Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

January 2006

Volume 7 Issue 2`

hpsc EPI-Insight

Disease Surveillance Report of HPSC, Ireland

ISSN: 1393-9548

Contents

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Enhanced Syphilis Surveillance in Ireland, Q1, 2000 to Q2,2005

Introduction

Since early 2000, there has been a dramatic increase in reports of infectious syphilis cases among men who have sex with men (MSM) in Dublin.[1-4] This was against a low incidence of syphilis throughout the 1990s, which in 1999 reached its lowest level in 10 years.[5] The outbreak peaked in 2001. However, the number of infections reported have not reverted to pre-outbreak rates and syphilis remains endemic in Ireland. Active case finding and an enhanced syphilis surveillance system were established in October 2000 in consultation with STI clinicians and the Department of Public Health in the former Eastern Regional Health Authority to capture data on all syphilis cases diagnosed from January 2000.[2]

Results

Between January 2000 and June 2005, a total of 1,388 cases of syphilis were notified to HPSC. Twelve hundred and sixty three (91.0%) of these reported cases were notified from HSE Eastern Region (HSE, ER). Three hundred and eighteen cases (22.9%) were non-infectious syphilis, 667 (48.1%) were infectious syphilis, 6 (0.4%) were congenital cases, and 397 (28.6%) were of unknown syphilis stage.

Non-infectious late syphilis

The number of reported late syphilis cases among males and females was 146 and 172 respectively, a ratio of 1:1.17 (82/172 female cases were identified through antenatal screening). Of the 318 cases of late syphilis reported, 41.1% were in males less than 34 years of age. In contrast, 82.0% of female cases were in women under 34 years of age. One hundred and sixty one (50.6%) of late syphilis cases were born outside of Ireland, 75 (23.6%) were Irish born, and in 82 cases (25.8%) no county of birth was recorded.

Congenital syphilis

There were six cases of congenital syphilis reported. Intrauterine death was reported in two of these six cases. In three of the cases the mother was diagnosed with late latent syphilis, two mothers were diagnosed with secondary syphilis, and one was diagnosed with primary syphilis. No other demographic information is available in relation to these cases.

Infectious syphilis

There were 587 reported cases of early infectious syphilis among males and 78 cases reported among females, a ratio of 7.5:1 (figure 1). Gender was unknown in two cases.* Three quarters (n=502) of all reported infectious syphilis cases were in MSM. Heterosexuals and those whose sexual orientation was not recorded accounted for 22.6% and 1.7% of cases respectively.

The number of infectious cases among MSM has declined since 2001 (figure 2). Among non-MSM (heterosexual, other, and unknown sexual orientation) the numbers peaked in 2002. Of the 667 infectious syphilis cases reported, 110 (16.5%) were HIV positive (figure 3). In 20 cases, syphilis and HIV were co-diagnosed (diagnosed within 3 months of each other). The average annual number of sexual partners within the previous 12 months amongst MSM and non-MSM was 11.9 (range 0-200) and 1.7 (range 0-20) respectively.

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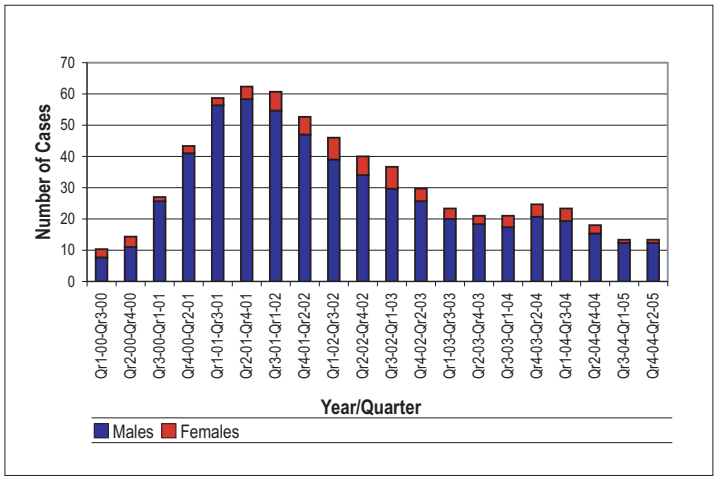

Figure 1. Number of infectious cases by gender in Ireland by three quarterly moving average, Q1 2000 to Q2 2005, as reported through the syphilis enhanced surveillance system (n=665).*

