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Annual Epidemiological Report

October 2019

Shigellosis in Ireland, 2018

Key Points

- One hundred and one notifications of confirmed cases, similar to 2017
- Disease incidence continues to be more common among adults than children
- Foreign travel, in particular to Africa and Asia, is strongly linked with shigellosis in Ireland, especially among children and adult females.
- Increasing proportion of adult male cases in recent years, with men-who-have-sex-with-men disproportionately represented
- Increasing proportion of *Shigella* isolates exhibiting resistance to Ciprofloxacin and Azithromycin
- Legal requirement now to notify both culture confirmed and PCR positive only cases of shigellosis, and to categorise them according to the new case definition
- In light of the value of typing, both for cluster detection and for AMR monitoring, clinical laboratories are encouraged to attempt culture on all specimens identified as shigella positive by PCR, and to refer all *Shigella* isolates to the NSSLRL for typing

Suggested citation: HSE Health Protection Surveillance Centre. Shigellosis in Ireland, 2018. Dublin: HSE HPSC; 2019

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Background

Shigellosis is a diarrhoeal illness caused by the bacterium *Shigella*. There are four species: *S. sonnei*, *S. boydii*, *S. flexneri* and *S. dysenteriae*. *S. dysenteriae* produces a very powerful toxin that induces severe damage to the lining of the gut. This bacterium is only found in humans. Anyone can get shigellosis, but those who are at greater risk include children attending childcare centres and their parents, overseas travellers, people who reside in institutions, and men who have sex with men (MSM)[1].

Methods

Disease notification

Shigellosis is a notifiable disease in Ireland under Infectious Disease Regulations. Consequently, all medical practitioners, including clinical directors of diagnostic laboratories, are required to notify the regional Medical Officer of Health(MOH)/Director of Public Health of all cases of shigellosis. Notifications are reported using the Computerised Infectious Disease Reporting system (CIDR) which is described here. Further information on the process of reporting notifiable infectious diseases is available here.

During 2018, the Irish shigellosis case definition was amended to facilitate the reporting of PCR positive, culture negative cases, in line with a change across the European Union. In recognition of limitations in the specificity of commercially available PCR-based tests for *Shigella*, cases which are PCR positive only are classified as probable cases, whereas those which are culture confirmed are recognised as confirmed cases. [2] The case definitions in use during 2018 are available here. For this report, data on cases notified to CIDR in 2018 were extracted from CIDR as of 30th August 2019.

Typing of *Shigella* isolates

The National *Salmonella*, *Shigella* and *Listeria* Reference Laboratory (NSSLRL) undertake whole genome sequencing (WGS) on all *Shigella* isolates referred from primary laboratories, enabling antimicrobial sensitivities to be predicted and genetically-related clusters to be detected.

Results

Basic epidemiology

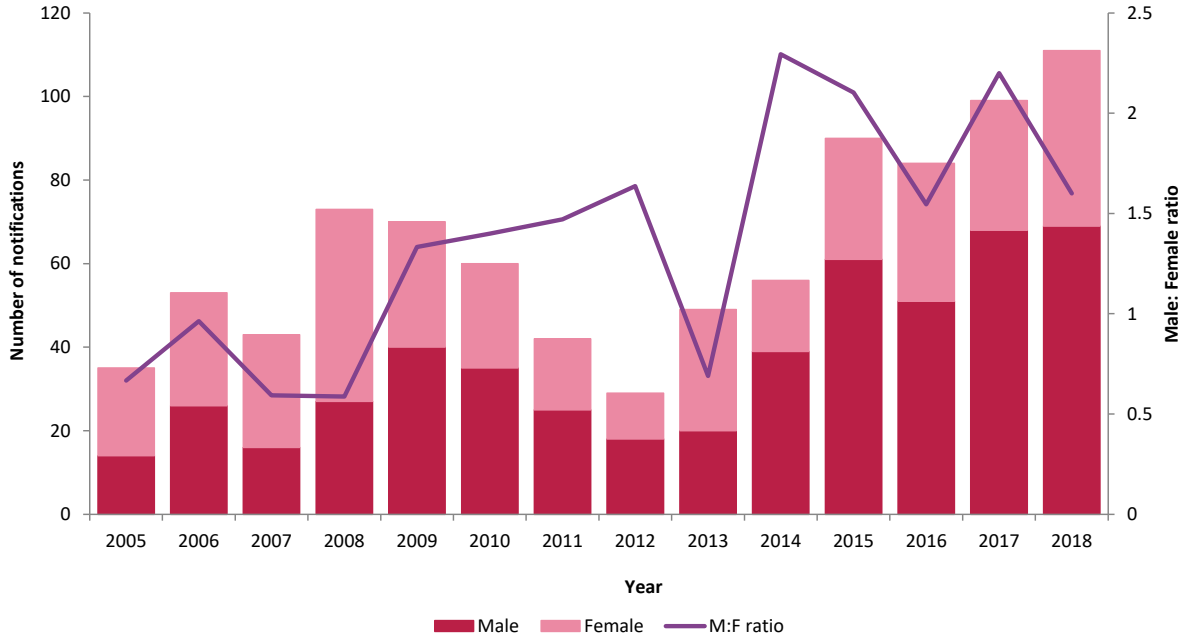
One hundred and eleven cases meeting the shigellosis case definitions were notified in Ireland in 2018, corresponding to a crude incidence rate (CIR) of 2.3 per 100,000. This rate represents an increase of 12% compared to 2017. Twenty-nine (27%) were reported as hospital in-patients (of 106 cases where hospitalisation status was recorded).

