Surveillance report

Genital chlamydia and gonorrhoea infection in Scotland: laboratory diagnoses 2009-2018

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ERRATUM: Please note that Tables 4 and 9, plus Figure 1, have been updated (shown in red) as minor miscalculations in the previous version occurred. Scotland level figures within the main body of the text remain unchanged. Key messages of the report have not been affected.

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Key points

- In 2018, 16,338 diagnoses of genital chlamydia were recorded; this is a small increase compared to 2017 (15,685).
- In 2018, 3,233 episodes of gonorrhoea were reported, a 24% increase compared to 2017 and the largest number recorded in the last decade.
- 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 condomless anal intercourse (CAI), increased in 2018 to 39% of all gonorrhoea episodes recorded. The number of male rectal gonorrhoea episodes is the largest number of episodes recorded over the last decade.
- Infection and behavioural data indicate that rates of unprotected sexual intercourse and STI infections among MSM are increasing. The impact of NHS-funded PrEP is not yet fully understood, but it now looks possible that this intervention is associated with the observed increase in STI incidence in MSM.

Health Protection Scotland

Introduction

In this report, ten-year trend data are presented on two acute sexually transmitted infections (STIs): genital chlamydia and gonorrhoea.

Data on genital chlamydia and gonorrhoea infection are extracted from the laboratory diagnoses database, the Electronic Communication of Surveillance in Scotland System (ECOSS).[1] This is an HPS surveillance system which is updated daily with positive test results from all Scottish diagnostic and reference laboratories.

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 since 2009 and, the implementation of ECOSS in all laboratories, are not directly comparable to those prior to this date. The data associated with the laboratory positive diagnoses are restricted to age, gender and the NHS board where the clinical specimen originated.

To maintain patient confidentiality and prevent deductive disclosure, numbers less than five have been suppressed and are indicated with an asterisk (*). To prevent back-calculation of suppressed numbers from totals, it may also be necessary to suppress some numbers greater than five (secondary suppression).

Genital chlamydia

In 2018, 16,338 episodes of genital chlamydial infection were reported to HPS; a 4% increase compared to the number reported in 2017 (15,685). The total number of diagnoses has increased slightly between 2016 and 2018, following a period of diagnoses being relatively stable with between 15,000 and 16,000 diagnoses recorded annually (Table 1). 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 chlamydial infection (genital and extragenital) 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.

Table 1: Laboratory diagnoses of *Chlamydia trachomatis* infection in Scotland by NHS board of report, 2009-2018.

NHS board	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ayrshire & Arran	818	1097	1251	1216	1206	1078	988	976	968	887
Borders	394	390	338	305	270	243	261	282	223	223
Dumfries & Galloway	483	503	451	568	515	428	278	355	370	323
Fife	1142	1149	1183	981	1025	984	913	890	979	1080
Forth Valley	1096	1031	1143	961	936	876	824	861	823	835
Grampian	1838	1801	1913	1969	1752	1958	1741	1722	1779	1868
Greater Glasgow & Clyde	5133	5106	4683	4499	4205	3692	3390	3415	3542	3800
Highland	746	713	763	760	749	563	599	635	611	685
Lanarkshire	1736	1946	1912	1742	1563	1357	1310	1298	1326	1347
Lothian	3286	2940	3307	3479	3502	3449	3146	3178	3501	3785
Orkney	46	52	45	64	40	52	27	34	20	32
Shetland	0	42	69	60	62	35	73	69	45	43
Tayside	1527	1764	1881	1574	1513	1582	1588	1408	1480	1418
Western Isles	32	27	22	22	33	23	22	24	18	12
Total	**18277**	**18561**	**18961**	**18200**	**17371**	**16320**	**15160**	**15147**	**15685**	**16338**

Table 2: Laboratory diagnoses of *Chlamydia trachomatis* infection in Scotland by gender, 2009-2018.

