing as contacts of diagnosed individuals.

The 38 heterosexual cases reported a total of 49 contacts in the three months prior to their diagnosis, with all reporting five or fewer partners. Of these 49 contacts, 37 (79%) could be traced.

Comment

There was a small decrease in the overall incidence of infectious syphilis in Scotland during 2014 from 169 cases in 2013 to 159 in 2014. This reflects similar proportions of male:female and heterosexual:MSM ratios to 2013. This is in contrast to England, where syphilis diagnoses continue to increase (data currently only available to 2013)³ principally driven by ongoing annual increases in diagnosis among MSM, including outbreaks in this group in various areas in England and Wales.⁴ There have been no further outbreaks of syphilis among young heterosexuals in Scotland.

Co-infection with HIV is still apparent among MSM, where 17% of syphilis diagnoses in 2014 were co-infected. While this is a lower proportion than in previous years, it remains essential that MSM who attend sexual health services should continue to be routinely offered HIV testing given that there is evidence of HIV transmission among this group and an increased likelihood of this when co-infected with syphilis.

There are a number of additional sexual health concerns in this population, which are being seen predominantly in the rest of the UK. Two emerging infections have been seen in this population in England, *Shigella flexneri*⁵ and *E. coli* O117:H7.⁶ Transmission of *S. flexneri* and *E. coli* was associated with high numbers of sexual partners, high rates of HIV co-infection and additionally shigellosis was linked to chemsex.⁷

While the major burden of infection occurs in the MSM population, 25% of syphilis diagnoses were made in heterosexuals. The proportion of cases identified in those under 25 years fell when compared with the previous two years.

Antenatal screening, with appropriate treatment and management, remains important to prevent re-emergence of congenital syphilis particularly in the context of the outbreaks in the heterosexual population. Congenital syphilis cases are monitored by the British Paediatric Surveillance Unit and congenital cases have been recorded elsewhere in the UK.⁸ Some infectious cases were also detected through the routine infectious diseases screening of blood donations.

Activities to control syphilis focus on service provision, partner management and health promotion, education and awareness-raising, either via national campaigns or local initiatives. MSM-specific services are available at sexual health clinics in the largest cities and syphilis testing opportunities, along with other sexual health services, are becoming more accessible in community venues. Partner management continues to present a challenge for the control of infection due to the large number of multiple anonymous contacts among MSM. Ongoing awareness-raising and the promotion of good sexual health continue among this community.

Acknowledgements

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The last Syphilis in Scotland Update Surveillance Report was in Issue [14/34](#)
The next Syphilis in Scotland Update Surveillance Report will be in Issue TBC

Genital herpes simplex, genital chlamydia and gonorrhoea infection in Scotland: laboratory diagnoses 2005 – 2014

A Potts, LA Wallace, LE Shaw Primrose, D Nicholson, K Eastick, DJ Goldberg

Key points

- Diagnoses of genital herpes and gonorrhoea have increased in 2014; diagnoses of genital chlamydia have decreased in 2014.
- Young people, particularly women aged less than 25, are the group most at risk of being diagnosed with an STI.
- Rectal gonorrhoea in men, a marker of unprotected anal intercourse, has increased since 2013 to a new high level.

Introduction

In this report, ten-year trend data are presented on three of the major acute sexually transmitted infections (STIs) – genital herpes simplex type 1/2, genital chlamydia and gonorrhoea. All three datasets are extracted from laboratory diagnoses databases. For herpes simplex and chlamydia, the source data is the Electronic Communication of Surveillance in Scotland System (ECOSS),¹ a Health Protection Scotland (HPS) surveillance system which is updated every day with positive test results from all Scottish diagnostic and reference laboratories. For gonorrhoea, the source data are confirmed positive results from the Scottish Bacterial Sexually Transmitted Infection Reference Laboratory (SBSTIRL).²

The data associated with the laboratory diagnoses are restricted to age, gender and the NHS board where the clinical specimen originated. Only those diagnoses which can be clearly identified as genital infections in the datasets at HPS are reported here, which may result in some under-reporting. Note that records of infection in those aged less than 10 years are not reported.

The universal use of ECOSS by testing laboratories in Scotland has resulted in a greater quantity and better quality of data which is subject to cleaning and refinement at HPS. Thus, the trends observed in recent years (since the introduction of ECOSS) are not directly comparable to those prior to 2009. Some numbers in this report have been suppressed – as indicated with an asterisk (*) – in instances where patient confidentiality might be compromised through deductive disclosure.

Genital herpes simplex infection

In 2014, there were 3420 reports of laboratory diagnosed genital herpes infection – a 15% increase on that reported in 2013 (2989). This is the highest annual total reported in the last ten years (Table 1). As the laboratory reports in ECOSS do not distinguish between a primary and a recurrent infection and no de-duplication is carried out across previous years to remove recurrent infections, these data will reflect all individuals tested and diagnosed with genital herpes during 2014.

The ratio of female to male diagnoses in 2014 was 2.3:1, which has been a consistent finding over the past ten years (Table 1). The numbers of diagnoses in males and females have increased annually over the last five years. Similar numbers of herpes simplex type 1 and type 2 infections were reported in 2014 (Figure 1). In women, type 1 infections were predominant (58% of infections for which typing data were available) and in men, type 2 infections were predominant (52% of infections for which typing data were available).

Cases of genital herpes were detected in all NHS boards (Table 2 and Figure 2) with large increases (greater than 20%) seen in 2014 compared to 2013, in NHS Highland, NHS Fife, NHS Grampian and NHS Lothian.

TABLE 1: Laboratory diagnoses of genital herpes simplex virus in Scotland 2005-2014, by gender

Gender	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Female	1152	1261	1440	1251	1783	1656	1781	1945	2074	2381
Male	489	539	646	588	811	733	794	853	911	1028
Unspecified	36	30	19	32	33	28	13	14	4	11
Total	1677	1830	2105	1871	2627	2417	2588	2812	2989	3420

Note: HPS experienced a problem with the receipt of genital herpes data from Tayside during the last quarter of 2006 and the first quarter of 2007

FIGURE 1: Laboratory diagnoses of genital herpes simplex in Scotland 2005-2014, by typing of virus