One hundred and one were classified as confirmed cases, two as probable cases reported on the basis of being epidemiologically linked to confirmed cases, and eight as probable cases reported on the basis of a PCR only finding.

The median age was 32 years (range 3 months to 88 years); 62% (n=69) of cases were male (Figure 1).

In the last four years, there has been a large increase in notifications; this is most pronounced among males, in particular adult males.

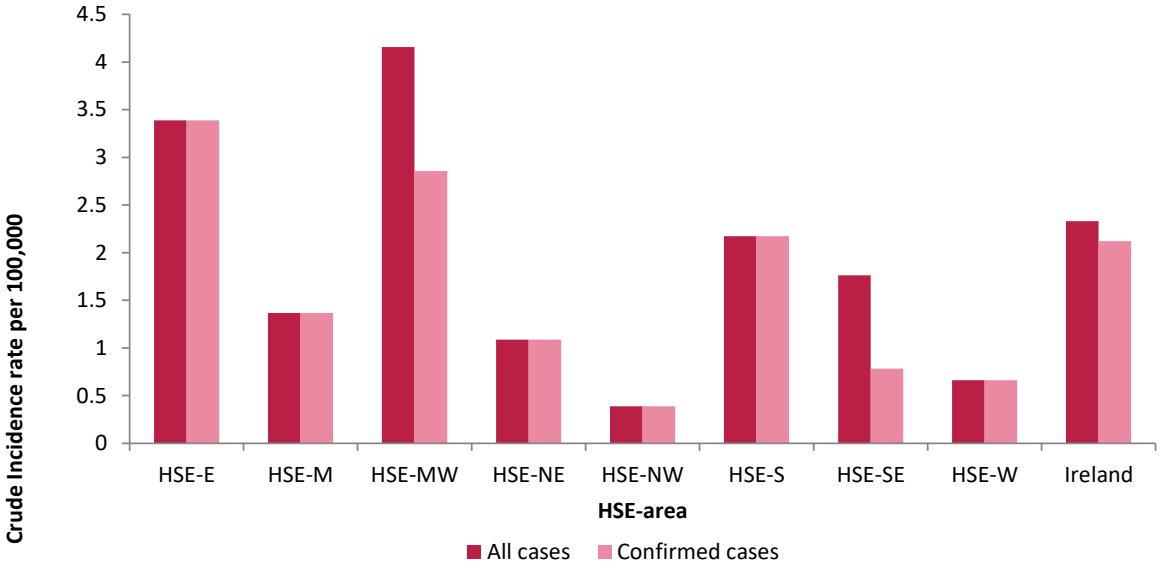
Figure 1. Annual number of notifications of shigellosis by sex and year, Ireland 2004-2018



Data source: CIDR

Fifty-eight (52%) cases were notified by HSE-E, 16 (14%) by HSE-MW and 15 (14%) by HSE-S, with the remaining areas reporting fewer than five cases each. The corresponding crude incidence rates (all cases and confirmed cases only) are depicted in Figure 2.

Figure 2. Annual crude incidence rate (all cases and confirmed cases only) shigellosis by HSE-area, Ireland 2018



Data source: CIDR

Enhanced surveillance

In autumn 2018, a small number of enhanced surveillance variables were added to the CIDR shigellosis dataset, including a variable on sexual orientation for adult males. Of the ten adult males who had this variable completed, five (50%) were reported as MSM.

Country of infection and infecting species

Data on country of infection was available for 77 (71%) of shigellosis notifications (Table 1). Forty-six cases (58% of known) were reported as being associated with foreign travel to 22 different countries. Thirty-three cases were reported as being acquired in Ireland (42% of known), while no country of infection information was available for 32 cases.

Table 1. Number of *Shigella* notifications by species and country of infection, Ireland 2018

Species	Ireland	Other Europe	Asia	Africa	Other	UNK/Not specified	Total
S. sonnei	22	3	9	2	1	14	51
S. flexneri	8	3	3	5	0	8	27
S. boydii	0	0	2	0	0	0	2
S. species	3	0	7	3	2	6	21
Probable –epi-linked	0	0	2	0	0	0	2
Probable-PCR only	0	0	1	3	0	4	8
Total	**33**	**6**	**24**	**13**	**3**	**32**	**111**

Data source: CIDR

S. sonnei was the most common species reported (n=51), followed by *S. flexneri* (n=27).

Acquisition abroad was more commonly reported for children (72%) and adult females (62%) than for adult males (51%) (Table 2).

Table 2. Number of Shigella notifications by age-sex group and country of infection, Ireland 2018.