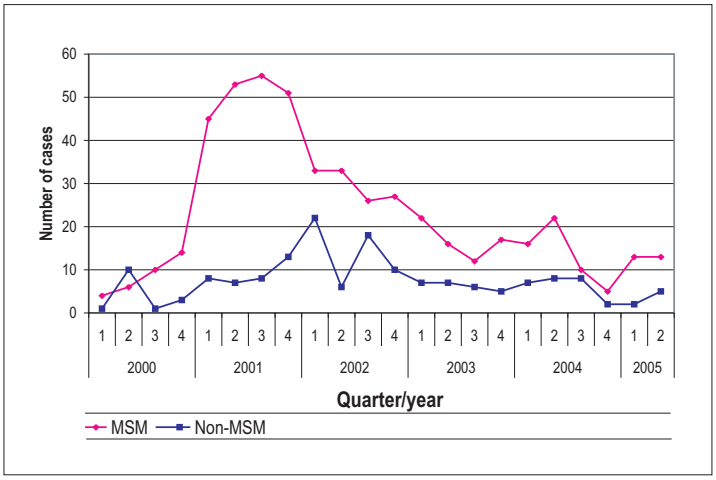

Figure 2 Number of infectious syphilis cases in Ireland amongst MSM and non-MSM, Q1 2000 to Q2 2005, as reported through the syphilis enhanced surveillance system (n=667).

Salmonella in Ireland, 2004

Background

Salmonella is a ubiquitous Gram-negative bacteria that is a common cause of foodborne illness in Ireland and worldwide. At present, over 2,460 serotypes of salmonella have been identified. However, two serotypes *S. enterica* serotype Enteritidis and *S. enterica* serotype Typhimurium have accounted for the majority of cases of human salmonellosis in recent years.

Salmonellosis is a notifiable disease in Ireland. It presents clinically as an acute enterocolitis with sudden onset of headache, abdominal pain, diarrhoea, nausea and occasionally vomiting. Fever is almost always present. Dehydration, especially amongst vulnerable populations such as infants, the immunocompromised, and the elderly may be severe. *S.* Typhi and *S.* Paratyphi can cause enteric fever, a severe systemic life threatening condition, but this is very rare in Ireland and is almost exclusively associated with travel to endemic areas outside of Europe.

Salmonella is a zoonoses. A wide range of domestic and wild animals as well as humans can act as the reservoir for this pathogen. Prevention, surveillance and control of *Salmonella* infections are of major public health importance.

Methods

The National Salmonella Reference Laboratory (NSRL) was established in 2000 in the Department of Medical Microbiology, University College Hospital, Galway. This laboratory accepts *S. enterica* isolates from all clinical and food laboratories and from a number of other sources for serotyping, phage typing, and antimicrobial susceptibility testing.

This report reviews data available from the National Salmonella Reference Laboratory (NSRL) and weekly events of salmonellosis extracted from the CIDR system (computerised infectious disease reporting system) for the year 2004. These data enable us to provide an up to date overview of the epidemiology and burden of disease caused by salmonella infections in Ireland.

Results

Demographic information

There were 419 clinical isolates of *S. enterica* referred to NSRL in 2004. The male: female ratio was 1.2:1. The highest rate of laboratory-confirmed cases was seen in children under five years of age (figure 1).

Seasonality

Analysis of the number of salmonellosis cases notified to HPSC in 2004 revealed a rise in cases in late August/early September(figure 2). A seasonal peak is typically seen each year at this time.

Serotyping, phage typing and antibiotic susceptibility results from NSRL

Serotyping

As has been the trend in recent years, the predominant serotype causing human illness in 2004 was *S.* Enteritidis (n=172), followed by *S.* Typhimurium (n=125). Table 1 depicts the change in the more common serotypes in the past number of years. In 2004, after *S.* Enteritidis and *S.* Typhimurium, the next most commonly isolated serotypes were *S.* Bredeney (n=11), *S.* Virchow (n=10), *S.* Kottbus (8) and *S.* Kentucky (7). There were just five cases of *S.* Typhi detected, which was a decrease on 2003 when there were nine cases reported.

