Public Health England

Protecting and improving the nation's health

Update on the epidemiology of *Shigella* in adults in London, 2012 to 2016

Excess of cases in men who have sex with men

May 2017

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Contents

Executive summary

Historically, *Shigella* infections in the UK were primarily associated with travel to low-income countries, where transmission due to poor sanitation is endemic. Since 2009, however, case numbers have increased among adult males with no/unknown history of foreign travel. There is evidence that this is likely to be due to transmission among men who have sex with men (MSM), through sexual activity[1].

Previous national investigation of *S. flexneri* serotype 3a in MSM revealed that the majority of cases were white, UK-born and part of dense sexual networks involving high numbers of casual and regular partners[2]. Nearly two-thirds were HIV positive, and many partook in condom-less sex and had sex under the influence of recreational drugs (ie chemsex). Of concern was that nearly 90% had never heard of *Shigella* infection.

In London in 2016 there remained a clear excess of adult males among *Shigella* cases with no/unknown history of foreign travel, with 103 more cases in males than females. This was, however, a smaller excess than seen previously, and represented a 62% decrease from 2015 (274 excess male cases). Given that the number of female *Shigella* cases has remained relatively constant, the recent decrease in excess male cases is likely to be a consequence of reduced numbers among adult males, as opposed to falling case numbers overall. In keeping with this, the male-to-female ratio also decreased from approximately 5:1 in 2015 to 3:1 in 2016.

PHE jointly conducted an awareness campaign in 2016 with Do It London, the Terence Higgins Trust and the LGBT foundation. This included engaging MSM through social media, and through posters and leaflets in specialist sexual health clinics. Despite this, there is evidence that awareness of *Shigella* among MSM remains low, with less than a third of MSM specialist sexual health clinic attenders reportedly aware.

This report highlights that despite falling case numbers, MSM in London remain disproportionately affected by *Shigella* infection. It is recommended that local action continues to be taken by commissioners and sexual health clinics to raise awareness among MSM, especially those who are HIV positive, of the symptoms of *Shigella* and how to avoid becoming infected; materials are available on the PHE website for this purpose. When managing cases, sexual health clinics and health protection teams should provide advice to cases on how to prevent spread and protect themselves.

Aim

The aim of this report is to update stakeholders on the epidemiology of *Shigella* in adult males with no/unknown history of foreign travel in London.

Additional information on the overall *Shigella* disease burden in adults in London can be found in Appendix B. For the distribution of *Shigella* cases by Health Protection Team please refer to Appendix C.

Context

Shigella

Shigella are gram negative bacteria that cause a highly infectious intestinal disease. Symptoms include diarrhoea (occasionally bloody), fever and abdominal pain, and last approximately 5 to 7 days[3]. Although rare, *Shigella* can also result in severe, invasive and potentially fatal disease including haemolytic-uraemic syndrome and toxic megacolon. Asymptomatic or mild infection can also occur. Most mild infections resolve without antibiotic treatment, and transmission can be limited by following simple hygiene measures such as frequent hand washing.

The incubation period of *Shigella* is between 12 and 96 hours[4]. Although most infectious during diarrhoeal illness, cases may continue to shed *Shigella* in their stool for up to two weeks after symptoms resolve. Humans are the sole significant reservoir of infection, with transmission occurring via the faeco-oral route. This can occur either directly via close personal or sexual contact, or else indirectly via contaminated food, water or the environment. The infectious dose of *Shigella* is low.

There are four species of *Shigella. S. sonnei* is associated with more mild disease, and is common in the UK and other developed countries. In England, *S. boydii, S. dysenteriae* and *S. flexneri* have historically been associated with travel to developing countries, and can cause more severe illness.

MSM are at increased risk for direct transmission of *S. flexneri* infections; this is of concern given the high rates of HIV in this population and the poorer prognosis of *Shigella* infection among HIV-infected persons[3].

Public health management

Shigella is a notifiable disease. All cases of *S. boydii*, *S. dysenteriae* and *S. flexneri* are followed up by health protection team staff to ascertain how infection was acquired and identify cases/contacts in recognised risk groups. Advice on preventing further transmission is also provided.

Raising awareness

In 2016, PHE jointly conducted an awareness campaign with Do It London, the Terence Higgins Trust and the LGBT foundation. This included engaging MSM through social media (Facebook and Grindr), and through posters/ leaflets in specialist sexual health clinics (available via the PHE website). NHS choices also has information on *Shigella*, targeted at MSM (www.nhs.uk/shigella).

Results from a PHE survey conducted with MSM at three sexual health clinics in London suggested that despite a range of awareness activities in this campaign and previously, overall awareness of *Shigella* among MSM in London remains low; 29% of those attending specialist sexual health clinics had reportedly heard of *Shigella*. These results also indicated that MSM more commonly hear of *Shigella* from sexual health clinics (via posters/leaflets or staff) and from people they know, than from social media sources.


