



## Infection report

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### HIV-STIs

## **Shigella infections in England with a focus on sexual transmission between men who have sex with men: laboratory reports 2004 to 2016**

### Key points

- The epidemiology of *Shigella* in England has changed markedly over the past decade, with non-travel associated cases accounting for a large and increasing proportion of diagnoses, rising from 26% in 2004 to 63% in 2015.
- Most cases of *Shigella* not known to be associated with travel were in men; including 87% of *S. flexneri* 3a, 80% of *S. flexneri* 2a and 59% of *S. sonnei* cases, while diagnoses of *Shigella* in women during 2004-2016 remained low (*S. flexneri*) or stable (*S. sonnei*).
- Overall, male to female sex ratios rose substantially from 2004, and peaked in 2014 at 59:1 for *S. flexneri* 3a and 17:1 for *S. flexneri* 2a, and in 2015 for *S. sonnei* at 3:1.
- The absolute number of *Shigella* cases in men peaked in 2013 for *S. flexneri* 3a, and in 2015 for *S. flexneri* 2a and *S. sonnei* cases, and there has subsequently been a fall in monthly cases of these *Shigella* species. Although transmission levels appear to have fallen it is possible that other *Shigella* species will replace *S. flexneri* 2a and *S. sonnei*.
- Together, these data are consistent with intense levels of sexual transmission in England of *Shigella* among men who have sex with men.
- Clinicians should sensitively assess sexual history when managing men diagnosed with *Shigella* to promote appropriate testing, diagnosis and management, and referral to sexual health services where indicated.

### Introduction

This report presents data on the recent trends and epidemiology of *Shigella* in England. Faecal specimens from cases with symptoms of gastrointestinal infection are submitted to local hospital, private and regional laboratories in England for culture of Shiga toxin-producing *Escherichia coli*, *Salmonella*, *Campylobacter*, and *Shigella* species. Local hospital laboratories are recommended to submit presumptive strains of *Shigella flexneri* and other *Shigella* spp. to the Public Health England (PHE) national reference laboratory in London, the Gastrointestinal Bacteria Reference Unit (GBRU), for confirmation and typing, using standard biochemistry and serological tests. Neither sexual behaviour nor sexual orientation are routinely collected as part of this process, but the number of cases associated with sexual transmission among men may be approximated by identifying diagnoses for men and women aged 16 to 60 years and excluding cases where recent travel outside the UK was reported. Given an assumption that equal numbers of men and women

would be affected if transmission between men were not a risk factor, excess male cases are deemed likely to be in MSM [1]. Gender ratios are also used to understand the proportion of cases that might be attributable to MSM transmission.