Gender	2009	2010	2011	2012	2013	2014	2015*	2016	2017	2018
Women	11485	11497	11881	11405	10726	9976	9018	8994	9179	9465
Men	6566	6941	6913	6748	6572	6265	6078	6098	6479	6857
Unknown	226	123	167	47	73	79	64	55	27	16
Total	**18277**	**18561**	**18961**	**18200**	**17371**	**16320**	**15160**	**15147**	**15685**	**16338**

In 2018, the majority of genital chlamydia diagnoses (58%, 9,465/16,338) were made in women (Table 2) which has been a consistent pattern over the past decade; however, it should also be noted that a small increase (6%) in diagnoses among men was observed between 2017 and 2018. In addition, the female to male ratio has slightly decreased year on year since 2011 (from 1.7:1 in 2011 to 1.4:1 in 2018). The increase in diagnoses among men and the decreasing female to male ratio could be due, in part, to the rise recorded over the last few years in rectal chlamydia diagnoses among men (from 8% (487) in 2014 to 15% (1,034) in 2018). Alternatively, this increase could partly be a result of the additional STI testing, most notably among men who have sex with men (MSM), which has been undertaken since July 2017 following the introduction of NHS-funded HIV pre-exposure prophylaxis (PrEP) in Scotland.[2]

Genital chlamydia is an infection which predominates in young people. In 2018, 66% of all diagnoses (74% and 54% of all female and male diagnoses, respectively) were made in those aged less than 25 years (Table 3); of these, the majority 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 diagnoses were observed in those aged under 20).

Table 3: Laboratory diagnoses of *Chlamydia trachomatis* in Scotland by gender and age group, 2009-2018.

Women

Age	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<20	4499	4756	4636	4268	3915	3653	3099	2970	3069	3184
20-24	4549	4377	4677	4540	4369	4016	3691	3749	3741	3846
25-29	1562	1488	1608	1449	1503	1431	1317	1304	1354	1468
30-34	484	501	534	553	541	521	518	547	554	550
35-39	216	202	217	199	186	177	198	228	240	238
40-44	89	81	98	105	102	88	96	91	101	82
45-49	38	39	51	42	55	38	40	44	63	38
>49	40	34	46	33	43	46	39	15	41	40
Unknown	8	19	14	216	12	6	20	16	16	19
Total	**11485**	**11497**	**11881**	**11405**	**10726**	**9976**	**9018**	**8994**	**9179**	**9465**

Men

Age	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<20	1364	1602	1439	1294	1270	1156	962	990	1052	1140
20-24	2769	2882	2923	2839	2765	2548	2493	2526	2566	2589
25-29	1337	1337	1370	1327	1372	1335	1349	1266	1359	1480
30-34	489	486	587	551	566	582	576	570	634	657
35-39	274	266	244	226	221	245	251	283	336	354
40-44	146	160	133	139	139	150	147	162	189	207
45-49	100	100	94	93	115	95	118	107	119	154
>49	77	93	94	92	110	141	173	184	205	262
Unknown	10	15	29	187	14	13	9	10	19	14
Total	**6566**	**6941**	**6913**	**6748**	**6572**	**6265**	**6078**	**6098**	**6479**	**6857**

In 2018, for women, the highest rates of diagnosis per 100,000 population were observed in NHS Lothian and NHS Tayside (over 600 diagnoses per 100,000 population) (Table 4). There was a similar observation for men with the highest rates in NHS Lothian, NHS Tayside and NHS Greater Glasgow & Clyde (over 400 diagnoses per 100,000 population). Outside the island NHS boards, the lowest rates for men and women were observed in NHS Borders and NHS Lanarkshire, respectively. It should be noted that with respect to NHS Highland data, these 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 less than 25 years, rates of diagnosis per 100,000 population are much higher than for the overall diagnosed population. Among women aged under 25, the highest rates of diagnosis per 100,000 population were observed in NHS Lothian, NHS Tayside and NHS Grampian (greater that 2,200 diagnoses per 100,000 population) (Table 4 and Figure 1). Among young men, the highest rates of diagnosis were recorded in NHS Lothian, NHS Tayside, NHS Fife and NHS Grampian (over 1,200 diagnoses per 100,000 population). Outside the island NHS boards, the lowest rates were observed in NHS Highland and NHS Lanarkshire for men and women aged less than 25 years, respectively.