GOOD SESSION?
BAD CASE OF DIARRHOEA? MAYBE IT'S...
SHIGELLA
It's caught from tiny amounts of faeces (poo) getting into your mouth during and after sex
Shigella causes severe diarrhoea (sometimes bloody), stomach cramps and fever, and is often mistaken for food poisoning.
GAY & BISEXUAL MEN ARE AT RISK
Know how to avoid getting Shigella:
you can get shigella by rimming or giving oral sex after anal sex
change condoms between anal and oral sex
wash your hands after sex – buttocks and penis too if you can
Get medical advice if you think you have it, mentioning Shigella, for treatment
FOR MORE INFORMATION:
visit www.nhs.uk/shigella
Public Health England
PHE gateway number: 2015728
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LGBT foundation
Terrence Higgins Trust

Data sources

The PHE Gastrointestinal Bacteria Reference Unit's (GBRU) web-based, specimen-level reporting system, Gastro Data Warehouse (GDW), was the sole data source used to produce this report. It is estimated that the reference laboratory receives only two-thirds of locally diagnosed *Shigella* spp. isolates. This report will therefore be an underestimate of the true burden of disease, and may be subject to bias should specimens processed by the GBRU systematically differ from those that are not. Please see Appendix A for more information on how data was managed and analysed.

This report includes only laboratory confirmed cases of *Shigella* spp. among those aged 16 to 60 years. Where a valid London residential postal code was missing in GDW, the original reporting laboratory's postal code was used instead. Between 2012 and 2016, residence information was available for only 23% of London cases.

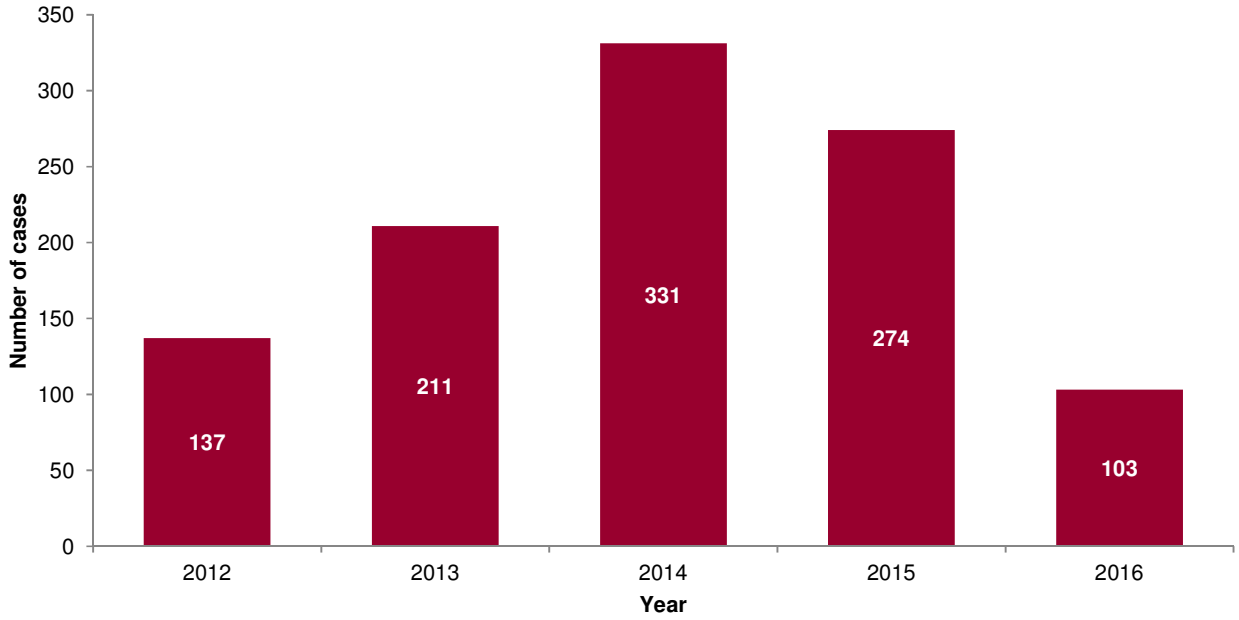
Epidemiology

Excess of adult males with no/unknown history of foreign travel

In 2016, there was an excess of 103 males among adults with no/unknown history of foreign travel (152 males vs. 49 females). This is a fall from 2014, when the number of excess male cases peaked, at 331 (Figure 1).

- relative to 2015, the number of excess male cases decreased by 62% in 2016 (103 excess cases vs. 274 in 2015). This is a continued decrease since 2014
- in 2016, 76% of cases were male
- for every female case of *Shigella* in 2016 there were 3.1 male cases; this was the lowest observed male-to-female ratio in the past five years

Figure 1. Excess males aged 16 to 60 years diagnosed with Shigella infection with no/unknown history of foreign travel, London, 2012-2016



In 2016, the highest number of cases among those with no/unknown history of foreign travel occurred in adult males aged 26-35 years; these accounted for 30% (60/201) of cases with no/unknown history of foreign travel (Figure 2).

Although most marked in 26-35 year olds, there was an excess of male cases across all adult age-groups.