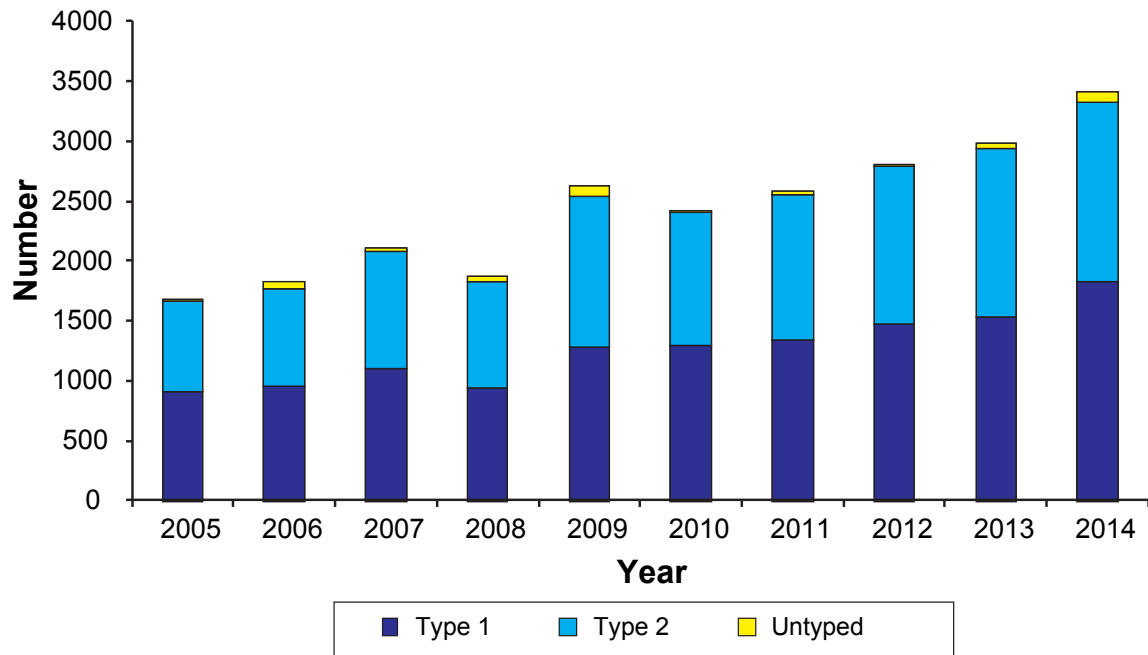
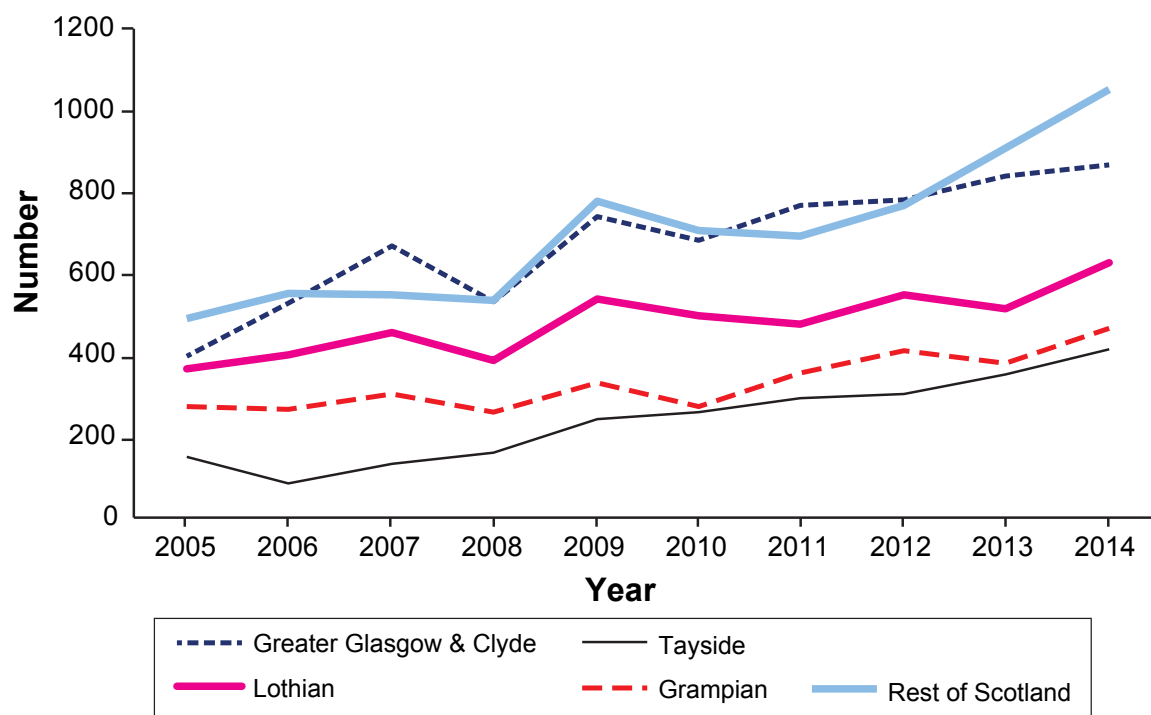


TABLE 2: Laboratory diagnoses of genital herpes simplex virus in Scotland 2005-2014, by NHS board of report

NHS board	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AA	75	88	87	115	124	112	139	138	180	205
BR	21	29	28	10	47	47	29	34	43	39
D&G	59	100	91	91	143	84	96	110	98	112
FF	43	92	94	99	136	130	125	152	159	199
FV	84	75	61	66	95	71	105	85	119	137
GR	275	267	304	258	331	272	356	412	378	464
GG&C	466	527	667	531	739	683	768	781	838	866
HG	97	101	104	78	108	105	76	133	126	180
LN	34	54	77	74	116	151	112	102	166	159
LO	367	399	454	386	538	495	476	548	515	625
OR	*	*	0	*	*	*	*	*	*	*
SH	*	*	*	*	*	*	*	*	*	*
TY	149	85	132	161	241	260	295	303	351	415
WI	*	*	*	*	*	*	*	*	*	*
Unspecified	0	0	0	*	0	0	0	0	0	0
Total	1677	1830	2105	1871	2627	2417	2588	2812	2989	3420

Note: HPS experienced a problem with the receipt of genital herpes data from Tayside during the last quarter of 2006 and the first quarter of 2007

FIGURE 2: Laboratory diagnoses of genital herpes simplex in Scotland 2005-2014, by geographical regions



In 2014, for women, the highest rates per 100,000 population were observed in NHS Tayside, NHS Grampian and NHS Dumfries & Galloway (over 150 diagnoses per 100,000 population) (Table 3). For men the highest rates were observed in NHS Tayside, NHS Dumfries and Galloway and NHS Greater Glasgow & Clyde (over 70 diagnoses per 100,000 population). Outside the island NHS boards, the lowest rates of genital herpes infections were recorded among women in NHS Lanarkshire and among men in NHS Borders. These findings are similar to those of 2013.