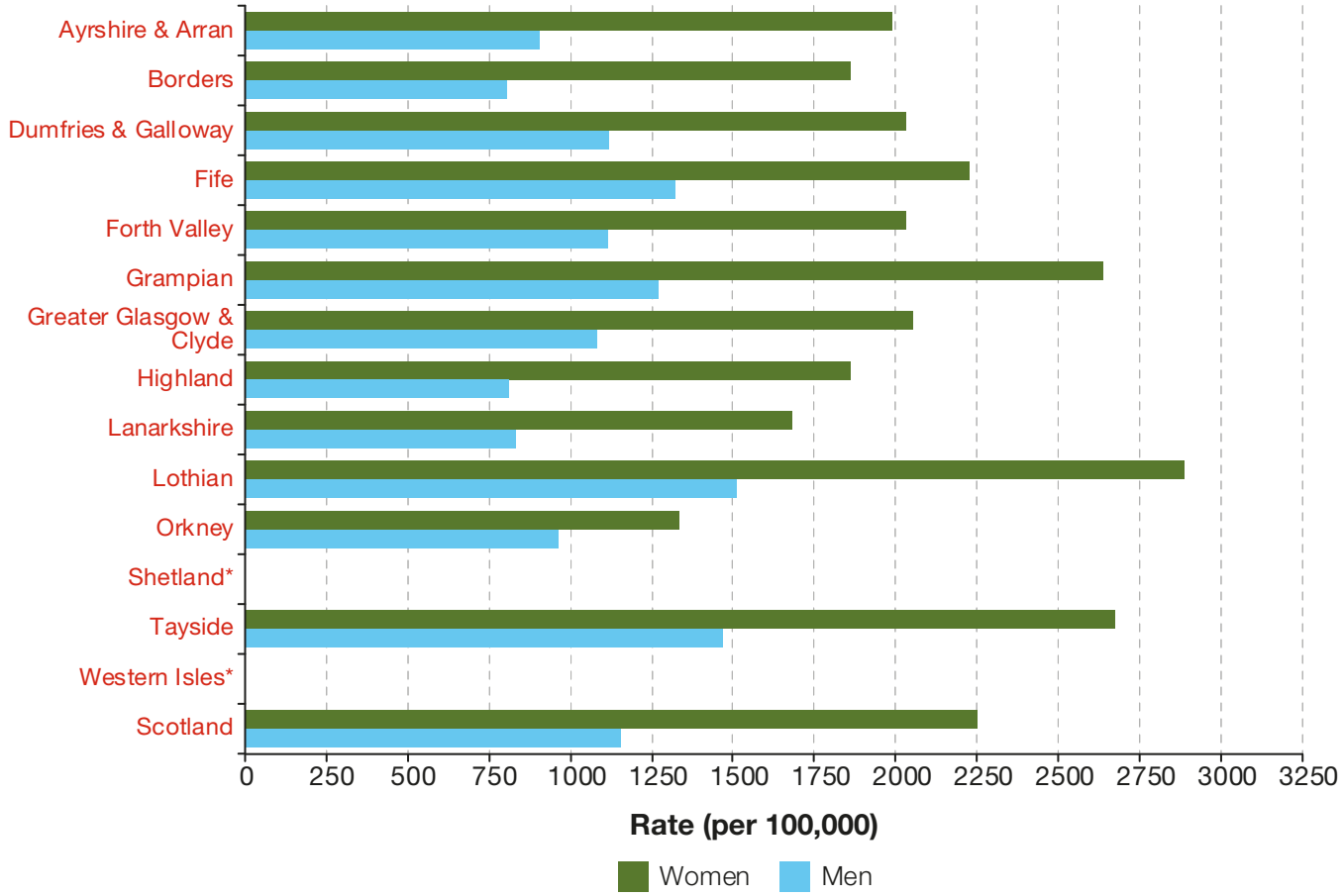
Table 4: *Chlamydia trachomatis* infection, Scotland 2018: number and rate per 100,000 population by NHS board of report and gender for all ages and for those aged less than 25 years.