Figure 2. Age and sex distribution of persons aged 16 to 60 years diagnosed with *Shigella* infection with no/unknown history of foreign travel, London, 2016

In recent years, there have been many more male than female cases of *S. flexneri* serotype 2a, *S. flexneri* serotype 3a and *S. sonnei* in London (Figure 3). In 2016, we continued to see excess male cases for each of these *Shigella* species/serotypes, although fewer than seen previously:

- *S. flexneri* serotype 2a: 57 excess adult male cases in 2016 vs.149 cases in 2014
- *S. flexneri* serotype 3a: 15 excess adult male cases in 2016 vs. 74 cases in 2014
- *S. sonnei*: 28 excess adult male cases in 2016 vs. 90 cases in 2014

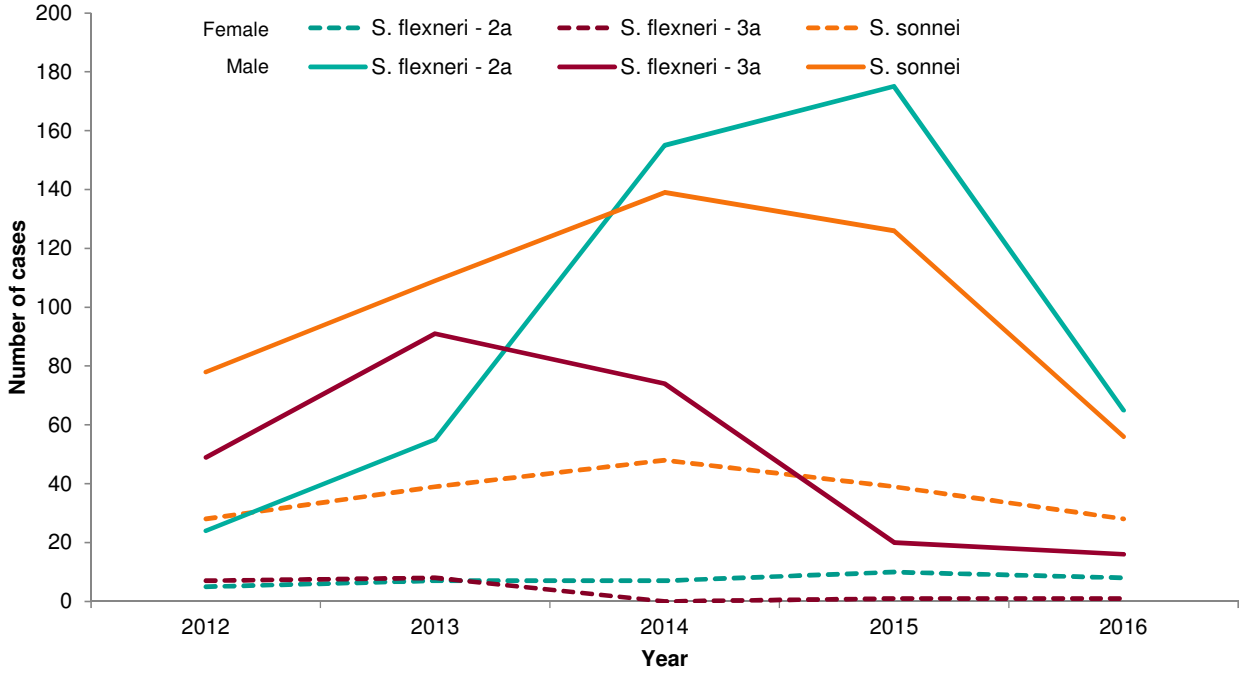
The male-to-female ratios of each of the above discussed *Shigella* species/serotypes have also decreased in recent years (Table 1). Given that the number of female *Shigella* cases has remained relatively constant since 2012, the recent decrease in excess male cases is likely to be a consequence of reduced numbers among adult males, as opposed to falling case numbers overall.

Table 1. Sex ratio and excess males aged 16 to 60 years diagnosed with Shigella infection with no/unknown history of foreign travel, London, 2012-2016

Species	Serotype		2012	2013	2014	2015	2016	Total
S. flexneri	1b	Male	7	4	5	0	2	18
		Female	3	3	2	3	2	13
		Ratio	2.3	1.3	2.5	0.0	1.0	1.4
		Excess male	4	1	3	-3	0	5
	2a	Male	24	55	156	175	65	475
		Female	5	7	7	10	8	37
		Ratio	4.8	7.9	22.3	17.5	8.1	12.8
		Excess male	19	48	149	165	57	438
	3a	Male	49	91	74	20	16	250
		Female	7	8	0.0	1	1	17
		Ratio	7.0	11.4	∞	20.0	16.0	14.7
		Excess male	42	83	74	19	15	233
	6	Male	3	1	1	1	1	7
		Female	3	3	0	0	4	10
		Ratio	1.0	0.3	∞	∞	0.3	0.7
		Excess male	0	-2	1	1	-3	-3
	Other	Male	27	19	20	11	11	88
		Female	4	8	4	5	3	24
		Ratio	6.8	2.4	5.0	2.2	3.7	3.7
		Excess male	23	11	16	6	8	64
S. sonnei	NA	Male	78	109	138	126	56	507
		Female	28	39	48	39	28	182
		Ratio	2.8	2.8	2.9	3.2	2.0	2.8
		Excess male	50	70	90	87	28	325
S. boydii	NA	Male	1	6	2	3	0	12
		Female	4	5	3	3	3	18
		Ratio	0.3	1.2	0.7	1.0	0.0	0.7
		Excess male	-3	1	-1	0	-3	-6
S. dysenteriae	NA	Male	3	0	0	0	1	4
		Female	1	1	1	1	0	4
		Ratio	3.0	0.0	0.0	0.0	∞	1.0
		Excess male	2	-1	-1	-1	1	0
All	NA	Male	192	285	396	336	152	1361
		Female	55	74	65	62	49	305
		Ratio	3.5	3.9	6.1	5.4	3.1	4.5
		Excess male	137	211	331	274	103	1056