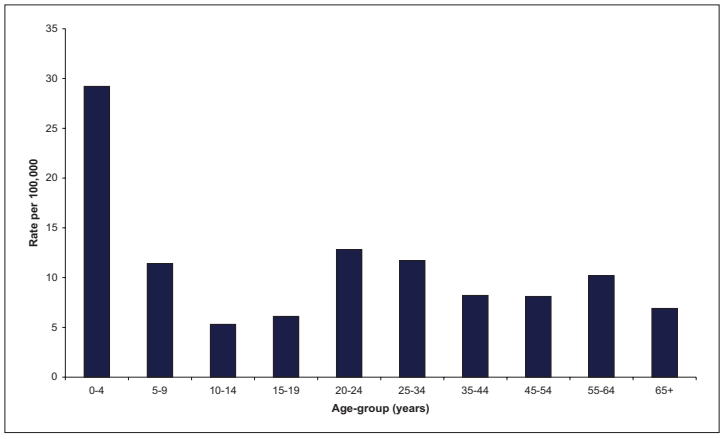

Figure 1. Age-specific incidence rate of human salmonellosis in Ireland, 2004

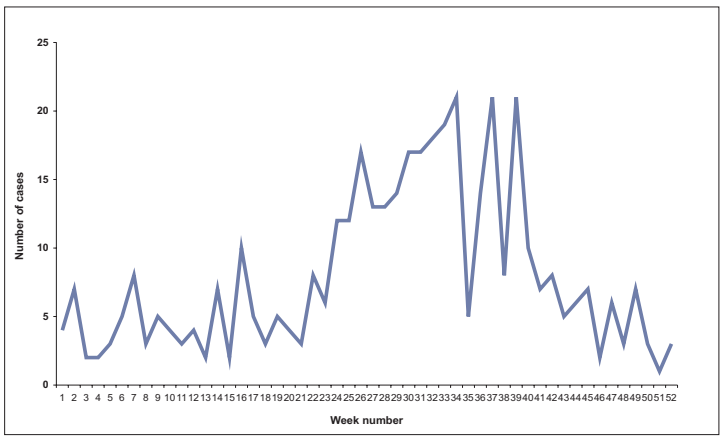

Figure 2. Number of salmonellosis notifications by week, 2004 (data from CIDR)

Table 1. Serotypes of S. enterica referred to NSRL, 1998-2004

Serotypes	1998 No. (%)	1999 No. (%)	2000 No. (%)	2001 No. (%)	2002 No. (%)	2003 No. (%)	2004 No. (%)
S. Enteritidis	60 (8)	155 (33)	239 (36)	248 (46)	165 (40)	205 (42)	173(41)
S. Typhimurium	578 (80)	200 (42)	286 (43)	165 (30)	140 (34)	135 (28)	125 (30)
S. Bredeney	15 (2)	55 (12)	24 (4)	11 (2)	2 (0.5)	3 (1)	11 (3)
S. Kentucky	14 (2)	12 (3)	15 (3)	4 (1)	1 (0.2)	10 (2)	7 (1)
All other serotypes	54 (7)	52 (11)	101 (15)	115 (21)	108 (26)	133 (27)	103 (25)
Total	**721**	**474**	**665**	**543**	**416**	**486**	**419**

Phage typing

The predominant phage types of *S.* Typhimurium and *S.* Enteritidis are summarised in tables 2 and 3. The commonest phage type of *S.* Typhimurium reported in 2004 was DT104 (38%), followed by DT104b (18%). This trend was the reverse of that seen in 2003 when DT104b was the most commonly detected type. An interesting trend was noted with *S.* Enteritidis phage typing with PT1 becoming the predominant phage type of this serotype for the first time since 1998, replacing PT4 as the previously most common phage type detected.

Table 2. Phage types of S. Typhimurium in human isolates, 2004

Phage Type	No. of isolates (%)
DT104	48 (38)
DT104b	23 (18)
DT49	10 (8)
DT1	4 (3)
DT104c	4 (3)
DT120	3 (2)
DT193a	3 (2)
DT208	3 (2)
U310	3 (2)
Other	15 (12)
No type	9 (7)
Total	**125**

Table 3. Phage types of S. Enteritidis in human isolates, 2004

Phage Type	No. of isolates (%)
PT1	48 (28)
PT4	43 (25)
PT21	18 (10)
PT6a	11 (6)
PT14b	11 (6)
PT8	10 (6)
PT6	10 (6)
PT24var	4 (2)
PT4b	3 (2)
Other	13 (7)
No type	2 (1)
Total	**173**

Table 4. Antimicrobial susceptibilities of human Salmonella enterica serotypes isolated in Ireland in 2004