TABLE 3: Genital herpes simplex, Scotland, 2014: number and rate per 100,000 population by NHS board and gender

NHS board	Female (number of diagnoses)	Female (rate per 100,000)*	Male (number of diagnoses)	Male (rate per 100,000)*
AA	145	119	53	47
BR	34	95	5	15
D&G	77	164	35	78
FF	124	102	75	65
FV	96	96	40	41
GR	327	168	136	69
GG&C	583	147	283	75
HG	128	127	52	52
LN	117	53	41	20
LO	444	149	181	63
OR	*	*	*	*
SH	*	*	*	*
TY	294	218	121	92
WI	*	*	*	*
Scotland	2381	133	1028	59

* rates based on GROS population estimate as at 30 June 2014 using ages 15-64 as denominator

In 2014, 61% of infections were diagnosed among persons aged under 30, following the pattern of the last decade. The largest number of diagnoses was observed among young women and men aged 20-24 years – a consistent finding over the past ten years (Table 4).

TABLE 4: Laboratory diagnoses of genital herpes simplex in Scotland 2005-2014, by age group

TABLE 4a: Women

Age group	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
15-19	256	254	259	258	335	351	368	329	384	403
20-24	312	375	431	331	524	477	485	563	617	653
25-34	326	333	384	348	480	460	504	562	562	626
35-44	153	185	185	179	237	188	208	239	258	270
>45	97	109	176	130	197	174	208	239	248	415
Total*	1152	1261	1440	1251	1783	1650	1773	1932	2074	2381

*(including unknown)

TABLE 4b: Men

Age group	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
15-19	29	38	40	35	62	46	44	63	54	73
20-24	105	134	152	149	186	212	226	204	231	245
25-34	172	185	224	206	278	243	295	313	318	342
35-44	107	109	119	124	165	111	113	128	144	151
>45	73	71	111	72	119	119	112	142	163	209
Total*	489	539	646	588	811	731	790	850	911	1028

*(including unknown)

Genital chlamydia

In 2015, 16,320 diagnoses of genital chlamydial infection were reported to HPS, a decrease of 6% on that reported in 2013 (17,371) and the lowest annual total in the last ten years (Table 5). The improved data capture of laboratory test results via ECOSS means that the data since 2009 have been subject to more extensive validation particularly with regard to removing repeat samples taken for the same episode of infection. The data presented in this report for genital chlamydia infection indicate episodes of infection, where an episode is defined as a six-week period. Multiple laboratory positive diagnoses made more than six-weeks apart are classed as separate episodes of infection.

As with genital herpes infection, the majority of genital chlamydia diagnoses (61%) were made in women (Table 6) - this has been the pattern over the last decade.

TABLE 5: Laboratory diagnoses of genital chlamydial infection in Scotland 2005-2014, by NHS board of report

NHS board	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AA	778	891	1123	1053	818	1097	1251	1216	1206	1078
BR	244	230	262	270	394	390	338	305	270	243
D&G	494	598	565	480	483	503	451	568	515	428
FF	1116	1198	1211	1232	1142	1149	1183	981	1025	984
FV	704	916	887	1085	1096	1031	1143	961	936	876
GR	1885	1781	1805	1768	1838	1801	1913	1969	1752	1958
GG&C	4826	4766	4714	5955	5133	5106	4683	4499	4205	3692
HG	743	711	746	693	746	713	763	760	749	563
LN	1299	1534	1570	1389	1736	1946	1912	1742	1563	1357
LO	3344	3414	3141	3448	3286	2940	3307	3479	3502	3449
OR	55	38	50	27	46	52	45	64	40	52
SH	53	37	23	26	0	42	69	60	62	35
TY	1730	1790	1737	1577	1527	1764	1881	1574	1513	1582
WI	18	22	7	51	32	27	22	22	33	23
Total	17289	17926	17841	19054	18277	18561	18961	18200	17371	16320

TABLE 6: Laboratory diagnoses of genital chlamydial infection in Scotland 2005-2014, by gender

Gender	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Female	11106	11416	11033	11652	11485	11497	11881	11405	10726	9976
Male	6054	6366	6563	7137	6566	6941	6913	6748	6572	6265
Unspecified	129	144	245	265	226	123	167	47	73	79
Total	17289	17926	17841	19054	18277	18561	18961	18200	17371	16320

In 2014, for women, the highest rates of diagnoses per 100,000 population were observed in NHS Lothian, NHS Tayside and NHS Grampian (over 600 diagnoses per 100,000 population) (Table 7a). For men, the highest rates were seen in NHS Tayside, NHS Lothian and NHS Greater Glasgow & Clyde (over 400 diagnoses per 100,000 population). Outside the island NHS boards, the lowest rates for females were observed in NHS Highland and NHS Lanarkshire; while the lowest rates for males were observed in NHS Highland, NHS Lanarkshire and NHS Borders. NHS Highland data are thought to reflect an under-representation of diagnoses, as Highland residents living in areas which were part of the former NHS Argyll & Clyde may have been diagnosed in, and reported from, NHS Greater Glasgow & Clyde.

For those aged under 25 years, rates of diagnoses per 100,000 population are much higher than for the overall diagnosed population. Outside the island NHS boards, among women aged under 25, the highest rates of diagnoses per 100,000 population were observed in NHS Tayside, NHS Lothian and NHS Dumfries & Galloway (greater than 2500 diagnoses per 100,000 population) (Table 7b and Figure 3). Among young men, the highest rates of diagnoses were recorded in NHS Tayside, NHS Lothian and NHS Dumfries & Galloway (over 1200 diagnoses per 100,000 population). Outside the Island NHS boards, lowest rates were observed in NHS Highland for women and men aged under 25 years.

TABLE 7: Genital chlamydial infection, Scotland 2014: number and rate per 100,000 population by NHS board of report and gender

TABLE 7a: Number of diagnoses and rate per 100,000 population for all ages by NHS board of report and gender

NHS board	Female (number of diagnoses)	Female (rate per 100,000)*	Male (number of diagnoses)	Male (rate per 100,000)*
AA	651	536	379	334
BR	160	449	83	243
D&G	273	581	154	343
FF	597	493	386	335
FV	536	535	339	350
GR	1182	606	762	386
GG&C	2165	546	1523	402
HG	329	325	234	233
LN	867	394	489	233
LO	2178	732	1265	440
OR	40	593	12	175
SH	19	260	13	169
TY	965	714	617	470
WI	14	169	9	107
Scotland	9976	556	6265	361