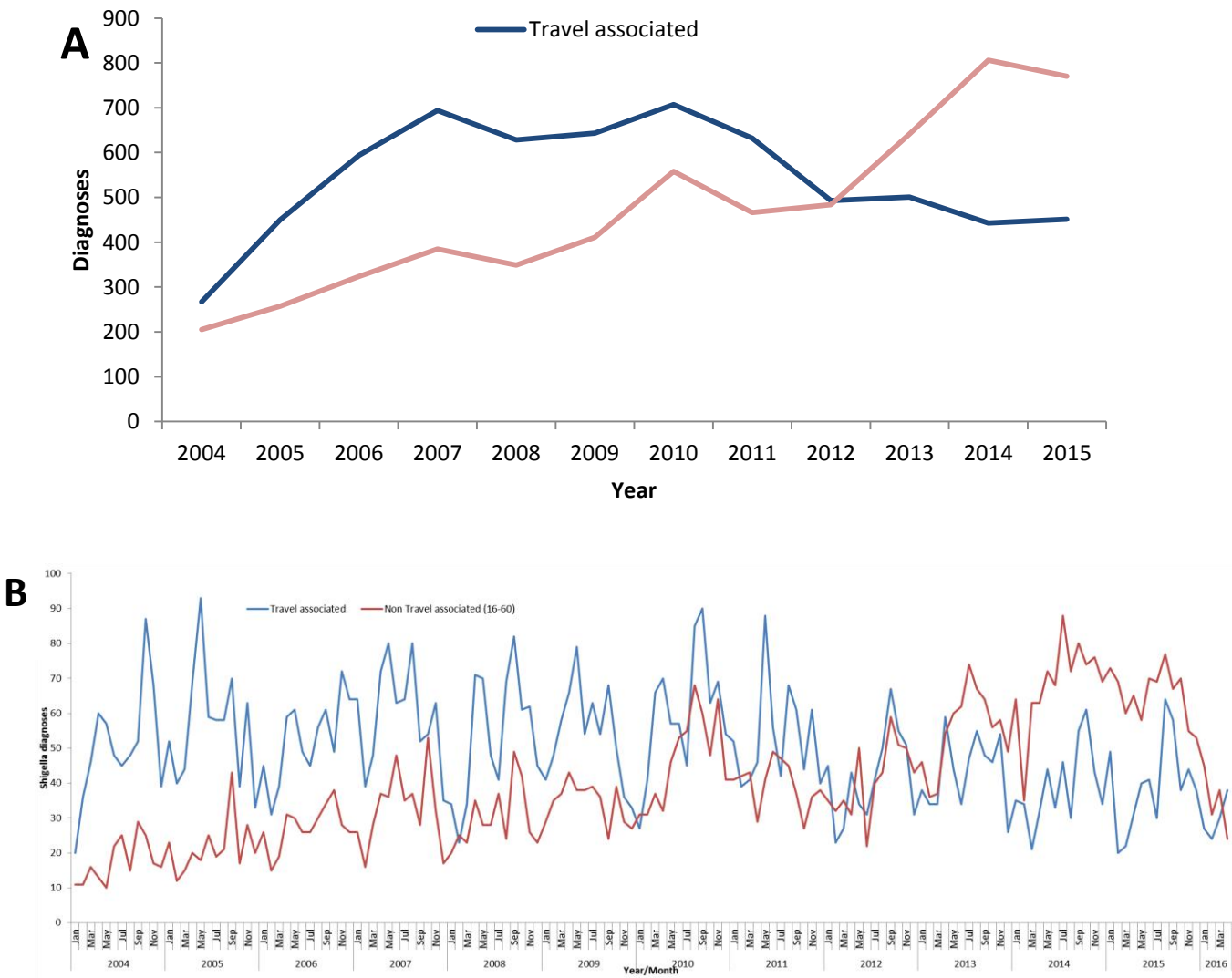
### Recent trends in shigellosis in England

In the past, most *Shigella* diagnoses in England were associated with travel to high-incidence regions. However, since 2004, the number of non-travel associated cases has increased, and in 2012 started to exceed the number of travel associated cases for all ages (figure 1A).

Overall, between January 2004 and April 2016, the total number of *Shigella* spp. diagnoses in England among 16 to 60 year olds was 10,851 and of these, 5,910 (54%) were not known to be associated with travel outside the UK. The proportion of non-travel associated cases rose over this period from 26% in 2004 to 63% in 2015.

More recently, the number of non-travel associated cases has declined and fell below the level of travel associated cases in March 2016 for the first time since mid-2013 (Figure 1B).

**Figure 1. All diagnoses of shigella in England by year: travel associated (all ages) and non-travel associated (aged 16-60 years) by (A) year 2004-2015 (B) month (2013-2016)**



The remainder of this report focuses on diagnoses not known to be associated with travel.

Among those without recent travel history, diagnoses of *S. flexneri* 3a, *S. flexneri* 2a, and *S. sonnei* accounted for 89% (702/786) in 2015, representing a 15% increase from 74% (153/207) in 2004 (table 1B).

Cases in men rose substantially over the same period while cases in women were stable. Gender ratios can be used to track this change; male to female ratios started to rise in 2004 and peaked at 59:1 for *S. flexneri* 3a and 17:1 for *S. flexneri* 2a in 2014, and at 3:1 *S. sonnei* in 2015.

