



Serial number: 2018/066 Date: 18th December 2018

Event: Multidrug resistant *Shigella sonnei* circulating in UK and USA

Notified by: Gastrointestinal Infections Department, National Infection Service

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PHE NIRP National – standard response

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Background and Interpretation:

Whole genome sequencing has identified links between 17 cases of *Shigella sonnei* in England, Wales and Scotland. Case isolates fall within the 10-SNP cluster CC 152 1.3.197.460.1360.%. An enquiry has also been received from the USA Centers for Disease Control (USA CDC) who have identified a further nine isolates that also fall within this cluster between March and November 2018, from cases resident in multiple states across the USA that identify as men who have sex with men (MSM).

This strain is of concern due to its multi-drug resistant genotype; resistance markers include *bla*_{CTX-M-27} associated with extended spectrum β -lactamase production, a single *gyrA* mutation associated with reduced susceptibility to fluoroquinolones and the plasmid-mediated macrolide resistance markers *erm(B)* and *mph(A)*. This macrolide resistance profile has been associated with sexual transmission amongst MSM in the UK. Standard treatment with first line agents like quinolones, azithromycin and ceftriaxone may not be effective; please see below for further details.

UK cases are distributed across Great Britain in London ($n = 8$), Yorkshire and Humber ($n = 3$), South East of England ($n = 1$), South West of England ($n = 2$), Wales ($n = 2$) and Scotland ($n = 1$). Specimen dates range from 19 March to 28 November 2018, respectively.

All cases are adults and 14 of 17 (82%) are male; the three female cases are resident in London and the South West of England, respectively. No exposure or clinical outcome data is available for UK cases, as to date none have been interviewed.

Due to the highly drug resistant nature of this strain, we would be grateful if the GI [enhanced shigellosis questionnaire](#) could be completed for all cases (prospective and retrospective). The case definition is a resident of the UK with a laboratory confirmed *S. sonnei* infection and with an isolate that falls within the t10.1360 cluster. New and previous cases will be reported to Health Protection Teams by the national GI surveillance team.



Implications and recommendations for PHE Centres and Health Protection Teams

PHE centres are asked to be aware of this period of active enhanced surveillance and are requested to use the GI [enhanced shigellosis questionnaire](#) available on the phe.gov.uk website for all *S. sonnei* cases that have isolates within the t10.1360 whole genome sequencing cluster. Completed questionnaires should be emailed to shigella@phe.gov.uk.

S. sonnei t10.1360 cluster cases should also be linked to the HPZONE context (congregation) available here: [Shigella sonnei t10.1360 national MDR MSM cluster](#) 📄

Health protection Teams are requested to share this briefing note with their local GPs.

Health Protection Teams should continue to provide appropriate advice on preventing further transmission to cases falling within risk groups as described in the [Interim Public Health Operational Guidance for Shigellosis](#). Cases may be directed towards the NHS choices web page on dysentery for further information (<https://www.nhs.uk/conditions/dysentery/>). Specific guidance on preventing sexual transmission of *Shigella* in men who have sex with men is available as a set of posters and leaflets on the phe.gov.uk website here: <https://www.gov.uk/government/publications/shigella-leaflet-and-poster>.

Implications for Microbiology services and PHE sites and services

Clinical microbiology and public health laboratories should continue to test for antimicrobial susceptibility in all *S. sonnei* isolates and are requested to continue to refer isolates of *Shigella* spp. including *S. sonnei* to the Gastrointestinal Bacteria Reference Unit (GBRU) at Colindale for typing and confirmation as soon as possible.

Laboratories are requested to screen *S. sonnei* for ESBL production (cefpodoxime disc or gradient method according to EUCAST methodology is adequate) in addition to testing for sensitivity to quinolones (pefloxacin disc according to EUCAST) and azithromycin when clinically indicated, to avoid treatment failures.

Implications and recommendations for NHS clinicians and microbiologists

Clinicians managing cases of community acquired diarrhoea should be aware of this predominantly adult male cluster, ask for sexual and travel history where appropriate and request appropriate tests (i.e. faecal PCR and culture).

Microbiologists should be aware that this strain of *S. sonnei* is phenotypically an extended spectrum beta lactamase producer, resistant to amoxicillin, co-amoxiclav, ceftriaxone, ceftazidime, co-trimoxazole and azithromycin. It is susceptible to chloramphenicol, ertapenem, temocillin, mecillinam and fosfomycin. The strain has a single *gyrA* mutation, therefore appears resistant when screened with a pefloxacin disc, but may appear susceptible to ciprofloxacin on Etests (MIC on screening has been 0.125 mg/L). Laboratories should follow EUCAST protocols for Enterobacteriaceae for susceptibility testing for these antibiotics. Susceptibility testing for these additional antibiotics can be arranged on special request from GBRU and will be free of cost if the isolate is confirmed as an outbreak strain.

Past experience with strains with this single *gyrA* mutation indicate that cases have a suboptimal response to treatment with ciprofloxacin and symptoms, especially diarrhoea, may be prolonged. Oral treatment options are therefore limited to antibiotics such as chloramphenicol, mecillinam and fosfomycin. For information on doses of these antibiotics please see attached references. If there are any further queries about therapeutic advice please contact the duty microbiologist at Colindale on 0208 327 6736 or email Gauri.Godbole@phe.gov.uk.



Implications and recommendations for local authorities

Environmental health teams may be asked to support the investigation by interviewing cases of infection linked to this incident, should they occur in their area.

References:

Williams, P. and Berkley, JA (November 2016). Dysentery (Shigellosis): Current WHO guidelines and the WHO essential medicine list for children.
https://www.who.int/selection_medicines/committees/expert/21/applications/s6_paed_antibiotics_appendix5_dysentery.pdf

British National Formulary: <https://www.bnf.org/products/bnf-online/>