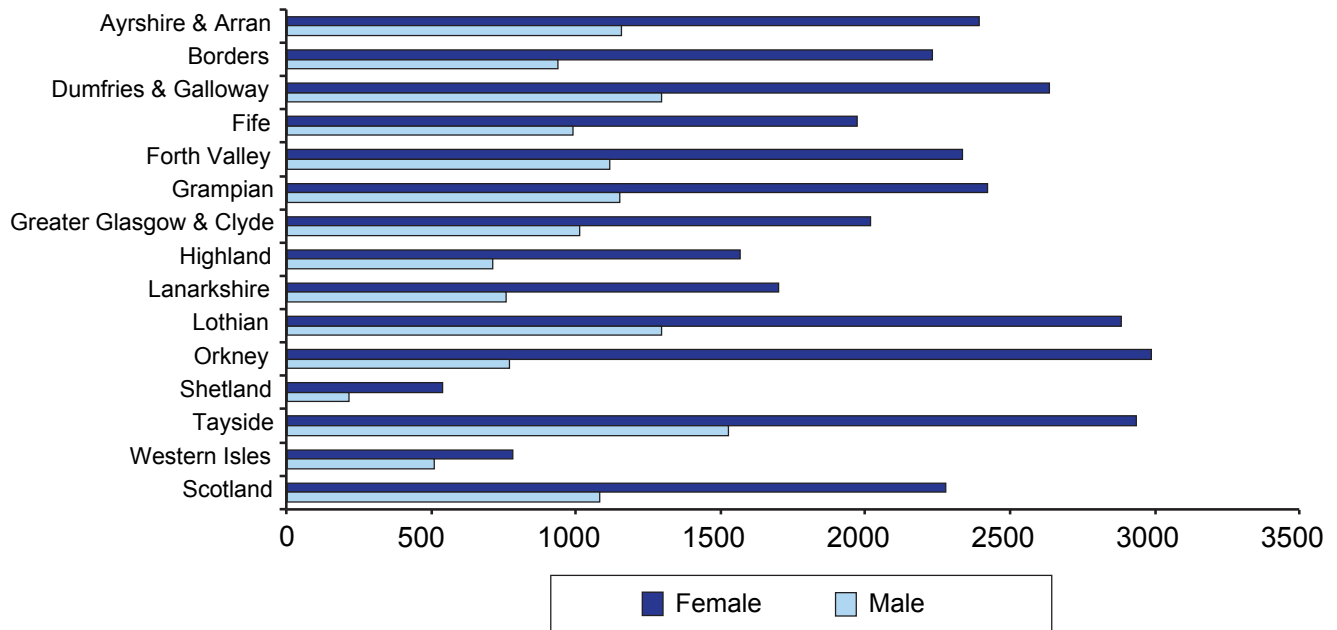
* rates based on GROS population estimate as at 30 June 2014 using ages 15-64 as denominator

TABLE 7b: Number of diagnoses and rate per 100,000 population for those under 25 years by NHS board of report and gender

NHS board	Female (number of diagnoses)	Female (rate per 100,000)*	Male (number of diagnoses)	Male (rate per 100,000)*
AA	508	2394	254	1159
BR	130	2230	55	937
D&G	208	2636	106	1294
FF	458	1969	226	987
FV	436	2338	217	1114
GR	904	2425	440	1152
GG&C	1566	2016	790	1010
HG	252	1568	132	713
LN	652	1698	304	756
LO	1709	2884	736	1295
OR	33	2986	10	768
SH	7	541	*	*
TY	796	2933	424	1527
WI	10	783	*	*
Scotland	7669	2280	3704	1083

* rates based on GROS population estimate as at 30 June 2014 using ages 15-24 as denominator

FIGURE 3: Rate (per 100,000) of diagnosis of genital chlamydia infection in those aged less than 25 years in Scotland in 2014, by gender and NHS board



Genital chlamydia, as with genital herpes, is an infection which predominates in young people. In 2014, 70% of all diagnoses (77% and 59% of all female and male diagnoses, respectively) were made in those aged under 25 years (Table 8). The majority of diagnoses were made among women and men aged 20-24 years. This has been a consistent finding for the past ten years (except for women in 2010, where more cases were seen in those aged under twenty).

Lymphogranuloma venereum (LGV) infection, caused by a serovar of *Chlamydia trachomatis*, re-emerged during 2003/2004 when outbreaks were reported in many European cities. LGV infection occurs predominantly in men who have sex with men (MSM) and is associated with high levels of concurrent STIs, in particular HIV, and with multiple anonymous partners and high risk sexual behaviour. Since its re-emergence, over 3000 diagnoses have been reported in the UK. The UK now has the largest documented outbreak of LGV among MSM in Europe.³ In Scotland during 2014, eight LGV diagnoses were recorded, all of which were made in men, compared to eleven in 2013, ten in 2012, six in 2011 and eight in 2010.

TABLE 8: Laboratory diagnoses of genital chlamydial infection in Scotland 2005-2014, by gender and age group

TABLE 8a: Women

Age	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<20	4195	4280	4157	4498	4499	4756	4636	4268	3915	3653
20-24	4481	4666	4492	4680	4549	4377	4677	4540	4369	4016
25-29	1458	1536	1514	1575	1562	1488	1608	1449	1503	1431
30-34	541	478	472	490	484	501	534	553	541	521
35-39	238	253	221	209	216	202	217	199	186	177
40-44	99	126	103	115	89	81	98	105	102	88
45-49	40	43	37	41	38	39	51	42	55	38
50+	31	22	27	26	40	34	46	33	43	46
Unknown	23	12	10	18	8	19	14	216	12	6
Total	11106	11416	11033	11652	11485	11497	11881	11405	10726	9976

TABLE 8b: Men

Age	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<20	1162	1193	1185	1393	1364	1602	1439	1294	1270	1156
20-24	2673	2738	2781	3087	2769	2882	2923	2839	2765	2548
25-29	1165	1321	1401	1444	1337	1337	1370	1327	1372	1335
30-34	476	513	523	584	489	486	587	551	566	582
35-39	279	280	282	295	274	266	244	226	221	245
40-44	146	163	196	155	146	160	133	139	139	150
45-49	57	86	98	89	100	100	94	93	115	95
50+	60	60	85	80	77	93	94	92	110	141
Unknown	36	12	12	10	10	15	29	187	14	13
Total	6054	6366	6563	7137	6566	6941	6913	6748	6572	6265

Gonorrhoea

In 2014, 1814 diagnoses of gonorrhoea were reported to HPS, a 14% increase on the 2013 total of 1598 (Table 9) and a return to a similar level as in 2012. Since 2012, NAATs have been in routine use across Scotland.⁴ During this time, there has been a concomitant increase in extragenital testing. Thus, a proportion of the increase in diagnoses is due to more effective testing, however, it is likely that the incidence of infection has also increased. Testing strategy has now stabilised and epidemiological trends since 2013 will be more comparable. Additional data cleaning at HPS has resulted in a different number of episodes compared to those reported in the GASS 2014 report (HPS Weekly report, this issue).

TABLE 9: Gonorrhoea, Scotland 2005 - 2014: laboratory reports (episodes) by gender

Gender	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Female	227	198	350	453	345	446	468	614	538	456
Male	674	700	665	612	666	930	1077	1290	1056	1358
Unspecified	3	2	0	8	10	2	2	0	1	0
Total	904	900	1015	1073	1021	1378	1547	1904	1595	1814

Note: one episode of gonorrhoea corresponds to an infected individual from whom more than one isolate could have been recovered

There is annual variability in the number of episodes in each NHS board and for some NHS boards no clear trends in incidence are evident (Table 10, Figure 4). However, in 2014 the most notable changes were an increase in episodes in NHS Lothian (increase of 103 since 2013) and NHS Grampian (increase of 51 since 2013). A decrease in episodes was seen in NHS Dumfries & Galloway. A continuing pattern remains of around one third of episodes being diagnosed in NHS Greater Glasgow & Clyde and around one quarter of episodes in NHS Lothian.