	% Resistance						
Serotypes (n)	**Amp**	**Chl**	**Strep**	**Sulph**	**Tet**	**Trim**	**Nal**
Enteritidis (173)	10	0.5	2	2	6	2	33
Typhimurium (125)	68	62	64	71	71	10	7
Bredeney (11)	18	0	0	0	0	0	0
Virchow (10)	20	0	10	20	20	20	50
Kentucky (7)	28	0	14	28	28	0	14
Typhi (5)	20	20	20	20	20	20	20
Hadar (4)	25	0	100	0	75	0	50

Amp = ampicillin, Chl = chloramphenicol, Strep = streptomycin, Sulph = sulphonamide, Tet = tetracycline, Trim = trimethoprim, Nal = naladixic acid.

Travel-association

In 2004, 75 out of 419 isolates (18%) reported to NSRL were reported to be associated with travel outside of Ireland. The most commonly reported countries were Spain (n=26), Greece (n=5), Thailand (n=4), and India (n=3).

Antimicrobial resistance

The antimicrobial susceptibility patterns of the most commonly isolated serotypes in 2004 are presented in table 4. Analysis of the 2004 antimicrobial resistance (AMR) data again demonstrated high levels of resistance among *S.* Typhimurium, particularly DT104 isolates.

Clinical notification data

There were 415 salmonellosis cases notified to HPSC through the weekly notification system in 2004, giving a crude incidence rate of 10.6 per 100,000 population (figure 3).

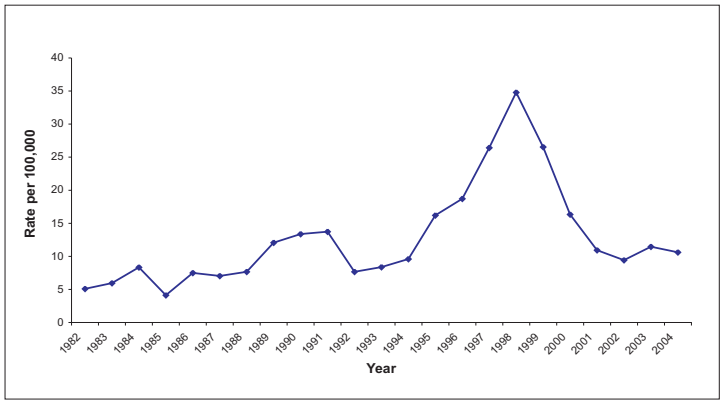

Figure 3. Crude rate of salmonellosis in Ireland per 100,000 population, 1982-2004 (CIDR)

Outbreaks

In 2004, there were eight outbreaks of *S. enterica* notified to HPSC; one general, six family outbreaks, and one small cluster which was reported as travel-associated. The general outbreak involving ten persons occurred in a restaurant in the HSE Western Area. Nine of the cases were confirmed microbiologically as *S.* Typhimurium DT49, all with an identical pulsed field gel electrophoresis (PFGE) pattern. The food implicated epidemiologically in this outbreak was tiramisu dessert.

Discussion

Salmonella enterica continues to be an extremely significant cause of gastroenteritis in Ireland, despite a decrease in the rate of infections due to salmonellosis in 2004 (10.6/100,000) compared to 2003 (11.5/100,000). The highest incidence was reported in the HSE Midland Area. Higher rates were reported for the year 2004 in Northern Ireland (26.3/100,000),[1] England and Wales (24.0/100,000),[2] and Scotland (22.5/100,000).[3]

Similar trends regarding the epidemiology of this pathogen were noted in 2004 as in previous years. All age-groups were affected but the highest incidence was noted in children less than five years of age. It is likely that more specimens were submitted for testing from this age-group, so this should be borne in mind when interpreting these data.

National roll-out of the CIDR system commenced in 2005 and is continuing on a region by region phased approach. Once all regions are 'live' on the system, all data relating to human cases of salmonellosis in Ireland will be stored in the CIDR repository. This will be invaluable as for the first time, a single dataset of clinical, epidemiological, and laboratory data can be analysed for each individual case of illness.

The typing of all human salmonella cases by the NSRL continues to be an extremely powerful discriminatory tool particularly for cluster/outbreak detection and especially for the two most common serotypes *S.* Enteritidis and *S.* Typhimurium. NSRL currently employs serotyping, phage typing, antimicrobial susceptibility testing, and PFGE (molecular) methodologies. Typing in the reference laboratory facilitates detection of clusters/outbreaks of salmonellosis before they have been detected by other means. In addition, rapid typing methods allow NSRL to identify if isolates diagnosed in Ireland are part of a larger, possibly international outbreak, and hence we can alert our international colleagues through the Enter-network.