NHS board	All ages			
	Women		Men	
	Number	Rate/100,000[1]	Number	Rate/100,000[1]
Ayrshire & Arran	562	473	324	294
Borders	141	398	82	242
Dumfries & Galloway	191	420	132	304
Fife	621	516	457	397
Forth Valley	497	492	337	346
Grampian	1107	581	760	392
Greater Glasgow & Clyde	2087	515	1712	438
Highland	414	416	270	272
Lanarkshire	820	374	527	252
Lothian	2137	690	1646	551
Orkney	17	250	15	219
Shetland	26	369	10	134
Tayside	839	627	579	444
Western Isles	6	75	6	75
Total	**9465**	**526**	**6857**	**393**

NHS board	Less than 25 years			
	Women		Men	
	Number	Rate/100,000[2]	Number	Rate/100,000[2]
Ayrshire & Arran	390	1990	187	907
Borders	103	1862	47	804
Dumfries & Galloway	144	2034	87	1119
Fife	486	2227	297	1325
Forth Valley	367	2035	210	1115
Grampian	851	2638	428	1269
Greater Glasgow & Clyde	1486	2054	799	1084
Highland	285	1858	146	809
Lanarkshire	613	1685	318	830
Lothian	1625	2887	821	1512
Orkney	13	1331	11	965
Shetland	*	*	*	*
Tayside	656	2672	373	1468
Western Isles	*	*	*	*
Total	**7030**	**2250**	**3729**	**1156**

1 Rates based on population estimate as at 30 June 2018 using ages 15-64 as denominator.
2 Rates based on population estimate as at 30 June 2018 using ages 15-24 as denominator.

Figure 1: Rate (per 100,000) of diagnosis of *Chlamydia trachomatis* infection in those aged less than 25 years in Scotland in 2018 by gender and NHS board.[1]



1 Rates based on population estimate as at 30 June 2018 using ages 15-24 as denominator.
* Rates for Shetland and Western Isles have been suppressed to prevent deductive disclosure.

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 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 4,600 diagnoses have been reported in the UK to the end of March 2016 (latest report available).[3] The UK now has the largest documented outbreak of LGV among MSM in Europe.[4] In Scotland during 2018, 30 LGV episodes were recorded compared to 23 in 2017, 45 in 2016, 15 in 2015, eight in 2014, and 11 in 2013. Data for 2018 indicate that all but one of the LGV diagnoses were among men (for one gender was unknown) with 43% being diagnosed in NHS Greater Glasgow & Clyde (13) and 37% in NHS Lothian (11). Over three quarters (23/30, 77%) of these men with LGV infection were aged 35 and over with a median age of 45 years.

Gonorrhoea

In 2018, 3,233 episodes of gonorrhoea were reported to HPS (a single episode is defined as a six week period); this represents a 24% increase on the number reported in 2017 (2,610) (Table 5). Since 2013, gonorrhoea diagnoses have increased by 103% (from 1,595 in 2013 to 3,233 in 2018). This increase is mainly due to a 121% increase in male diagnoses (from 1,056 to 2,339); however, female diagnoses have also increased by 66% (from 538 to 893) during this period. Since 2012, NAATs have been in routine use across Scotland.[5] During this time, there has been a concomitant increase in extra-genital testing. Testing strategy has now stabilised and epidemiological trends since 2013 will be more comparable than those in previous years. Furthermore, since 2015, confirmatory testing is being performed by several testing laboratories and not exclusively by the Scottish Bacterial Sexually Transmitted Infection Reference Laboratory (SBSTIRL).[6] As a consequence, the number of episodes reported here differ from those reported in the GASS 2018 report. It should be noted that, following the introduction of HIV PrEP in July 2017, STI testing increased which is possible to account in part for the increase in episodes observed during 2017 and 2018;[2] however, it is also possible that part of the observed increase represents a true increase in the incidence of infection.

Table 5: Laboratory reports (episodes) of gonorrhoea by gender, Scotland, 2009-2018.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Women	345	446	468	614	538	457	443	604	655	893
Men	666	930	1077	1290	1056	1362	1891	1750	1953	2339
Unknown	10	2	2	0	1	0	12	9	2	1
Total	**1021**	**1378**	**1547**	**1904**	**1595**	**1819**	**2346**	**2363**	**2610**	**3233**