Totals presented are for those where sex is known. The sex ratio is of male-to-female cases; where greater than 2.0, these are shaded pink.

Figure 3. Persons aged 16 to 60 years diagnosed with *Shigella flexneri* serotypes 2a and 3a or *Shigella sonnei* with no/unknown history of foreign travel, by sex, London, 2012-2016



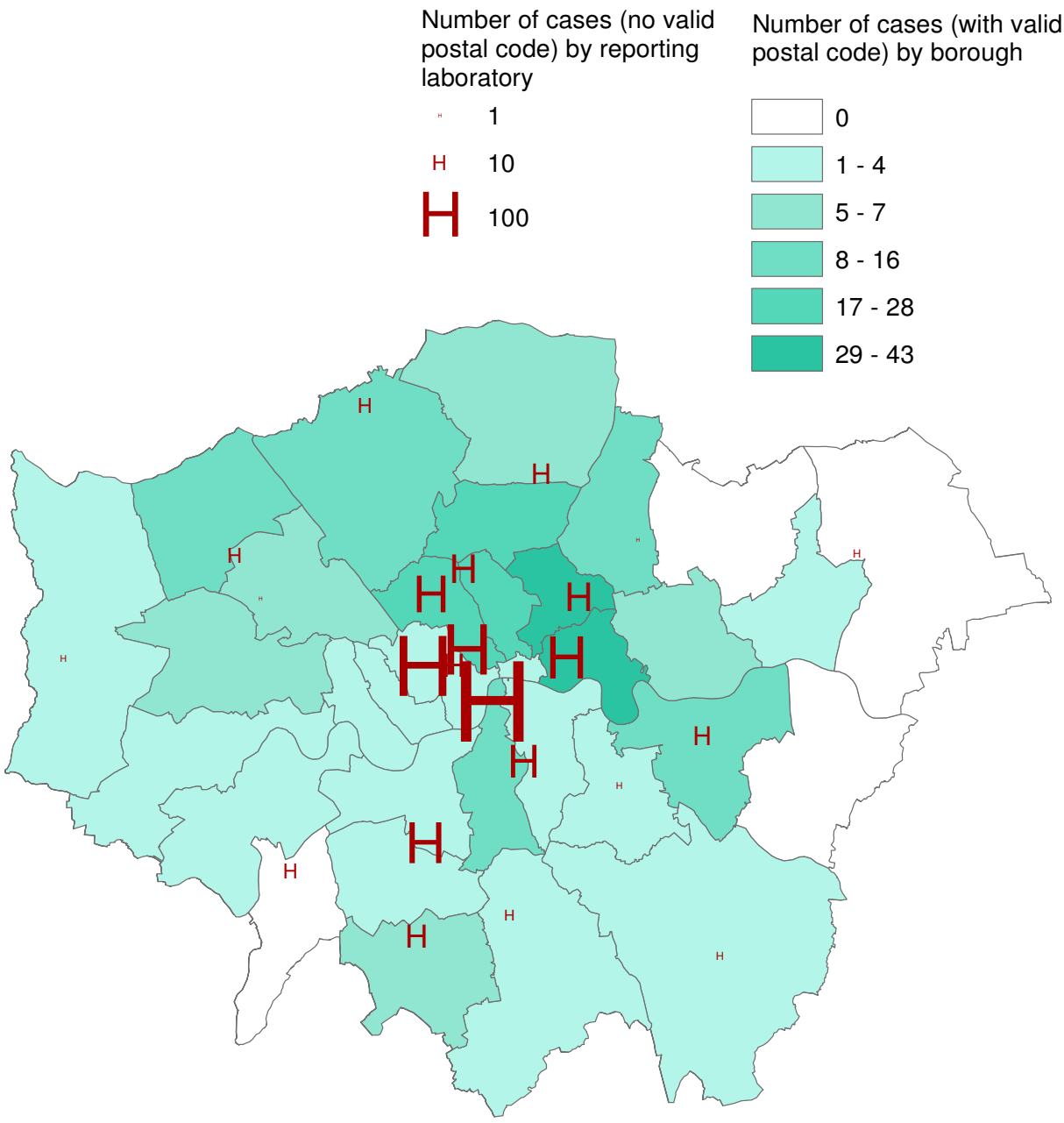
Adult male cases with no/unknown history of foreign travel, by local authority

Between 2012 and 2016, there were 1,361 adult male cases with no/unknown history of foreign travel in London. Of these, 81% did not have a valid London residential postal code in GDW; these were mapped to the original reporting laboratory (Figure 4). It is assumed that cases are more likely to present to local health care services. Thus the number of specimens processed by the original reporting laboratories can serve as proxy for the local burden of infection.