In 2004, an increase was noted in the number of salmonellosis cases reported as being associated with travel outside of Ireland compared to 2003. Every year, an increasing number of more 'unusual' serotypes are being detected and it is quite probable that many of these are acquired abroad. In addition, a significant number of travel-associated typhoid cases are reported each year. It is important that travellers are made aware of the measures that can be taken to reduce the risk of developing food-/water-borne illness whilst abroad and that typhoid vaccination is given where appropriate.

Finally, analysis of the 2004 AMR data of the various *Salmonella* serotypes again demonstrated high levels of resistance among *S.* Typhimurium isolates, particularly DT104. A recently published review outlines that during the period 1992-2001, the incidence of MDR (multi-drug resistant) *S.* Typhimurium and DT104 increased on a continuous basis globally, although the problem affected primarily Europe and North America.[4] The study highlighted that MDR *S.* Typhimurium constitutes an increasing public health problem in many parts of the world, not only in Ireland, and emphasised the importance of surveillance and control programs.

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Acknowledgements

We wish to thank the staff of the National Salmonella Reference Laboratory, UCHG for providing the laboratory data for this report and also the clinical, food and veterinary microbiology laboratories that send isolates to NSRL for analysis. In addition, we would like to thank the departments of public health and community care areas for providing the clinical notification data.

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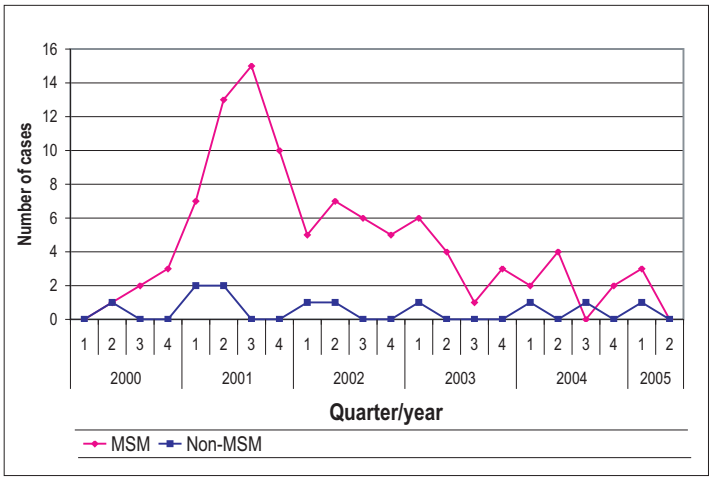

Figure 3. Number of HIV and infectious syphilis co-infected cases, by sexual orientation and by year/quarter diagnosis, Q1 2000 to Q2 2005, as reported through the syphilis enhanced surveillance system (n=110).

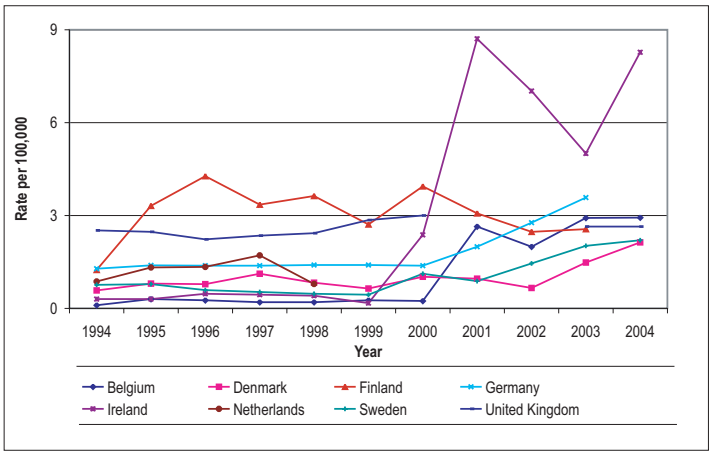

Figure 4. Rates per 100,000 of all cases of syphilis for selected counties in Northern and Western Europe.

Data obtained from the WHO Computerized Information System for Infectious Diseases (CISID; http://data.euro.who.int/cisid/?TabID=62413) and the HPSC enhanced surveillance database for Ireland.