In contrast to genital herpes and chlamydia, the majority of gonorrhoea diagnoses were made in men (Table 9). The male:female ratio was 3:1, which is higher than the ratio seen in recent years (2:1 male:female) and reflects an increase in diagnoses among men in 2014 with a concomitant decrease in diagnoses among women.

TABLE 10: Gonorrhoea, Scotland 2005 - 2014: laboratory reports (episodes) by NHS board of report

NHS board	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AA	8	28	40	20	14	51	50	84	50	67
BR	3	2	0	6	3	3	5	14	8	17
D&G	8	2	2	9	9	11	26	26	58	45
FF	37	60	48	21	31	52	57	48	33	41
FV	24	25	28	17	23	25	51	70	73	78
GR	74	88	44	73	88	105	113	173	146	198
GG&C	415	347	409	427	424	690	606	723	609	635
HG	21	14	11	8	13	29	18	21	27	31
LN	35	71	242	229	124	126	126	180	121	120
LO	226	205	148	202	185	200	361	486	393	496
OR	0	*	*	0	0	0	0	0	*	0
SH	0	0	0	0	0	0	0	0	*	0
TY	53	57	42	61	100	85	134	79	74	86
WI	0	0	0	0	0	*	0	0	*	0
Total	904	900	1015	1073	1021	1378	1547	1904	1595	1814

Note: one episode of gonorrhoea corresponds to an infected individual from whom more than one isolate could have been recovered

The data indicate that, for those cases for whom the referral source was known, an estimated 85% were diagnosed in the sexual health clinic setting, 11% in primary care and the remainder in other settings including family planning and hospital.

In 2014, the highest rates of gonorrhoea infection (at over 100 per 100,000 population) for men were seen in NHS Greater Glasgow & Clyde and for women (at over 30 per 100,000 population) in NHS Lothian (Table 11).

FIGURE 4: Episodes of gonorrhoea by NHS board, Scotland, 2005-2014

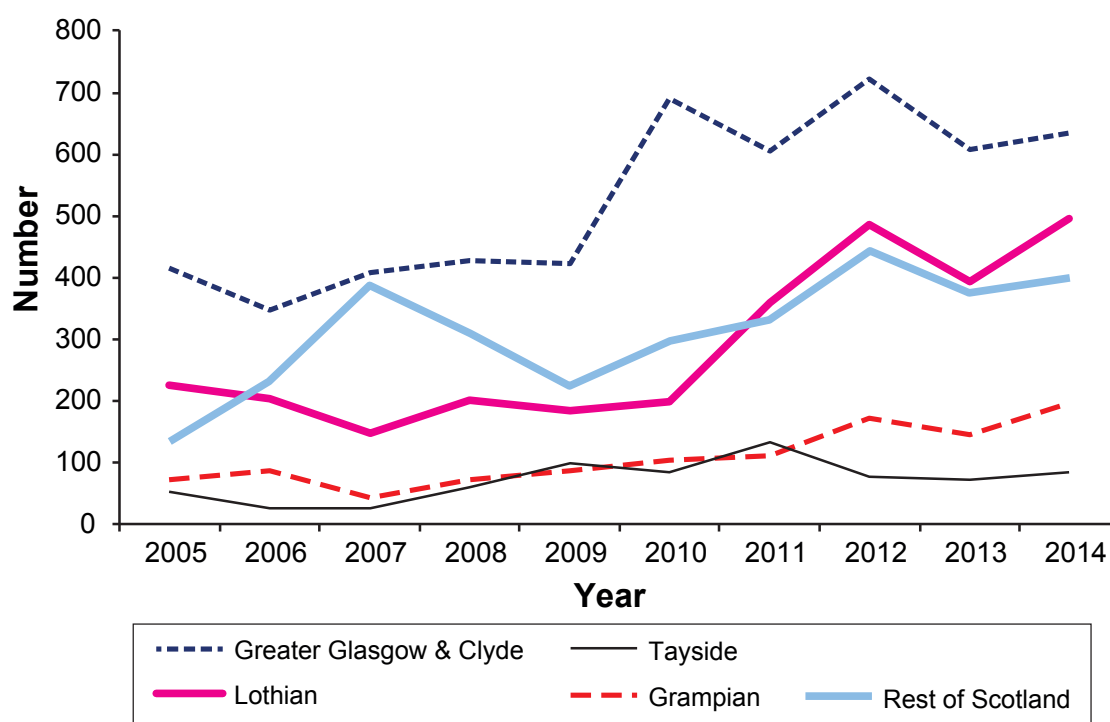


TABLE 11: Gonorrhoea, Scotland 2014: laboratory reports (episodes) by NHS board, gender and rate per 100,000 population

NHS board	Males		Females		All	
	Number	Rate/100,000	Number	Rate/100,000	Number	Rate/100,000
AA	36	20	31	16	67	18
BR	10	18	7	12	17	15
D&G	22	30	23	30	45	30
FF	31	17	10	5	41	11
FV	55	38	23	15	78	26
GR	159	29	39	7	198	17
GG&C	549	190	86	29	635	109
HG	24	15	7	4	31	10
LN	70	22	50	15	120	18
LO	336	81	160	36	496	58
OR	0	0.0	0	0.0	0	0.0
SH	0	0.0	0	0.0	0	0.0
TY	66	33	20	9	86	21
WI	0	0.0	0	0.0	0	0.0
Total	1358	52	456	17	1814	34

Note: rates based on GROS population estimate as at 30 June 2014 using ages 15-64 as denominator

In women, infection with gonorrhoea is associated predominantly with a young age group, with 72% of female episodes occurring in those aged under 25 years (Table 12b). For men, in 2014, 39% of episodes occurred in those aged under 25 years (Table 12a).

TABLE 12: Gonorrhoea, Scotland 2005 - 2014: laboratory reports (episodes) by gender and age group

Table 12a: Men

Age	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<25	268	309	336	333	322	432	500	579	463	531
25-29	113	129	128	108	128	194	238	274	239	308
30-34	89	71	57	56	83	113	134	157	140	196
35-39	87	60	58	40	43	57	73	78	61	89
40-44	56	62	39	35	42	67	54	77	47	80
45-54	45	54	38	27	38	46	57	99	72	113
>55	16	14	9	12	10	21	20	25	33	41
Not given	0	1	0	1	0	0	1	1	0	0
Total	674	700	665	612	666	930	1077	1290	1056	1358

Table 12b: Women

Age	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<25	159	161	268	355	262	333	346	440	390	327
25-29	27	20	47	67	45	63	60	88	82	62
30-34	17	5	17	14	22	28	24	40	28	34
35-39	13	5	8	6	6	9	12	12	15	17
40-44	2	3	4	4	3	8	13	15	8	5
>45	9	3	5	7	7	5	13	19	15	11
Not given	0	1	1	0	0	0	0	0	0	0
Total	227	198	350	453	345	446	468	614	538	456

The increase in gonorrhoea among men, observed between the late 1990s and 2006, is considered to be due, largely, to transmission among MSM. Rectal gonorrhoea is a key marker for unprotected anal intercourse. In 2014, 37.5% of episodes in males were diagnosed from a rectal swab positive for gonorrhoea (Table 13). This is a large increase from 2013 (28%) and is the highest recorded level in over ten years.