**Table 1. Patients aged 16 to 60 years diagnosed with *Shigella* spp. and with no reported history of travel outside the United Kingdom, by sex, and male to female sex ratios, England, 2004-2015**

Shigella species	serotype	Gender and sex ratio	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
<i>S. flexneri</i>	1b	Male	8	6	16	18	12	9	8	9	17	8	9	2	122
		Female	5	2	6	5	8	8	4	6	7	10	4	4	69
		ratio	1.6	<b>3.0</b>	<b>2.7</b>	<b>3.6</b>	1.5	1.1	<b>2.0</b>	1.5	<b>2.4</b>	0.8	<b>2.3</b>	0.5	1.8
	2a	Male	9	21	27	18	23	23	51	30	42	75	222	291	832
		Female	8	16	28	22	18	17	14	22	12	13	13	23	206
		ratio	1.1	1.3	1.0	0.8	1.3	1.4	<b>3.6</b>	1.4	<b>3.5</b>	<b>5.8</b>	<b>17.1</b>	<b>12.7</b>	<b>4.0</b>
	3a	Male	3	6	11	11	18	65	77	83	86	154	118	49	681
		Female	5	5	5	6	8	8	10	10	10	15	2	3	87
		ratio	0.6	1.2	<b>2.2</b>	1.8	<b>2.3</b>	<b>8.1</b>	<b>7.7</b>	<b>8.3</b>	<b>8.6</b>	<b>10.3</b>	<b>59.0</b>	<b>16.3</b>	<b>7.8</b>
	6	Male	4	5	11	12	6	6	7	9	11	8	4	4	87
		Female	1	10	14	9	13	14	15	12	11	7	2	2	110
		ratio	<b>4.0</b>	0.5	0.8	1.3	0.5	0.4	0.5	0.8	1.0	1.1	<b>2.0</b>	<b>2.0</b>	0.8
	other	Male	11	6	9	21	15	14	33	31	45	37	36	39	297
		Female	7	4	13	9	8	15	15	13	11	16	12	18	141
ratio		1.6	1.5	0.7	<b>2.3</b>	1.9	0.9	<b>2.2</b>	<b>2.4</b>	<b>4.1</b>	<b>2.3</b>	<b>3.0</b>	<b>2.2</b>	<b>2.1</b>	
<i>S. sonnei</i>	N/A	Male	77	73	52	86	83	90	148	136	146	192	268	257	1608
		Female	51	72	90	124	98	125	136	87	64	99	108	79	1133
		ratio	1.5	1.0	0.6	0.7	0.8	0.7	1.1	1.6	2.3	1.9	<b>2.5</b>	<b>3.3</b>	<b>1.4</b>
<i>S. boydii</i>	N/A	Male	9	7	18	14	13	5	10	5	5	13	10	4	113
		Female	5	11	13	15	17	9	20	11	9	13	9	7	139
		ratio	1.8	0.6	1.4	0.9	0.8	0.6	0.5	0.5	0.6	1.0	1.1	0.6	0.8
Dysenteriae	N/A	Male	2	3	2	4	12	2	7	2	4	1	2	0	41
		Female	2	6	4	10	4	4	10	7	11	2	5	4	69
		ratio	1.0	0.5	0.5	0.4	3.0	0.5	0.7	0.3	0.4	0.5	0.4	0.0	0.6
Species unidentified	N/A	Male	1	4	5	5	2	0	0	0	0	0	0	0	17
		Female	2	4	5	4	2	0	1	2	0	0	0	0	20
		ratio	0.5	1.0	1.0	1.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
<b>Total</b>		207	253	319	384	356	414	565	473	491	663	824	786	5735	