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

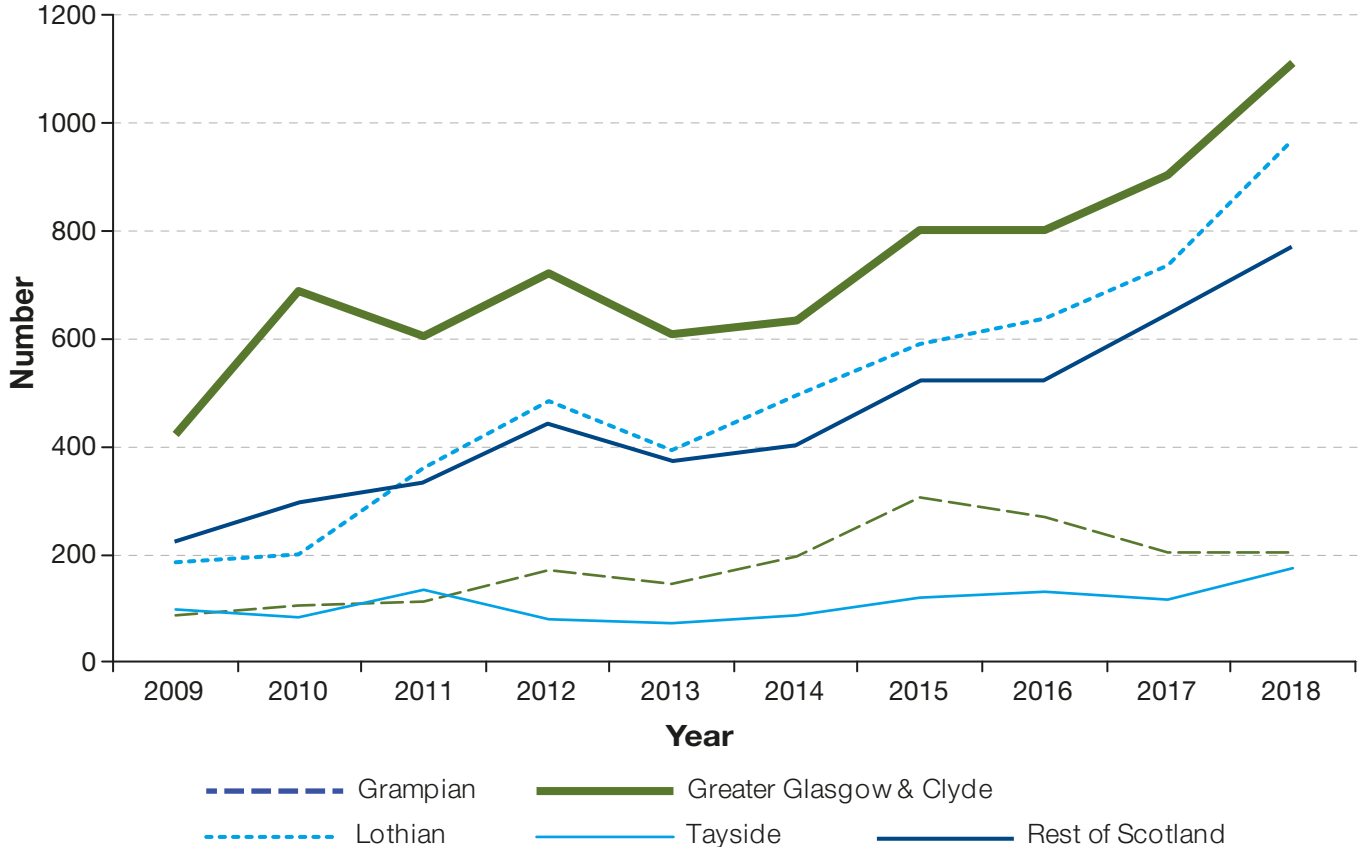
Over the past decade, while there has been annual variability in the number of episodes and for some NHS boards no clear trends in incidence, an increase was evident in the number of episodes recorded between 2017 and 2018; increases were most notable in NHS Tayside, NHS Lothian, NHS Fife and NHS Greater Glasgow & Clyde (Table 6, Figure 2). A continuing pattern remains where the majority of episodes were recorded in NHS Greater Glasgow & Clyde and NHS Lothian with 34% and 30%, respectively.

Table 6: Laboratory reports (episodes) of gonorrhoea by NHS board of report, Scotland, 2009-2018.

