2.3 Invasive Group A Streptococcal Disease

Summary

Number of cases, 2012: 122
Crude incidence rate, 2012: 2.66 per 100,000 population

Notifications

One hundred and twenty-two cases of invasive Group A streptococcal (iGAS) disease were notified in 2012. This corresponds to 2.66 iGAS cases per 100,000 population [95% confidence interval (CI), 2.21 to 3.17 per 100,000], which is higher than in 2011 when the iGAS rate was 1.46 per 100,000 population (95% CI, 1.13 to 1.85 per 100,000). This increase is considered to be statistically significant as the confidence intervals do not overlap. One hundred and eighteen cases were confirmed, defined as patients with Group A streptococcus (GAS), or *Streptococcus pyogenes*, isolated from a sterile site. Four cases were probable, defined as patients with streptococcal toxic shock syndrome (STSS) and GAS isolated from a non-sterile site (e.g. throat, sputum, vagina).

Patient demographics

Of the 122 cases, 59 (48%) were males and 63 (52%) were females, with ages ranging from 2 weeks to 92 years (mean, 44 years; median, 42 years). iGAS was more common in young children and older adults (Figure 1).

Geographic spread and seasonal variation

Table 1 outlines the numbers and crude incidence rates (CIRs) of iGAS disease by HSE area from 2006 to 2012. Of note, the highest number of cases and CIR in 2012 occurred in the HSE-East (n=51; CIR, 3.15 per 100,000 population). The numbers of cases and CIRs increased in all HSE Areas, with the HSE-North-East reporting the biggest increase (up by over 10-fold on 2011).

In 2012, the peak periods were January-February (21 cases) and April-July (66 cases), which is broadly similar to the data from previous years with the peak typically occurring during the first half of the year (Figure 2). Comparing monthly data between 2011 and 2012, the first signs of an increase in notifications in 2012 occurred in April (n=11; 2011, n=6), with the highest number of monthly notifications reported to date following in May (n=21; previously the highest monthly figure was 12) (Figure 3). Note: the data presented here are based on the date the case was notified to public health and not on the date the case was first detected.

Isolate details

GAS was isolated from a sterile site in 103 of 118

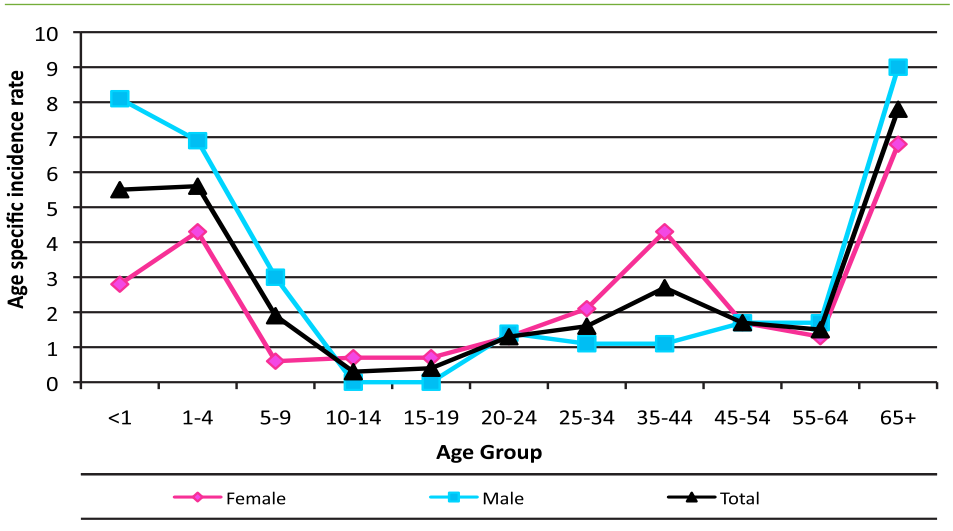

Figure 1. Age and sex specific rates of iGAS disease in 2012

confirmed cases (no data on the source were available for the other 15 cases), primarily from blood cultures (n=83 isolates, 91%), but also deep tissue (n=8), abscesses (n=6), joints (n=2), pleural aspirates (n=2), bone (n=1) and cerebrospinal fluid (CSF) (n=1). For 8 cases, GAS was isolated from another sterile site in addition to blood: abscesses (n=3), CSF (n=2), deep tissue (n=1) and pleural fluid (n=1). For the four probable cases, GAS source was wound swabs.

Typing data, based on sequencing of the *emm* genes that encode the M protein (the major virulence factor), were available on 108 isolates submitted from 27 laboratories: *emm*-types 1.0 (n=50; 46%), 12.0 (n=10; 9%) and 28.0 (n=8; 7%) comprised 63% of all the isolates typed. Nineteen other *emm*-types (each represented by four isolates or less) were also detected. Of the 24 patients with STSS for which *emm*-typing was undertaken, 17 of the GAS isolates belonged to *emm*-type 1.0 (71%) and three to type 12.0 (13%).

Enhanced surveillance data

Enhanced data fields were entered for 112 (92%) of the 122 iGAS cases, which is similar to 2011 (90%, 61 of 67 cases). The source laboratory could be ascertained for all cases. As in previous years, a wide variation in completed fields was observed.