Among those for which a valid London residential postal code was unavailable, St. Thomas' Hospital laboratory processed the highest number of specimens (316 cases). A large number of specimens were also processed by St Mary's Hospital laboratory (174 cases) and University College Hospital laboratory (120 cases).

Where residence information was available, Hackney had the highest number of diagnosed *Shigella* infections in adult males with no/unknown history of foreign travel (43 cases). A large number of cases were also diagnosed among residents of Tower Hamlets (33 cases) and Islington (24 cases).

Figure 4. Map of males aged 16 to 60 years diagnosed with *Shigella* infection with no/unknown history of foreign travel, by local authority of residence (where residence known) or reporting laboratory (where residence not known), London, 2012-2016



Conclusion

The number of adult male cases with no/unknown history of foreign travel decreased in 2016. *Shigella* infection, however, continued to disproportionately affect this group, with three times the number of diagnoses in males compared to females (among those with no/unknown history of foreign travel). This suggests continued, elevated levels of *Shigella* transmission among the MSM community. In particular, *S. flexneri* serotypes 2a and 3a were more commonly diagnosed in adult males than females.

Further work is needed, therefore, to raise awareness and reduce transmission of *Shigella* infection in this group. We recommend that specialist sexual health clinics use available materials to raise awareness among MSM on how to protect themselves, especially those who are HIV positive. Health protection teams should continue to provide advice to cases on how to prevent spread.

Appendix A: Data management/analysis

1. Data source: Gastro Data Warehouse (GDW)

2. Date data extracted: Data extracted 26 April 2017

3. Inclusion criteria:
   a. Laboratory confirmed *Shigella* infection cases reported to GDW
   b. Cases resident in London - if case residence unknown, original reporting laboratory in London
   c. Cases with sample date between 01/01/2012 and 31/12/2016 (inclusive)
   d. Cases aged between 16 and 60 years

4. Exclusion criteria:
   a. Records were de-duplicated based on forename and surname; if a given individual was reported more than once within a 14 day period the record with the earliest sample date was preserved and other records excluded
   b. Records with missing date of birth were excluded

5. Modifications:
   a. Where sample date was missing in GDW, sample receipt date was used instead

6. Caveats: Not all positive cultures are sent to the Gastrointestinal Bacteria Reference Unit (GBRU). Therefore the data held in GDW is a subset of the true number of positive results reported in London. Cases where sex is unknown (35, 1.7%) are excluded from figures and calculations when data is presented by sex.

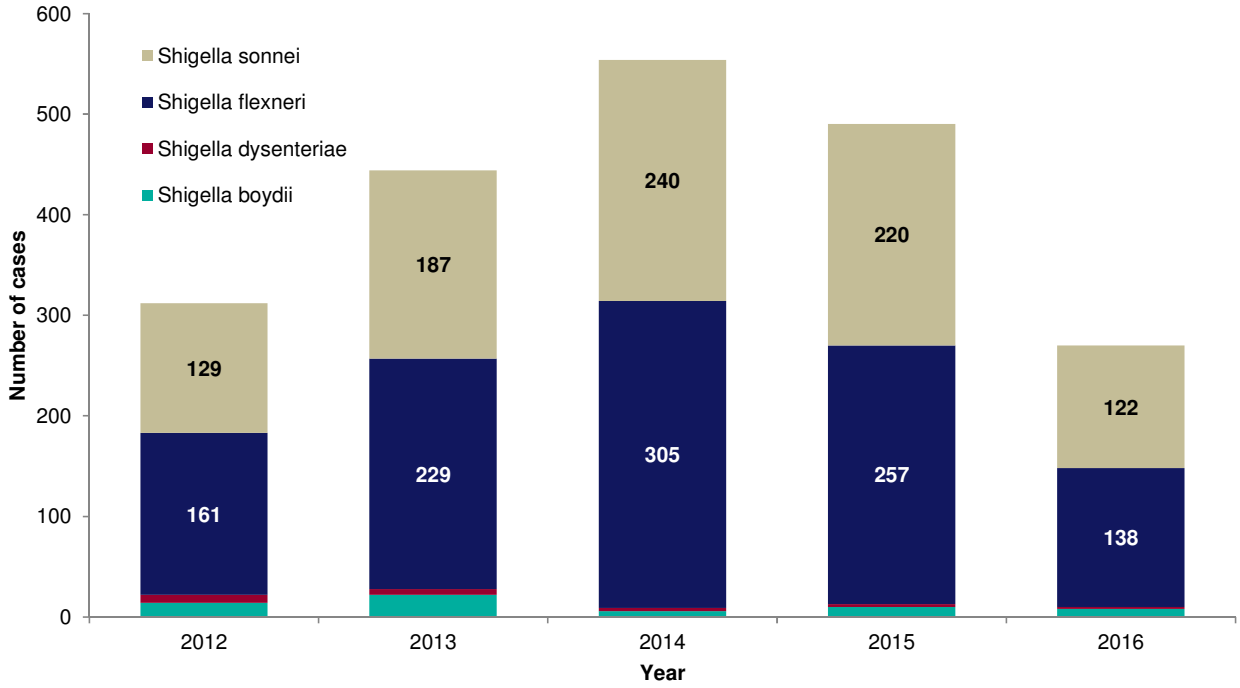
Appendix B: All London adult cases (including those with history of foreign travel)

