

Increase in group A *Streptococcus* and *Staphylococcus aureus* infections in prisons, people who use drugs, and those who are homeless or live in hostels, England 2018-2019

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INTRODUCTION

- *Staphylococcus aureus* and group A *Streptococcus* (GAS) infections in prison and homeless populations have been associated with poor general hygiene.
- In people who inject drugs (PWID) these infections may be related to unsterile injection practices.
- Morbidity can be severe and compounded by delays in seeking healthcare.
- In 2018-2019, increased reports of GAS infections were observed in England in prison inmates, PWID and the homeless, with co-infection with *S. aureus* reported in some cases.
- We report the results from an ongoing national investigation to quantify the burden of these infections and characterise risk factors in order to direct prevention measures.

METHODS

- National case reporting and laboratory surveillance systems were searched using the following case definition (see box).
- Isolates received at the national reference laboratory were typed using *emm* gene sequencing for GAS or multilocus sequence typing (MLST) for *S. aureus*.
- Whole Genome Sequencing (WGS) was performed on isolates of the two most common *emm* types (*emm* 108.1 and *emm* 66) identified amongst GAS isolates.
- Questionnaires were completed prospectively from June 2019 onwards, and retrospectively for those who were still in prison.

Case definition

People in prison (including staff)

- and/or people who use or have a history of using drugs (injecting or not)
- and/or live in a hostel
- and/or are homeless

with invasive or skin and soft tissue GAS infection from 1 January 2018.

For prison settings, cases of *S aureus* (MRSA and MSSA) bacteraemia and skin and soft tissue infections were also included.

RESULTS

Between 1 January 2018 and 27 August 2019, 1,066 cases were identified; 1,026 with GAS infection and 60 with *S. aureus* infections (20 had co-infection).

Characteristics of cases

- In total, 382 cases were associated with prisons, 79 with hostels and 276 with homelessness.
- Twenty-two prisons geographically distributed across England reported two or more cases.
- A history of injecting drug use was reported by 733 cases (69%), of which 707 cases (96%) were current drug users.

Clinical presentation

- Of 1,026 GAS infections, 651 were invasive, 375 non-invasive or unspecified; 392 were admitted to hospital and 10 deaths (all-cause) were reported.
- Of the 60 *S. aureus* infections, 4 were invasive and 56 were non-invasive or unspecified. Two were admitted to hospital and no deaths have been identified

MLST/*emm* typing and WGS results

- Three predominant *emm* types were identified amongst GAS cases; *emm* 66.0 (n=156), *emm* 108.1 (n=153), and *emm* 94.0 (n=47).
- *S. aureus* MLST typing information was available for 44 cases; predominant MLST types were MLST 5 (n=8), MLST 8 (n=7) and MLST 398 (n=5).
- WGS results from 179 isolates (both historical and current) of *emm* 108.1 suggest recent expansion of a strain lineage, supported by evidence of low SNP variation. 15 genomic clusters were identified (2-23 isolates per cluster) amongst samples from 2018-19 using a 0 SNP cluster threshold, indicative of potential recent transmission.
- WGS results of 63 *emm* 66.0 isolates from 2018-19 revealed a number of regional clades with 0-3 SNPs indicative of a strain may have become established within the population.

Table 1. Questionnaire results from cases in prison and non-prison settings. Results as of 27 August 2019. Includes only responses reported by ≥50% of respondents

Cases in prison settings (n=87)	No. responses	n	%
UK born	67	61	91%
Wound acquired while in current prison	84	49	58%
Wound source if acquired while in current prison:			
- injury during leisure activity	47	9	19%
- self-harm	47	8	17%
- insect bites	47	4	9%
Drug use			
Any drug use in 12 months prior	76	48	63%
Smoked, snorted or inhaled drugs in 7 days prior	40	27	68%
Cases in non-prison settings (n=51)			
UK born	43	42	99%
Wound site: leg	27	16	59%
Wound at injection site	28	17	61%
Issues keeping wound clean	21	12	57%
Drug use			
Any drug use in 12 months prior	48	45	94%
Injected drugs in 7 days prior	45	39	87%
Injection site: groin	33	28	85%
Injected drug: heroin	36	34	94%
Injected drug: crack	36	22	61%
Used an acidifier	26	20	77%
Saved and reused filters	28	16	57%