Ninety four (14.1%) infectious syphilis cases reported sexual contact abroad within the previous 12 months. Cities most often cited included London, Manchester, Barcelona and Amsterdam. Where probable mode of acquisition was reported (n=278), the most frequently reported mode of acquisition was oral sex (n=112), followed by oral or anal sex (n=100), vaginal sex (n=45), anal sex (n=12), and oral or vaginal sex (n=9). Where the information was available, 39.4% (n=222/564) of infectious syphilis cases were asymptomatic.

Four hundred and fifty-five (68.2%) infectious syphilis cases were born in Ireland, of which 379 (83.3%) were reported as MSM, and 76 (16.7%) as non-MSM. In contrast, of the 138 (20.7%) cases of infectious syphilis who were born outside Ireland, only 75 (54.3%) were MSM, while 63 (45.6%) were non-MSM.

Antenatal screening

Of the 1,388 cases of syphilis reported in Ireland since Q1 2000, 127 (9.1%) were identified through antenatal screening. Thirty one (24.4%) of these were classified as infectious cases and 82 (64.6%) were classified as non-infectious. The classification stage of the remaining 14 cases (11.0%) was unknown. Fourteen cases were born in Western Europe, 12 of these in Ireland. Twenty-eight cases were born in Sub-Saharan Africa and 58 were born in Central or Eastern Europe.

Discussion

Two distinct patterns associated with the increase in syphilis since 2000 are apparent: an increase in late non-infectious syphilis cases predominantly amongst those born outside Ireland, and an outbreak of infectious syphilis mainly amongst MSM in Dublin.[2]

The majority of non-infectious cases of syphilis were born outside Ireland and more than half were female. Furthermore, it is noteworthy that the majority of cases of syphilis identified through antenatal screening were from areas of the world where syphilis is endemic. This presents challenges for the development of culturally appropriate preventative and clinical treatment services in Ireland.

Incidence levels of syphilis (all stages) are continuing to rise in many Northern and Western European countries, including Ireland where the reported rate of syphilis (all cases) is the highest in Western Europe (figure 4). These rates are likely to be partly due to the data collection system, reflecting the completeness and timeliness of the data collected through the enhanced syphilis surveillance system when compared to other European surveillance systems.[6] The high rates of reported cases in Ireland may also partly reflect the high numbers of immigrants from Sub-Saharan Africa, Eastern and Central Europe, areas of the world where syphilis is endemic, who have been coming to Ireland in recent years.

The 'endemic' phase of the current outbreak of infectious syphilis appears to have been reached by the end of Q4 2004 and this phase continues, with the numbers of cases currently being reported considerably higher than the numbers being reported before the outbreak began in 2000. Interventions to control the current outbreak included enhancing public and healthcare worker awareness of syphilis,[2-5,7] venue based screening,[8] rapid testing within and outside of STI treatment centres, targeted sexual health promotion and syphilis screening of HIV positive individuals.[3] It has been suggested that the availability of highly active antiretroviral therapy (HAART) and 'safe sex message fatigue' may be partly responsible for increased risk-taking in sexually active homosexual men.[9]

Prevention programmes must take into account underlying attitudes towards unprotected sex in the era of HAART amongst both HIV-infected and uninfected men. More than a third (39.8%) of MSM with a diagnosis of infectious syphilis reported probable mode of acquisition as including oral sex and 21.5% reported probable mode of acquisition as including anal sex. Oral sex as a route of transmission is reported in a high percentage of cases with concurrent HIV infection and syphilis.[10] It should be noted that as these numbers are self-reported they are likely to be an underestimate. In addition, the reported numbers of recent sexual partners amongst infectious syphilis cases suggests that risky sexual behaviour contributed to the onward transmission of infection in Dublin.

Close monitoring of the epidemiology of syphilis is imperative in order to continue to inform the planning and delivery of appropriate services to control this infection. The outbreak of syphilis has highlighted the need to develop a national sexual health strategy as a priority, in order to provide a framework for the development of STI and HIV prevention and treatment services into the future.

Piaras O'Lorcain and Mary Cronin, HPSC

Acknowledgements

We wish to thank the directors of public health and their staff; staff in the STI clinics, particularly the GUIDE clinic, St James' Hospital; Mary Cafferkey, Rotunda Hospital; Sarah Jackson, Lelia Thornton, and Lisa Domegan, HPSC.

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