All cases

There were 270 cases of *Shigella* diagnosed among adults in London in 2016; fewer than half the number diagnosed in 2014, when case numbers were at their highest (Figure B1).

Since 2012, *S. flexneri* has been the most commonly reported species, accounting for just over half of diagnoses each year (51% in 2016). The majority of remaining cases were *S. sonnei* (45% in 2016), with only small numbers of *S. boydii* and *S. dysenteriae* (combined total of 4% in 2016).

Figure B1. Persons aged 16 to 60 years diagnosed with *Shigella* infection, by species, London, 2012-2016

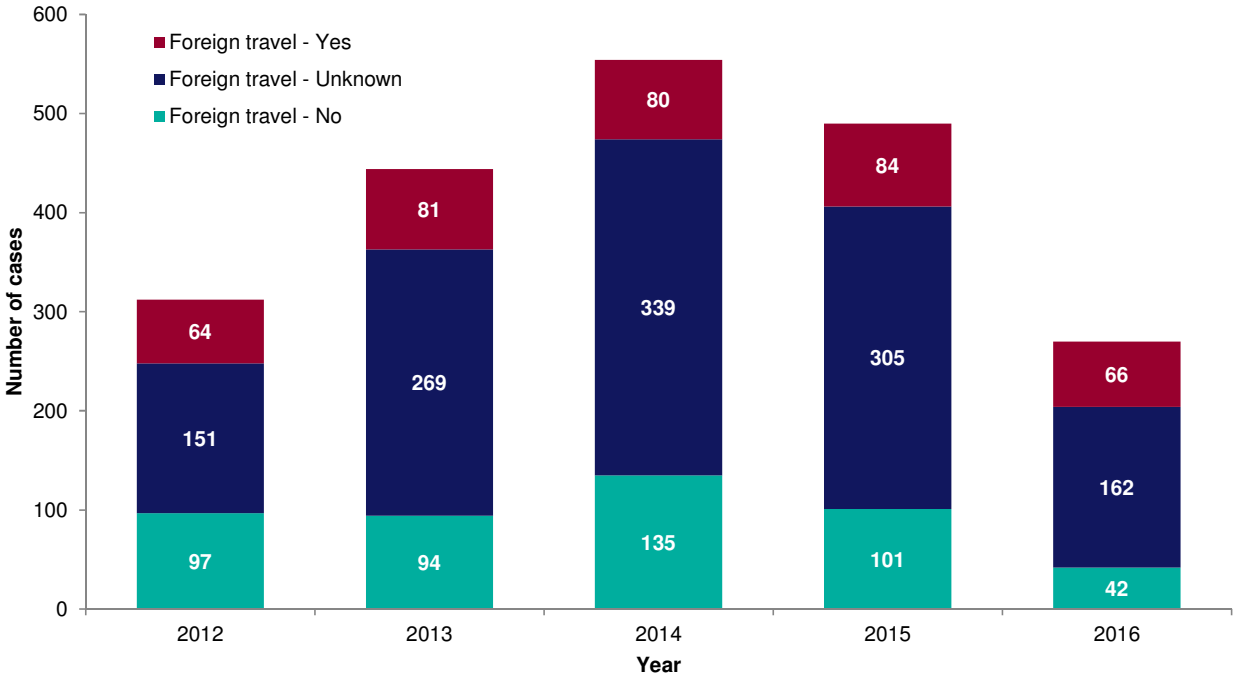


Foreign travel

In 2016, 24% of cases reported foreign travel, and another 16% reported none (Figure B2). The remaining 60% of cases were missing information on foreign travel, consistent

with recent years. Given the high proportion of missing data, trends in autochthonous vs. foreign *Shigella* acquisition cannot be inferred.