TABLE 13: Gonorrhoea, Scotland 2005 - 2014: number and percent rectal gonorrhoea isolated among males

Year	Male-all	Male-Rectal	% Rectal
2005	674	80	11.9%
2006	700	118	16.9%
2007*	597	90	15.1%
2008**	603	86	14.3%
2009	666	140	21.0%
2010	930	227	24.4%
2011	1077	288	26.7%
2012	1290	362	28.1%
2013	1058	296	28.0%
2014	1358	509	37.5%

* Data based on 597 gonococcal isolates reported by SBSTIRL

** Includes only those cases for whom specimen type data available

Discussion

Overall, the number of laboratory-positive diagnoses for genital herpes simplex types 1/2 and gonorrhoea has increased, while that for genital chlamydia has decreased between 2013 and 2014. As HPS has been refining the ECROSS data system over the past four years to improve the quality and quantity of the laboratory diagnoses dataset, it is not possible to make direct comparisons for genital herpes and genital chlamydia with data prior to 2009.

Much of the increase in chlamydia diagnoses prior to 2011 is due to a combination of issues including: increased opportunistic testing;⁴ the use of more sensitive diagnostic tests;⁵ increased awareness through health promotion campaigns; and latterly, improvements in data collection. In recent years, as a result of the initial findings of the CMO Expert Advisory Group on genital chlamydia testing, there has been discussion about the extent of opportunistic testing that is performed. HPS is unable to measure the extent of opportunistic testing with our current data collection systems but it may be that levels of testing have decreased resulting in lower numbers of diagnoses.

Infection among heterosexuals

Information about sexual orientation is not available from laboratory reports to SBSTIRL or in ECROSS and it is impossible to know if infections in men are occurring among those who have sex with women or those who have sex with men. Therefore, to ascertain information about heterosexual transmission, the analysis of STIs in women can be used to provide an insight.

Testing for many STIs has increased since the start of the last decade due to a combination of improvements in access to sexual health clinics, sexual health promotion activities and improvements in test technology. Testing for chlamydia infection, which is asymptomatic in up to 80% of individuals, also increased during this time,⁴ initially as a result of the SIGN guideline⁵ recommendations including the provision of NAAT testing platforms which allow samples to be tested for both chlamydia and gonorrhoea.⁶ This latter change in testing practice has also likely resulted in an increase in gonorrhoea diagnoses.

Over the past few years, genital chlamydia diagnoses have decreased and it is, as yet, unclear as to whether this is a decrease in incidence or a decrease in opportunistic testing. There is, however, no doubt that very large numbers of people are infected – particularly those in the younger age groups. The discrepancy between the numbers of male and female chlamydial infections is almost certainly due to more women than men undergoing testing.

Trends in genital herpes and gonorrhoea among women, however, could be considered true reflections of any changes in high-risk sexual behaviour among heterosexual populations. In this respect, there has been an increase in the incidence of gonorrhoea in women over the last four years. For genital herpes, caution should be applied in interpreting the data as these do not necessarily reflect incident infection. Nevertheless, the data continue to indicate that young people, in particular women, are acquiring STIs at an early age.

In summary, the evidence suggests that the incidence of STIs among young heterosexuals through casual unprotected sexual intercourse remains a problem in Scotland. Thus, it is essential that efforts to affect behavioural change in this group through positive sexual health messages are continued while encouraging individuals to undergo testing when at risk of infection and so receive appropriate treatment.

Infections among men who have sex with men (MSM)

As laboratory data contain no information on sexual orientation, rectal infections may be used as a surrogate marker for gonococcal infection in MSM. The incidence of rectal gonorrhoea, an indicator of unprotected anal intercourse among MSM, reached its highest recorded level accounting for 37.5% of male gonorrhoea diagnoses.

Surveillance data on other STIs indicate that:

- the annual incidence of infectious syphilis among this group has fluctuated in recent years and in 2014 remained below the 2008 peak of 200 diagnoses;⁷ and
- the number of newly diagnosed HIV cases among MSM has fallen in 2014 to 146 diagnoses following a period of stability of around 170 diagnoses per year for the period 2008-13.⁸

While the HIV prevalence, among those providing an oral fluid specimen for the Medical Research Council's triennial cross-sectional surveys of men in gay bars in Glasgow and Edinburgh, has remained stable at 4.8% between 2005 and 2011 (latest data available), there is evidence from this survey of a statistically significant increase in self-reported sexual risk behaviour.⁹ The likelihood of HIV transmission is increased in the presence of another STI, particularly rectal gonorrhoea, so HIV transmission among this group remains a serious public health concern. From data available on newly acquired HIV infection (that is within the preceding three to four months), MSM have the highest proportion (30%) in 2014 compared to 15% among other groups.

There are a number of additional sexual health concerns in this population, which are being seen predominantly in the rest of the UK. Two emerging infections have been seen in this population in England, *Shigella flexneri*¹⁰ and *E. coli* O117:H7.¹¹ Transmission of *S. flexneri* and *E. coli* was associated with high numbers of sexual partners, high rates of HIV co-infection and additionally shigellosis was linked to chemsex.¹²

In summary, information from both infection data (particularly the increase in rectal gonorrhoea) and behavioural studies, suggest that rates of unprotected sexual intercourse and risk of STI infection among MSM continue despite initiatives to raise awareness and levels of knowledge. Challenges for control and prevention of STIs in this group continue.

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The last Sexually transmitted Infections Surveillance Report was in Issue [14/38](#)
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Gonococcal antibiotic surveillance in Scotland (GASS): prevalence, patterns and trends in 2014

Prepared by: K Eastick

Summary

- The number of episodes of gonorrhoea submitted to SBSTIRL increased by 14% between 2013 and 2014, most of this increase being seen in male patients. Around half of episodes were diagnosed by nucleic acid amplification only. The resistance surveillance in 2014 was therefore based on 51% of gonococcal infections in Scotland.
- No resistance was observed to ceftriaxone, the recommended first-line therapy along with azithromycin, or to spectinomycin. No treatment failures were formally reported.
- A small but increasing number of isolates demonstrated resistance to cefixime (1.4%). This is in line with reports elsewhere in the UK and Europe.
- Decreased susceptibility to azithromycin has also remained low (1.3%) but is increasing. The rate of resistance to ciprofloxacin has decreased slightly (27.2%).
- Continued surveillance for antibiotic resistance is essential for guiding the choice of effective therapeutic regimens for gonorrhoea and every effort should be made to maintain culture from a high proportion of gonococcal episodes of infection to best guarantee the accuracy of surveillance data.