NA: not applicable

The male to female sex ratios  $\geq 2.0$  are highlighted in bold

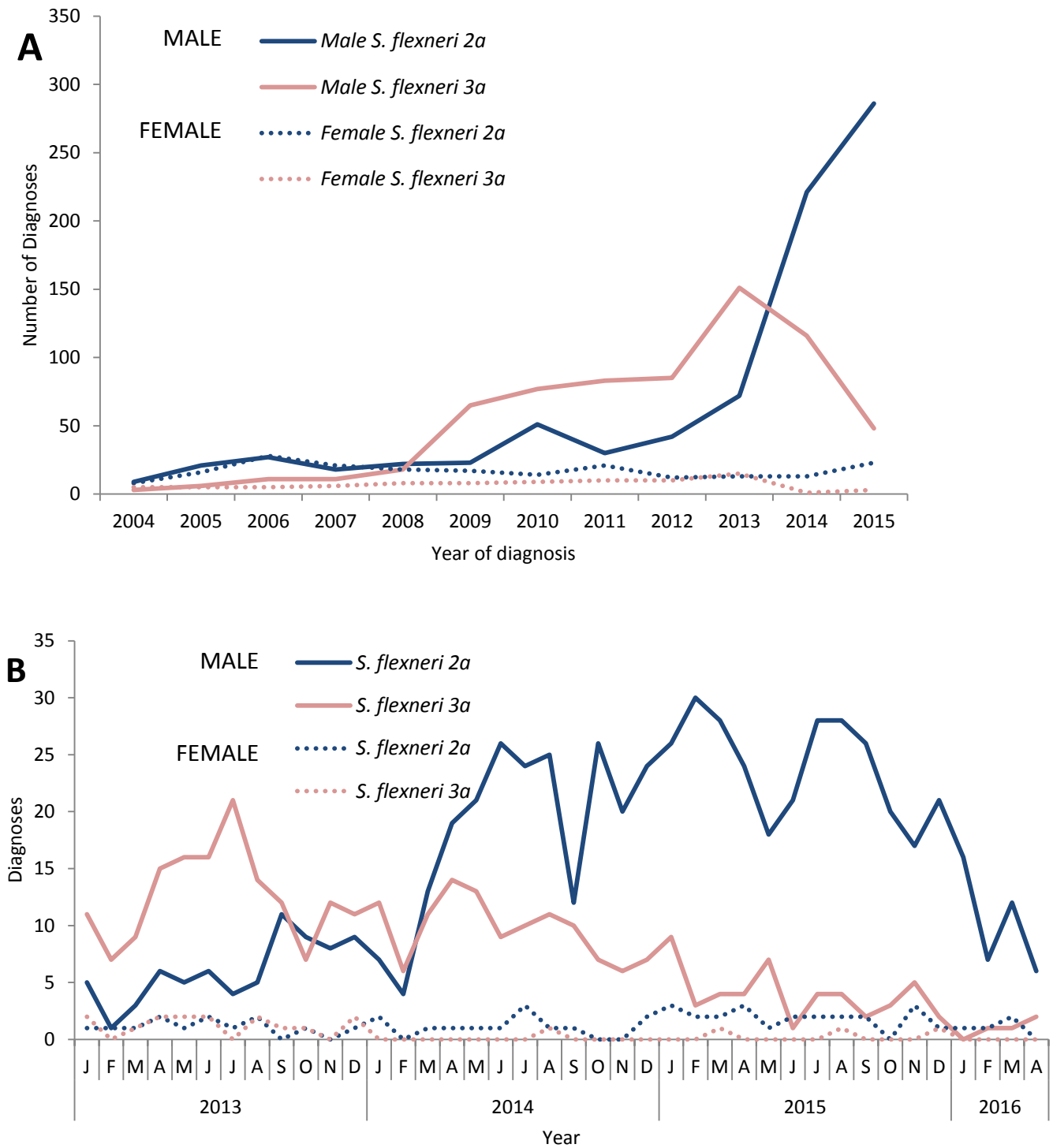
## *S. flexneri*

Diagnoses of *S. flexneri* 3a in men increased steadily from 2004 to 2013 (from 3 to 151 cases), with sharp increases noted in 2009 and 2013, but fell in 2014 (116 cases) and this fall continued through 2015 (51 cases). Diagnoses in women during this period remained low (table1A; figure 2A).

Diagnoses of *S. flexneri* 2a in men followed a similar pattern, although increases emerged later, rising from a baseline of nine cases in 2004 with peaks in 2010 (50 cases) and 2015 (286 cases); diagnoses in women during this period also remained low (table1A; figure 2A).