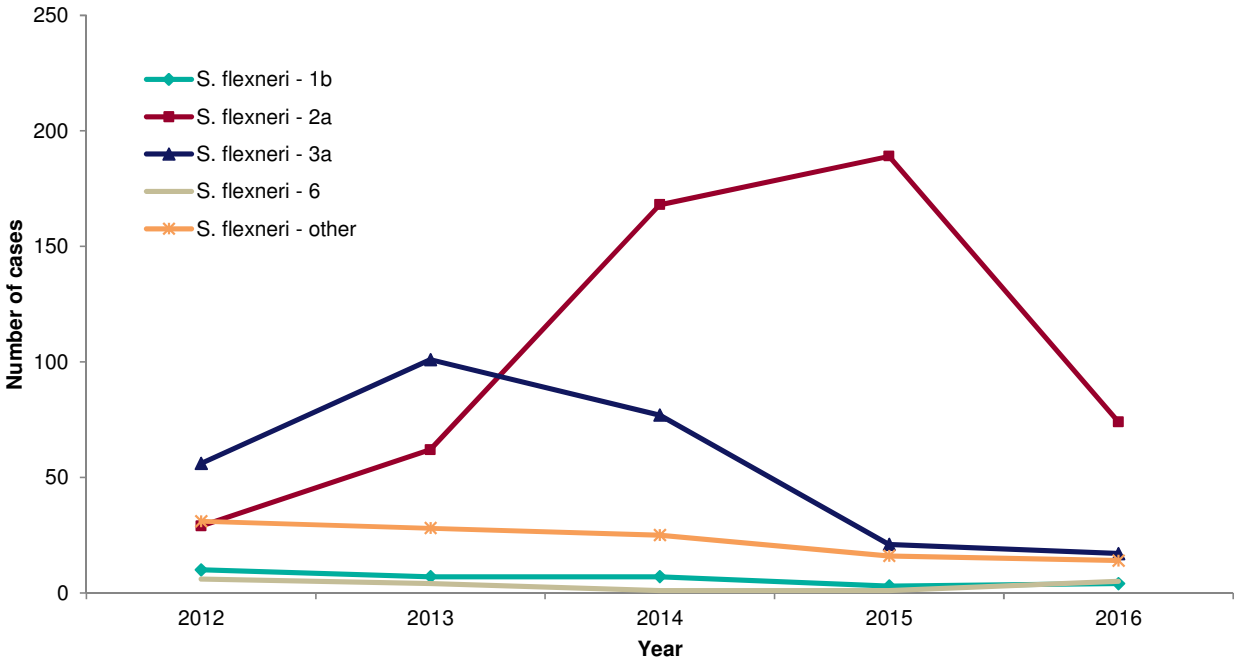
Figure B2. Persons aged 16 to 60 years diagnosed with *Shigella* infection, by foreign travel status, London, 2012-2016



No/unknown history of foreign travel

Between 2012 and 2016, 1,695 *Shigella* cases (82%) had no/unknown history of foreign travel. More than half of these (957, 56%) were *S. flexneri*. Since 2014, however, the overall number of *S. flexneri* cases decreased, with 114 cases reported in 2016 (compared to 279 in 2014). Although, at 74 cases, serotype 2a remained the most common *S. flexneri* serotype, this was a 61% decrease from 2015 (Figure B3). The number of serotype 3a cases continued further a decrease since 2013, with only 17 cases reported in 2016.

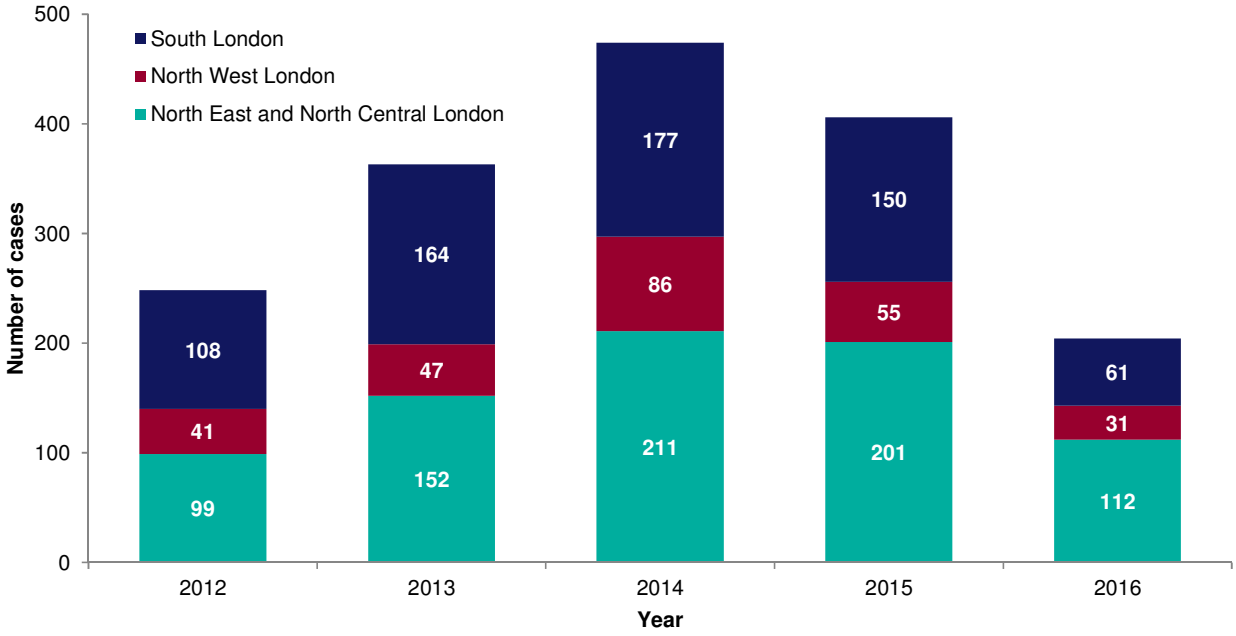
Figure B3. Persons aged 16 to 60 years diagnosed with *Shigella flexneri* with no/unknown history of foreign travel, by serotype, London, 2012-2016