Methodology

The Scottish Bacterial Sexually Transmitted Infections Reference Laboratory (SBSTIRL) provides surveillance data on antimicrobial resistance for all gonococci isolated in Scotland. All cultured organisms are tested against seven antibiotics using the agar dilution method,¹ and by E-tests (bioMérieux) when the minimum inhibitory concentration (MIC) exceeds the dilution series. *Neisseria gonorrhoeae* multi-antigen sequence typing (NG-MAST)² is performed on isolates and specimens positive by *N. gonorrhoeae* nucleic acid amplification tests (NAAT) submitted to SBSTIRL where a culture is not available.

Episodes of gonorrhoea in Scotland

The number of episodes of gonorrhoea is obtained by the manual removal from the database of duplicate samples from the same patient taken within a six-week period (one month prior to 2013), and presumed duplicate patients who appear to have been tested both in primary care and at sexual health services. A total of 1820 episodes of gonococcal infection were reported by SBSTIRL in 2014. Seven were cultures non-recoverable on receipt in the laboratory and 884 were diagnosed by NAAT with no culture available. Antibiotic susceptibility testing was therefore performed on isolates from 929 episodes (51%). NG-MAST data are available for 1391 episodes (76%). NG-MAST data can be a useful predictor of antibiotic susceptibility profile for those sequence types (STs) that occur commonly and for which no cultured isolate exists.³

Table 1 shows gonorrhoea episodes and trends by gender. Total gonorrhoea episodes show an increase of 14% in comparison with 2013. Males accounted for 74.9% of episodes in 2014, a larger proportion than recently seen. As has been the case for every year for which such data has been available, a larger proportion (58.6%) of diagnoses in women were by NAAT only, compared with 45.2% in men and 48.6% overall.

TABLE 1: Episodes gonorrhoea: isolates and NAAT specimens sent to SBSTIRL over the last five years

	2010			2011			2012			2013			2014		
	Culture positive	NAAT positive	Total	Culture positive	NAAT positive	Total	Culture positive	NAAT positive	Total	Culture positive	NAAT positive	Total	Culture positive	NAAT positive	Total
Total	797	581	1378	795	749	1544	958	947	1905	830	767	1597	936	884	1820
Male	588	339	927	612	465	1077	708	582	1290	617	440	1057	747	616	1363
Female	205	242	447	183	284	467	250	365	615	213	326	539	189	268	457
Unknown	4	0	4	0	0	0	0	0	0	0	1	1	0	0	0

General antibiotic susceptibility trends

Table 2 and Figure 1 provide resistance trends for the antibiotics tested over the last five years and Table 3 gives the pattern of resistance for isolates in 2014.

In total, 397 (42.7%) of the 929 episodes for which susceptibility data were available exhibited decreased susceptibility to one or more antibiotics tested, an increase on the 37.5% seen in 2013. There were no isolates with decreased susceptibility to ceftriaxone or resistance to spectinomycin in 2014.

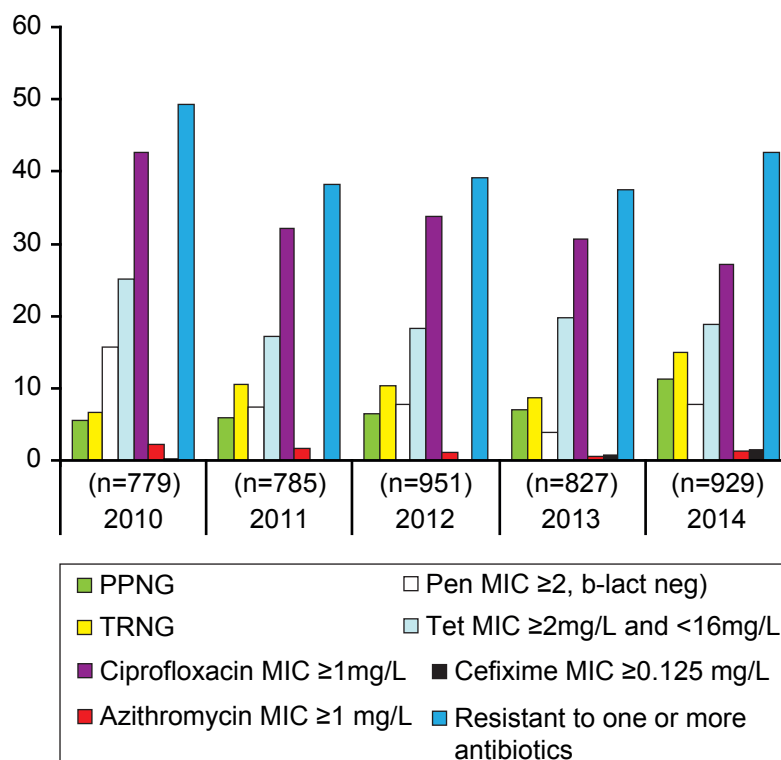
TABLE 2: Gonococcal antibiotic resistance trends over the last five years

	Plasmid resistance		Chromosomal resistance					Total
	PPNG ^a	TRNG ^b	Penicillin ≥ 2 mg/L	Tetracycline ≥ 2 mg/L	Ciprofloxacin ≥ 0.125 mg/L	Azithromycin ≥ 1.0 mg/L	Cefixime >0.125 mg/L	
	+	-	-	-	-	-	-	21
	-	+	-	-	-	-	-	9
	+	+	-	-	-	-	-	2
	+	-	-	-	+	-	-	19
	+	-	-	+	-	-	-	1
	+	-	-	+	+	-	-	5
	-	+	-	-	+	-	-	70
	+	+	-	-	+	-	-	57
	-	-	+	+	-	-	-	48
	-	-	+	+	+	-	-	11
	-	-	-	+	+	+	-	1
	-	-	+	+	+	-	+	10
	-	-	-	+	+	-	-	47
	-	-	-	+	+	-	+	3
	-	-	-	-	+	-	-	40
	-	-	+	+	-	+	-	3
	-	-	-	+	-	-	-	42
	-	-	-	-	-	+	-	3
	-	-	-	+	-	+	-	5
Total	105 (11.3%)	138 (14.9%)	72 (7.8%)	176 (18.9%)	263 (28.3%)	12 (1.3%)	13 (1.4%)	397 (42.7%)
2013	59 (7.1%)	71 (8.6%)	32 (3.9%)	164 (19.8%)	264 (31.9%)	4 (0.5%)	6 (0.7%)	301 (37.5%)

^a β-lactamase positive

^b Plasmid mediated tetracycline resistance – tetracycline MIC ≥ 16 mg/l

FIGURE 1: Five-year trends in gonococcal resistance



Cephalosporin resistance

Resistance to cefixime (MIC >0.125 mg/L) was found in 13 isolates in 2014 (1.4%), which although a small proportion of all isolates, is double the percentage seen in the previous year. Of these isolates, 11 were ST1407 which has been associated with decreased susceptibility to cephalosporins in Europe and worldwide⁴. All isolates remained susceptible to ceftriaxone.