NHS board	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Ayrshire & Arran	14	51	50	84	50	67	86	109	100	118
Borders	*	*	5	14	8	17	9	11	26	31
Dumfries & Galloway	9	11	26	26	58	45	45	15	26	29
Fife	31	52	57	48	33	41	76	89	140	174
Forth Valley	23	25	51	70	73	78	115	101	104	121
Grampian	88	105	113	173	146	198	307	269	204	205
Greater Glasgow & Clyde	424	690	606	723	609	635	804	803	903	1114
Highland	13	29	18	21	27	36	42	51	48	58
Lanarkshire	124	126	126	180	121	120	146	142	201	232
Lothian	185	200	361	486	393	496	592	637	736	969
Orkney	*	0	0	0	*	0	0	*	*	*
Shetland	0	0	0	0	*	0	*	*	*	*
Tayside	100	85	134	79	74	86	120	132	118	175
Western Isles	0	*	0	0	*	0	*	*	0	*
Total	**1021**	**1378**	**1547**	**1904**	**1595**	**1819**	**2346**	**2363**	**2610**	**3233**

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

Figure 2: Episodes of gonorrhoea by NHS board, Scotland, 2009-2018.



In contrast to genital chlamydia, the majority (72%, 2339/3233) of gonorrhoea diagnoses were made in men (Table 5). The male:female ratio was 2.6:1 which is slightly lower than the two previous years (3:1 in 2017 and 2.9:1 in 2016). During the last three years, the number of diagnoses in women recorded annually has steadily increased, rising from 604 in 2016 to 655 in 2017 (a 8% increase) to 893 in 2018 (a further 36% increase).

In women, infection with gonorrhoea is associated predominantly with a younger age group, with 73% of female episodes occurring in those aged under 25 years; this is similar to the proportion observed in 2017 (75%) (Table 7). For men, in 2018, 40% of episodes occurred in those aged under 25 years, a similar proportion to that recorded in 2017 (39%) (Table 7).

Table 7: Laboratory reports (episodes) of gonorrhoea by gender and age group, Scotland, 2009-2018.

Men

Age	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<20	102	132	136	162	141	134	174	163	190	279
20-24	220	300	363	417	322	400	590	554	562	645
25-29	128	194	238	274	239	308	414	407	470	545
30-34	83	113	134	157	140	196	240	219	237	306
35-39	43	57	73	78	61	89	133	133	171	196
40-44	42	67	54	77	47	80	111	95	101	127
45-54	38	46	57	99	72	113	166	130	156	164
>54	10	21	20	25	33	42	61	49	63	74
Unknown	0	0	1	1	1	0	2	0	3	3
Total	**666**	**930**	**1077**	**1290**	**1056**	**1362**	**1891**	**1750**	**1953**	**2339**

Women

Age	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<20	129	156	185	217	202	173	140	184	244	353
20-24	133	177	161	223	188	154	175	223	249	301
25-29	45	63	60	88	82	63	53	104	77	126
30-34	22	28	24	40	28	34	26	45	34	43
35-39	*	9	12	12	15	17	24	23	21	37
40-44	*	8	13	15	8	5	12	11	15	13
>44	7	5	13	19	15	11	13	14	13	18
Unknown	0	0	0	0	0	0	0	0	2	2
Total	**345**	**446**	**468**	**614**	**538**	**457**	**443**	**604**	**655**	**893**

The increase in gonorrhoea among men is largely considered to be due to transmission among MSM. Rectal gonorrhoea is a key marker for condomless anal intercourse (CAI). In 2018, 39% (907/2339) of episodes in men were diagnosed from a rectal swab positive for gonorrhoea (Table 8). This is the largest number of episodes of male rectal gonorrhoea recorded over the last decade; however, the proportion of male gonorrhoea diagnosed from a rectal swab has increased only slightly (37.1% in 2016, 37.4% in 2017 and 38.8% in 2018). The highest proportion of rectal gonorrhoea recorded over the past ten years was in 2015 (40.0%) The increase in the number of rectal gonorrhoea episodes is likely related, in part, to increased testing in MSM following the introduction of HIV PrEP in July 2017.

Table 8: Number and proportion of rectal gonorrhoea among men, Scotland, 2009-2018.

Year	Male-All	Male-Rectal	% Rectal
2009	666	140	21.0%
2010	930	227	24.4%
2011	1077	288	26.7%
2012	1290	362	28.1%
2013	1056	296	28.0%
2014	1362	509	37.4%
2015	1891	758	40.0%
2016	1750	650	37.1%
2017	1953	730	37.4%
2018	2339	907	38.8%

In 2018, the highest rates of gonorrhoea infection for men (at over 220 per 100,000 population) were seen in NHS Lothian and NHS Greater Glasgow & Clyde, and for women (at over 55 per 100,000 population) in NHS Lothian, NHS Greater Glasgow & Clyde and NHS Fife (Table 9).