Species	Acquired in Ireland	Travel-acquired	Unknown/Not specified	Total
Children <15 year	5	13	6	24
Adult females	10	16	9	35
Adult males	18	17	17	52
Total	**33**	**46**	**32**	**111**

Data source: CIDR

Serotype and antimicrobial resistance

Seventy-five *Shigella* isolates (74% of *Shigella* notifications reported as meeting the case deifintion for a confirmed case) were referred for typing from clinical laboratories in Ireland to the National *Salmonella, Shigella* and *Listeria* Reference Laboratory in Galway. The distribution by serotype and sequence type (ST) are shown in Table 3 below.

Table 3: Serotype and sequence type (ST) of Irish *Shigella* isolates referred to NSSLRL in 2018

Shigella serotype/ST type	152	245	145	1025	243	6917	Total
Shigella sonnei	48						48
Shigella flexneri 2a		7				1	8
Shigella flexneri		5	2				7
Shigella flexneri 3a				3			3
Shigella flexneri 6			3				3
Shigella flexneri 1b		2					2
Shigella boydii					2		2
Shigella flexneri 1c		1					1
Shigella flexneri Y variant		1					1
Total	48	16	5	3	2	1	**75**

Data source: NSSLRL

Among the 54 isolates for which an antimicrobial resistance profile were recorded on CIDR, an increasing proportion exhibited resistance to Ciprofloxacin (48%) and Azithromycin (28%).

Outbreaks and clusters

Eight outbreaks of shigellosis were notified in 2018, six family outbreaks and two general outbreaks. The six family outbreaks were small in size (range 2-3 persons ill), with four having at least one case in the household associated with foreign travel.

One national general outbreak comprised seven geographically diffuse cases of shigellosis which had onset dates within six days of one another. The outbreak was initially detected as a nationwide excess of non-travel associated female cases, and was later confirmed by whole genome sequencing of the isolates. Although no source was identified, the outbreak was suspected to be foodborne given the geographically diffuse but close temporal association of cases.

A smaller general outbreak in HSE-East comprising three cases occurred following travel to Africa. Food and person-to-person transmission were reported as suspected transmission routes.

In the 2017 shigellosis annual report, we described two shigellosis clusters where sex between men was believed to have played a role in transmission. For the 2017 cluster of *S. sonnei* ASuTmNaCpAzt (or ASuTTmNaCpAzt), a further twelve genetically related cases were reported in 2018, with adult males again predominating. For a second 2017 MSM-linked cluster of *S. flexneri*, a further two adult male cases occurred in 2018.

Discussion and Public Health Implications

Compared with the early 1990s, shigellosis has declined substantially in Ireland, with improvements in food hygiene and drinking water provision. Foreign travel, in particular to Africa and Asia, is very common among notified cases, especially in children and adult females among whom it is associated with approximately two thirds of notifications. Foodborne transmission has a continuing minor role, as evidenced by the reporting of another suspected foodborne general outbreak this year and the two previous years. [3,4]

The continued occurrence of excess cases among adult males compared to adult females, especially among non-travel associated cases, and genetic clustering of cases among MSM reflect an elevated risk in this population.[5] In response, resources have been developed to create awareness of sexually acquired shigellosis. [6,7]

During 2018 HPSC instituted a change in the case definition for shigellosis.[2] So far, the revised case definition has not impacted much on the number of cases reported. As only two HSE-areas have reported probable cases in 2018, it is possible that there is still some under-reporting of PCR positive only cases as notifiers become more familiar with the new case definition. We remind clinical laboratory staff of the legal requirement to now report both culture confirmed and PCR positive only cases of shigellosis. It is also important that the PCR-positive only cases are categorised as probable cases on CIDR in line with the

national case definition, in order that the impact of the case definition change can be monitored.

The now routine undertaking of WGS of *Shigella* isolates at the NSSLRL has provided useful information on the genetic relatedness of strains which is used by public health personnel to outrule/provide evidence for links between cases during investigations of case clusters. During 2018, there was a slight reduction in the number of *Shigella* isolates referred for typing at the NSSLRL in Galway. The use of WGS to characterise isolates has been key in confirming the existence of a number of important clusters and in outruling links in other instances. This demonstrates the value of continuing to attempt culture on all shigellosis cases that are diagnosed initially on the basis of PCR and the importance of referral of all *Shigella* isolates for typing. [8]

Referral of isolates to the NSSLRL is also key for monitoring trends in antimicrobial resistance. Notably, an increasing number and proportion of *Shigella* isolates referred for typing are exhibiting resistance to Ciprofloxacin and Azithromycin, potentially limiting options for therapy or prevention of transmission.[8]

Further information available on HPSC website

Further information about shigellosis is available at https://www.hpsc.ie/a-z/gastroenteric/shigellosis/

Publications on shigellosis in Ireland available at https://www.hpsc.ie/a-z/gastroenteric/shigellosis/guidancepublications/articles/

Acknowledgements

Sincere thanks are extended to all those who participated in the collection of data used in this report. This includes the notifying physicians, public health doctors, surveillance scientists, microbiologists, nurses, laboratory staff (especially the NSSLRL) and administrative staff.

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