Sentinal surveillance in England and Wales in 2013 demonstrated resistance to cefixime (MIC ≥ 0.25 mg/L) in 1.3% of 1,750 isolates, and identified three isolates with decreased susceptibility to ceftriaxone (MIC ≥ 0.125 mg/L).⁵

Azithromycin decreased susceptibility

Decreased susceptibility to azithromycin exceeded 5% in 2007 (44 of 845 episodes, 5.2%), reduced by 2009 to 1.6% (11 episodes), and fell gradually to a low of 0.5% in 2013. In 2007 extremely high MIC values (≥ 256mg/L) were observed in a high proportion of isolates with decreased susceptibility (75%, 33/44) whereas in subsequent years both the number of isolates and the proportion with high MICs were reduced. Three of the 12 (1.3%) azithromycin-resistant episodes in 2014 were associated with high-level resistance. Eight different STs were identified, indicating that ongoing transmission of resistance, if occurring, is likely to be limited.

Penicillin and tetracycline resistance

Overall resistance to penicillin and tetracycline (plasmid and chromosomal) was found in 19.1% and 33.8% of culture episodes respectively. The proportion of isolates exhibiting chromosomal resistance to penicillin, tetracycline and ciprofloxacin continues to fall, with 21 episodes (2.3%) reported in 2014.

Ciprofloxacin resistance

Ciprofloxacin resistance (MIC ≥ 1mg/L) continues a slow decline, with 253 of 929 episodes (27.2%) resistant in 2014. All isolates resistant to cefixime were also resistant to both tetracycline and ciprofloxacin, this is known to be characteristic of ST1407 and similar strains.

TABLE 3: Antibiotic resistance patterns in isolates from 929 episodes of infection; Scotland 2014

Antimicrobial resistance	2010 (n=779)	2011 (n=785)	2012 (n=951)	2013 (n=827)	2014 (n=929)
PPNG (β -lactamase positive)	5.5% (43)	6.0% (47)	6.5% (62)	7.1% (59)	11.3% (105)
TRNG (plasmid mediated tetracycline resistance – tetracycline MIC \geq 16 mg/l)	6.7% (52)	10.6% (83)	10.4% (99)	8.6% (71)	14.9% (138)
PenR (chromosomally mediated resistance to penicillin - MIC \geq 2mg/l but β -lactamase negative)	15.6% (122)	7.2% (57)	7.8% (74)	3.9% (32)	7.8% (72)
TetR (chromosomally mediated resistance to tetracycline - MIC 2 to 8 mg/l)	25.1% (196)	17% (134)	18.3% (174)	19.9% (164)	19% (176)
Ciprofloxacin intermediate resistance (MIC 0.125-0.5 mg/l)	0.3% (2)	0.6% (5)	0.5% (5)	1.2% (10)	1.1% (10)
Ciprofloxacin resistant (MIC \geq 1mg/l)	42.6% (332)	32.2% (253)	33.8% (321)	30.7% (254)	27.2% (253)
Azithromycin decreased susceptibility (MIC \geq 1 mg/l)	2.3% (18)	1.7% (13)	1.1% (10)	0.5% (4)	1.3% (12)
Spectinomycin resistance (MIC \geq 128 mg/l)	0%	0%	0%	0%	0%
Ceftriaxone resistance (MIC $>$ 0.125 mg/l)	0%	0%	0%	0%	0%
Cefixime resistance (MIC $>$ 0.125 mg/l)	0.1% (1)	0%	0%	0.7% (6)	1.4% (13)
Resistant to one or more antibiotics	49.2% (383)	38.3% (301)	39.1% (372)	37.5% (301)	42.7% (397)

Sequence type and antibiotic resistance

NG-MAST is a highly discriminatory typing scheme that differentiates between isolates on the basis of the sequence variation observed in two genes, coding for the por protein and transferrin binding protein b (tbpb). Each ST is unique and differs from any other by at least one nucleotide. Clusters of isolates sharing the same ST can be observed and both phenotypic and demographic data support the validity of the clusters as containing related isolates. Sequence types represented by five or more antibiotic-resistant episodes are given in Table 4.

The data in Table 4 indicate, as has been observed in previous years, that ciprofloxacin resistance and TRNG are more strongly correlated with ST than other chromosomally determined reduced susceptibilities or PPNG. A number of STs were associated with more than one resistance category.

Plasmid-mediated resistance has previously been associated with infection outside the UK⁶ and limited onward transmission in Scotland. However, in 2014 as seen in 2013, PPNG and TRNG

appeared to be associated with multiple isolations of the same ST, giving a likely indication of clusters of infection.

This data also makes clear the association between ST1407 and cefixime resistance. However, due to the relative ubiquity of this ST, it is not clear whether this is due to a cluster (or clusters) of transmission of a resistant strain, or to multiple introduction and/or mutation events.

TABLE 4: Antibiotic resistance and commonly occurring sequence types 2014

Resistance category	Sequence type	No. resistant isolates	No. non-resistant isolates	No. identified by NAAT only ^a	Total No episodes in 2014	Total No. episodes 2013
PPNG	5624	5	0	1	6	10
	5973	15	1	11	27	0
	6974	5	1	2	8	0
	10101	13	0	6	19	0
TRNG	4995	9	0	1	10	18
	6974	6	0	2	8	0
	9665	29	0	10	39	2
	10046	6	0	2	8	0
	10421	12	0	1	13	0
Penicillin (chromosomal)	21	49	7	8	64	4
	1407	14	16	10	40	61
Tetracycline (chromosomal)	21	55	1	8	64	4
	649	13	2	13	28	10
	1407	18	12	10	40	61
	2400	17	3	14	34	23
	10101	13	0	6	19	0
	10195	8	0	2	10	0
Ciprofloxacin	1407	30	0	10	40	61
	2400	20	0	14	34	23
	4995	9	0	1	10	18
	5624	5	0	1	6	10
	6360	7	0	3	10	4
	6974	6	0	2	8	0
	9665	29	0	10	39	2
	10046	6	0	2	8	0
	10101	13	0	6	19	0
	10195	8	0	2	10	0
	10421	12	0	1	13	0
Cefixime	1407	11	19	10	40	61

^aTherefore no antibiotic resistance data available.

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