Table 9: Laboratory reports (episodes) of gonorrhoea by NHS board, gender and rate per 100,000 population, Scotland, 2018.[1]

	Men		Women		All	
NHS board	Number	Rate/100,000	Number	Rate/100,000	Number	Rate/100,000
Ayrshire & Arran	81	73	37	31	118	52
Borders	19	56	12	34	31	45
Dumfries & Galloway	17	39	12	26	29	33
Fife	93	81	81	67	174	74
Forth Valley	85	87	36	36	121	61
Grampian	137	71	68	36	205	53
Greater Glasgow & Clyde	881	225	233	58	1114	140
Highland	36	36	22	22	58	29
Lanarkshire	155	74	77	35	232	54
Lothian	713	238	255	82	969	159
Orkney	*	*	*	*	*	*
Shetland	*	*	*	*	*	*
Tayside	117	90	58	43	175	66
Western Isles	*	*	*	*	*	*
Total	**2339**	**134**	**893**	**50**	**3233**	**91**

1 Rates based on population estimate as at 30 June 2018 using ages 15-64 as denominator.

Discussion

Between 2017 and 2018, increases were observed in the numbers of both chlamydia diagnoses and gonorrhoea episodes in Scotland; a small increase (4%) was seen in the number of laboratory positive diagnoses of genital chlamydial infection (primarily due to an increase in the number of rectal chlamydia diagnoses in men) while the number of episodes of gonococcal infection increased by 23%, the majority of which were in men.

Chlamydia remains the most commonly diagnosed STI in Scotland. Between 2007 and 2008, the annual total number of diagnoses of chlamydia rose from around 18,000 to a peak of over 19,000.[7] Subsequently, the number of diagnoses remained in the region of 18,000 per annum until 2011. The observed increase in diagnoses during this period was thought to be due, in part, to a combination of increased opportunistic testing,[8,9] the use of more sensitive diagnostic tests as per the recommendations of the SIGN guidelines,[9] increased awareness through health promotion campaigns, and latterly, improvements in data collection. Conversely, from 2011 onwards, annual totals fell year on year to around 15,000 diagnoses with only small increases being observed since 2016.

Since publication of the Chief Medical Officer's expert advisory group report on 'The changing evidence on genital *Chlamydia trachomatis* infection: implications for policy' in February 2014, there are has been considerable discussion around the overall decrease in chlamydia diagnoses compared to pre-2011 totals and, in particular, the extent of opportunistic testing and testing of asymptomatic individuals.[10] The data collection systems currently used by HPS are unable to measure the extent of opportunistic testing; however, it is possible that levels of testing have decreased, resulting in the lower numbers of diagnoses seen since 2011. This suggestion was reiterated by Public Health England (PHE) following the publication of their annual STI data for England and Wales for 2017 which showed a 8% decrease in the number of chlamydia tests conducted, attributed to restrictions on the resources given to sexual health services.[11] Publication of the PHE annual STI report for 2018, scheduled for June 2019, may offer further clarity around this key issue as efforts continue to engage, test and treat young people who are disproportionately affected by STIs.

The increase in the number of i) gonorrhoea episodes, ii) rectal gonorrhoea episodes, and iii) rectal chlamydia diagnoses among men between 2017 and 2018 may indicate a true increase in STI incidence among MSM; however, it could also be the result of more STI testing being conducted, particularly among MSM, given the implementation of NHS-funded HIV PrEP in Scotland since July 2017.[2] As the end of Year 2 of the PrEP programme draws closer, work to monitor and evaluate the programme continues.

Infection among heterosexuals

Information about sexual orientation is not available from laboratory reports to SBSTIRL or through ECOSS. Therefore, it is impossible to know whether infections in men are occurring among those who have sex with women or those who have sex with men. 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 women and 50% of men, also increased during this time. Initially, this was the result of the SIGN guideline recommendations[9] which included the provision of NAAT testing platforms, enabling the testing of samples for both chlamydia and gonorrhoea. This latter change in testing practice has also likely resulted in an increase in gonorrhoea diagnoses.