Monthly reporting has shown that a switch in the predominant serotype of *S. flexneri* from type 3a to type 2a occurred from March 2014. Monthly data suggest that the number of male cases of *S. flexneri* 2a has been decreasing since August 2015 and is now at levels last observed in February 2013 (table1B; figure 2B).

**Figure 2. Patients aged 16 to 60 years diagnosed with *S. flexneri* serotypes 2a and 3a, with no reported history of travel outside the United Kingdom, by sex, England, (A) annually 2004-2015 and (B) monthly January 2013 - April 2016.**

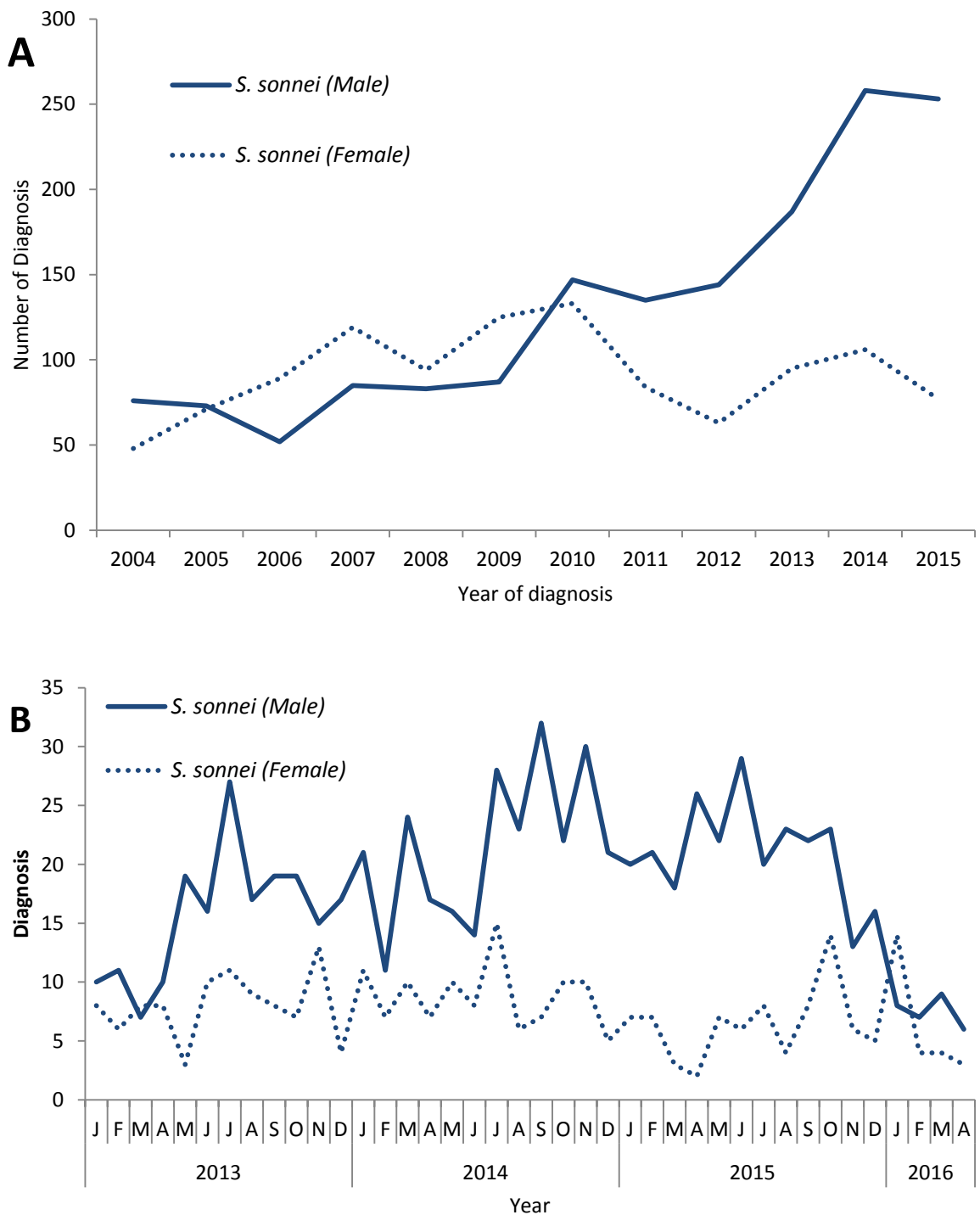


**S. sonnei**

Annual diagnoses of *S. sonnei* in men began to exceed those in women (139 compared with 127 cases) in 2010, and have since risen steadily in men (253 cases in 2015) while remaining stable in women (table 1A; figure 3A).

Monthly surveillance data suggest that *S. sonnei* diagnoses in men peaked in July 2015 (29 cases), but started to drop from October 2015 and by March 2016 reached lower levels not seen since March 2013 (table 1B; figure 3B).

**Figure 3. Patients aged 16 to 60 years diagnosed with *S. sonnei*, with no reported history of travel outside the United Kingdom, by sex, England, (A) annually 2004-2015 and (B) monthly January 2013 - April 2016.**



Between 2004 and 2015, the age distribution for cases of *S. flexneri* 3a, *S. flexneri* 2a, and *S. sonnei* was similar for men and women: 65% (2,024/3,121) of male cases and 60% (851/1,426) of female cases were in those aged 25 to 44 years. However, geographic distribution differed: 65% (2,043/3,121) of male cases of *S. flexneri* 2a, *S. flexneri* 3a and *S. sonnei* were reported by laboratories in London, Manchester, or Brighton, whereas only 37% (528/1,426) of female cases were from these areas.

## Discussion and conclusions

These laboratory data suggest three waves of *Shigella* transmission has occurred in England among adult men since 2009. The first was of *S. flexneri* 3a from 2009 to 2013, which was replaced by waves of *S. flexneri* 2a and then *S. sonnei* between 2011 and 2015. Diagnoses in women throughout this period have remained stable. These data strongly suggest intense *Shigella* transmission between MSM during these periods and are consistent with a previously reported epidemic of shigellosis in England associated with sexual transmission between men [2,3]. Surveillance systems will tend to underestimate the total numbers of infections occurring in the population due to cases not presenting to healthcare settings and/or not providing diagnostic faecal samples, and these data are likely to underestimate the true number of cases occurring.