Appendix C: Cases by Health Protection Team

In 2016, the North East and North Central London (NENCL) Health Protection Team (HPT) had the highest number of adult *Shigella* cases with no/unknown history of foreign travel (112 cases). Since 2012, the proportion of cases in NENCL has steadily increased (from 40%, to 55% in 2016); although case numbers have halved since 2014 (Figure C1). The proportion of cases in South London (SL) HPT has decreased (from 44% in 2012 to 30% in 2016), with only 61 cases in 2016 – a five-year low. The proportion of cases in North West London HPT has remained relatively low, at between 13% and 18%.

Figure C1. Persons aged 16 to 60 years diagnosed with *Shigella* infection with no/unknown history of foreign travel, by Health Protection Team, London, 2012-2016



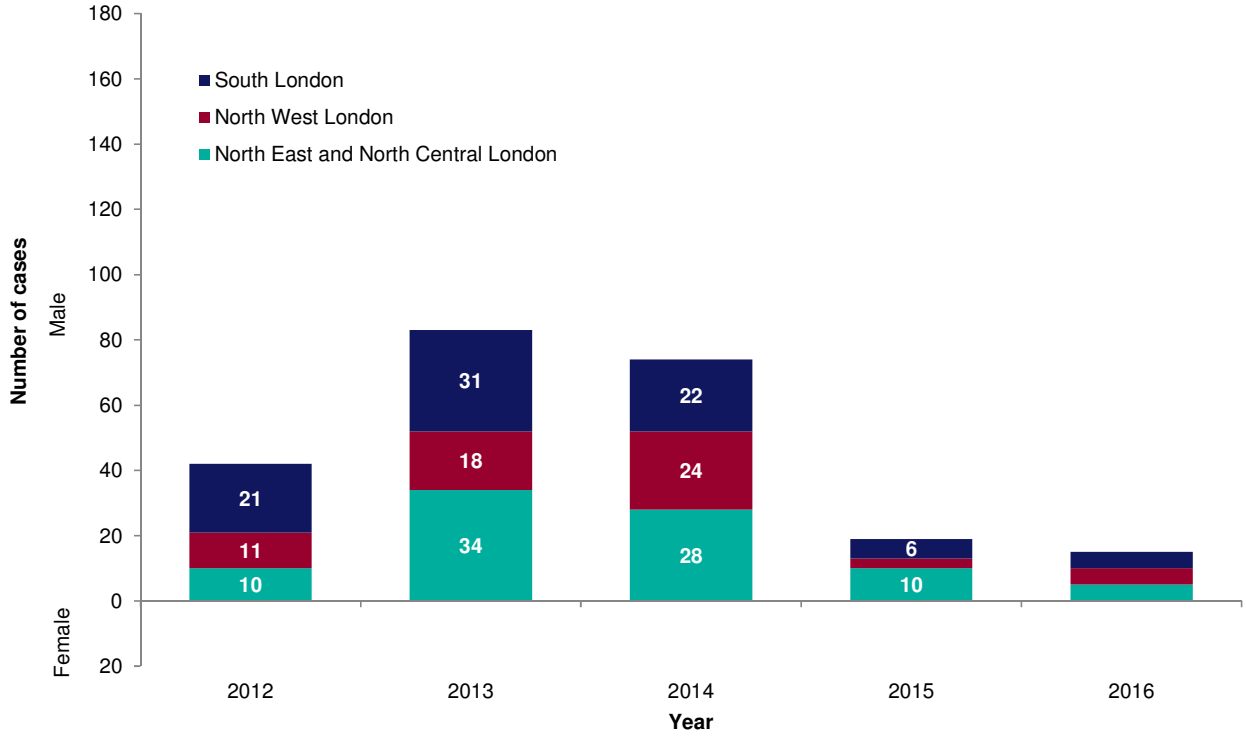
Relative to 2015, the number of excess male cases of *S. flexneri* serotype 2a decreased across all HPTs in 2016 (Figure C2a). This followed a period of marked and sustained increase from 2013-2015.

There were low numbers of excess male *S. flexneri* serotype 3a cases across all HPTs in 2016 (Figure C2b). This represented a sustained decrease since 2015, when there was a large drop in the number of excess male *S. flexneri* serotype 3a cases in London. Since 2012, the majority of excess male *S. sonnei* cases have been in NENCL and SL HPTs (Figure C2c). Relative to 2015, the number of excess male cases in these HPTs decreased in 2016. This followed a period of sustained increase – particularly in NENCL – from 2012-2015.

Figure C2. Excess male/female cases aged 16 to 60 years with no/unknown history of foreign travel, by Health Protection Team, London, 2012-2016

(a) *Shigella flexneri* serotype 2a

(b) *Shigella flexneri* serotype 3a



(c) *Shigella sonnei*

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