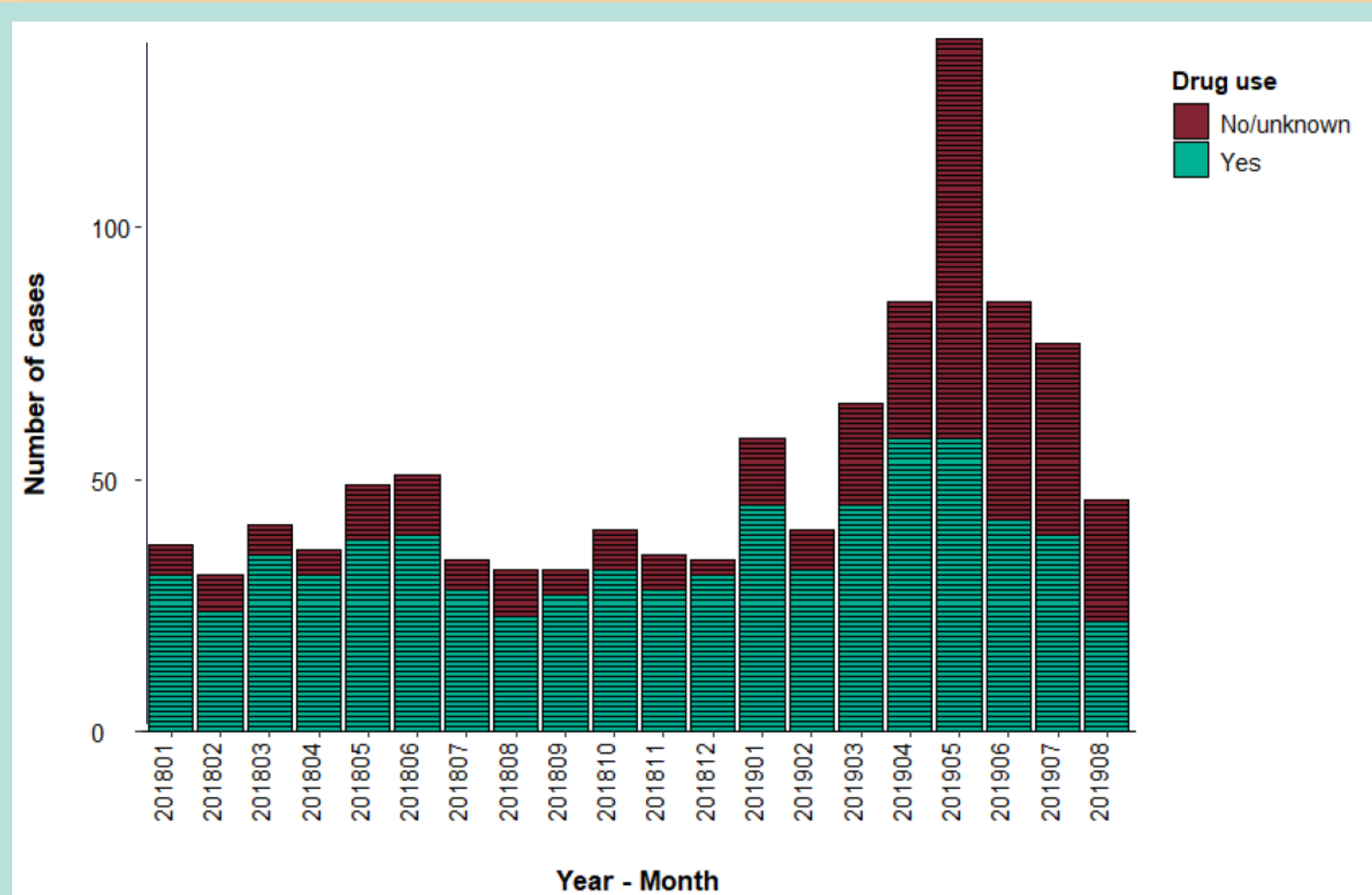


Figure 1: Cases of GAS and *S. aureus* infection meeting the case definition by drug use status, Jan 2018 – 27 August 2019

DISCUSSION

A persistent national increase in GAS infections has been observed in England in people in prison, PWID and those who are homeless. WGS results suggest recent expansion of a strain lineage, and potential recent transmission.

The risk factors related to injecting drug use reported by cases in non-prison settings who reported injecting drugs in the 7 days prior to symptom onset were consistent with the literature:

- Injecting into the groin was reported by 85% of cases. Groin injecting is a known risk factor for the development of skin and soft tissue infections (1,2).
- Over three in four (77%) cases reported use of an acidifier. Overuse of acidifiers, used for the preparation of heroin and crack, could increase skin damage associated with injecting (3).
- More than half (57%) of cases reported to reuse filters; sharing or reusing filters, spoons and containers for mixing, and needles or syringes is a known risk factor for developing an injection site infection (1,2).

RECOMMENDATIONS

Services that work with homeless, prison and PWID populations should:

- encourage people with any skin lesions or other signs of infection to seek prompt medical attention;
- report any clusters of cases to allow for prompt identification and control of outbreaks.

In addition, services that work with PWID populations should:

- emphasize safe and hygienic injection practices, including use of as little acidifier as possible (1/2 sachet is enough to prepare one hit of heroin), and rotation of injection sites to avoid vein damage.
- ensure easy access to needle and syringe programmes.

Specific guidance has been published for prisons to recommend:

- health assessment on first entry;
- isolation and restriction of prison transfers for cases until 48 hours of compliance with antibiotic treatment;
- thorough and regular cleaning in communal areas and deep cleaning for cells of cases;
- implementation of laundry protocols.

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