The number of *Shigella* cases in men appears to have fallen over the past six months until March 2016, which may be due to several reasons, including that the number of susceptible at risk individuals in the population has fallen, and that infection control and *Shigella* awareness messages might have contributed to less risky sexual behaviour in MSM (although no decrease has been observed in diagnoses of other STIs in MSM over the same period). It remains possible that a different *Shigella* species / serotype or another gastrointestinal pathogen might replace *S. flexneri* 2a and *S. sonnei*, and surveillance systems and clinicians should monitor for any such change.

The emergence of *Shigella* epidemics in MSM in England has coincided with rapid increases in diagnoses of gonorrhoea, lymphogranuloma venereum, and syphilis among MSM [4-6], as well as clusters of other sexually transmissible enteric pathogens, and many of these men are co-infected with HIV. This syndemic of STIs has been linked to dense sexual networks among MSM diagnosed with HIV, reporting of large numbers of sexual partners, chemsex (sexual activity under the influence of stimulant drugs), and meeting sex partners at sex parties through social media networking applications [2,3].

MSM with *Shigella* may present to a range of healthcare settings, and often not to specialist sexual health clinics. In the event of *Shigella* diagnosis in men, particularly where this is not associated with travel to an endemic area, a sexual history should be sensitively obtained. Patients reporting same sex partners are likely to be at risk of other STIs and HIV co-infection, and clinicians should consider referral to sexual health services for appropriate HIV/STI screening, partner notification and prevention advice. In addition to advice about handwashing, personal hygiene, and returning to work [7], MSM diagnosed with *Shigella* should be advised about the risk of sexual transmission and to avoid sexual activity for at least one week after symptoms cease.

## References

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