In contrast to the years prior to 2016, the number of genital chlamydia diagnoses among women has increased between 2016 and 2017, and again in 2018; however, it is, as yet, unclear whether this reflects a true increase in the incidence of infection. Nevertheless, there is 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 gonorrhoea diagnoses among women could be considered true reflections of any changes in high-risk sexual behaviour among the heterosexual population. During the last four years, the number of gonorrhoea diagnoses in women has steadily increased, the majority of which occurred among those aged under 25. The very considerable increase in gonorrhoea diagnoses among women, observed over the last four years, is concerning - an observation which merits further work to understand fully the sexual behaviours underpinning it. 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

As laboratory data contain no information on sexual orientation, rectal gonococcal infection may be used as a surrogate marker for sex between men. The incidence of rectal gonorrhoea, an indicator of CAI between men, accounted for 39% of male gonorrhoea diagnoses in 2018. This proportion is higher than those recorded - an observation which possibly reflects a combination of increased testing in the era of NHS-funded PrEP (introduced in July 2017) and an actual increase in incidence. The actual number of rectal gonorrhoea diagnoses in 2018 is the highest ever reported which could, in part, be a reflection of a combination of increased testing in the era of NHS-funded PrEP (introduced in July 2017) and an actual increase in incidence. In the first year of the PrEP programme, 1855 (99%) of the 1872 individuals prescribed PrEP were MSM.[2]

It should also be noted that the proportion of chlamydia infections in men has increased steadily since 2009, and between 2017 and 2018 a larger proportionate increase in diagnoses was noted in men compared to women. While the reasons for this cannot be fully determined, this increase may also, in part, be due to increased testing in MSM following the introduction of PrEP.

The likelihood of HIV transmission is increased in the presence of another STI, particularly rectal gonorrhoea. HPS reported a decrease in the overall number of reports of HIV among MSM, including first ever diagnoses, in 2018 in contrast to the previous year in which diagnoses increased.[13] Data available on recently acquired HIV infection (that is acquired within the preceding three to four months) also support a decrease.[12] In 2018, 24% of MSM tested had evidence of a recent infection; this compares with almost one third of MSM (32%) in 2017, one fifth (21%) in 2016 and over one third (35%) in 2015. The PrEP programme and Undetectable equals Untransmittable (U=U) campaign messages may be partly responsible for the decrease in HIV incidence in MSM in Scotland, but it is still too early to attribute this decrease directly to these interventions. The incidence of HIV and STIs will continue to be closely monitored by HPS.

Further to the increase in gonorrhoea diagnoses reported here, it should be noted that the annual incidence of infectious syphilis among MSM has continued to increase in recent years, and diagnoses in men, overall, have reached the highest level recorded for over sixty years. In addition, there are a number of other sexual health concerns in this population, including the sexual transmission of enteric infections (STEIs) such as hepatitis A[13] and *Shigella* infection, the latter being associated with a high number of sexual partners, increased rates of HIV and chemsex.[14] In recent years, alongside the rest of the UK, Scotland has also seen an increase in rectal STIs such as LGV.

The findings of behavioural studies have suggested that a significant minority of MSM in Scotland are engaging in high-risk behaviour. The most recently published of these studies, the second Social Media, Men Who Have Sex With Men, Sexual and Holistic Health Survey (SMMaSH2), reported that over half of the 1500 MSM surveyed had CAI in the previous 12 months and one fifth had engaged in CAI in the previous three months.[15]

In summary, information from both infection data (particularly the high level of rectal gonorrhoea) and behavioural studies indicate that rates of unprotected sexual intercourse and STI infections among MSM are increasing. As a consequence, there are a number of significant challenges for the control and prevention of STIs in MSM. The impact of NHS-funded PrEP is not yet fully understood, but it now looks possible that this intervention is associated with the observed increase in STI incidence in MSM. Work to evaluate the impact of PrEP on the epidemiology of HIV and other STIs continues.

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NHS board abbreviations

AA	Ayrshire & Arran	BR	Borders	DG	Dumfries & Galloway	GGC	Greater Glasgow & Clyde
FF	Fife	FV	Forth Valley	GR	Grampian	HG	Highland
LO	Lothian	LN	Lanarkshire	OR	Orkney	SH	Shetland
TY	Tayside	WI	Western Isles				

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