Clinical details

Clinical presentation data were provided for 111 of the 122 cases. As in 2011 and previous years, bacteraemia (n=84 cases, including cases where bacteraemia was not specifically stated but GAS was isolated from blood) and cellulitis (n=40) were the most common clinical presentations, followed by STSS (n=26; seven of which were implied based on the information provided on the clinical presentation), pneumonia (n=16), necrotising fasciitis (n=7), septic arthritis (n=7), myositis (n=4), erysipelas (n=3), puerperal sepsis (n=3), meningitis (n=3) and peritonitis (n=1). Note that cases could have more than one clinical manifestation of infection.

Risk factors

Risk factor data were provided for 105 of the 122 cases. Risk factors associated with iGAS disease included age ≥65 years (n=42), presence of skin or wound lesions (n=29), malignancy (n=10), varicella infection (n=8), steroid use (n=7), childbirth (n=6), intravenous drug

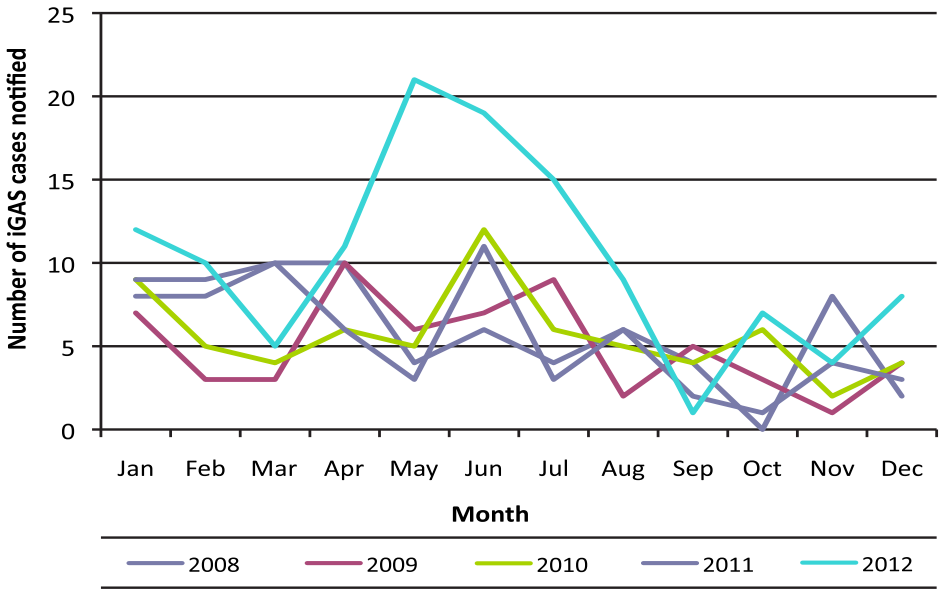

Figure 2. Monthly distribution of iGAS cases, 2008-2012

Table 1. Numbers (n) and Crude Incidence Rates (CIRs) per 100,000 population of iGAS disease by HSE Area, 2006-2012

HSE Area	2006		2007		2008		2009		2010		2011		2012	
	n	CIR	n	CIR	n	CIR	n	CIR	n	CIR	n	CIR	n	CIR
HSE-E	37	2.47	28	1.87	31	2.07	32	1.98	22	1.36	29	1.79	51	3.15
HSE-M	2	0.79	0	0.00	0	0.00	2	0.71	2	0.71	5	1.77	7	2.48
HSE-MW	2	0.55	2	0.55	3	0.83	5	1.32	6	1.58	6	1.58	8	2.11
HSE-NE	5	1.27	3	0.76	10	2.54	3	0.68	7	1.59	1	0.23	11	2.50
HSE-NW	1	0.42	3	1.27	3	1.27	1	0.39	8	3.10	2	0.77	5	1.94
HSE-SE	4	0.87	10	2.17	8	1.74	8	1.20	5	0.75	7	1.05	16	2.41
HSE-S	3	0.48	4	0.64	5	0.80	5	1.00	12	2.41	12	2.41	14	2.81
HSE-W	7	1.69	7	1.69	10	2.41	4	0.90	6	1.35	5	1.12	10	2.25
IRELAND	61	1.44	57	1.34	70	1.65	60	1.31	68	1.48	67	1.46	122	2.66

CIRs for 2006-2008 calculated using the 2006 census; CIRs for 2010-2012 calculated using the 2011 census

use (IDU) (n=6), diabetes mellitus (n=5), alcoholism (n=5) and non-steroidal anti-inflammatory drug (NSAID) use (n=2). Note that cases could have one or more associated risk factors: 63 cases had one risk factor, 22 had two risk factors, three had three risk factors, one had four risk factors and one had five risk factors. No risk factors were identified for 15 cases. Among the 26 patients with STSS, risk factor data were provided for 25 cases. Skin or wound lesions were identified as a risk factor in 15 cases, age 65 years and over in 10 cases, alcoholism in four cases, varicella in three cases, and childbirth, steroid and NSAID use in one case each. No risk factors were identified for two STSS cases.

Clinical management
Surgical intervention was required for 24 patients (compared to 8 in 2011), ranging in age from 17 months to 81 years.

Forty patients, ranging in age from 2 weeks to 84 years, were admitted to an intensive care unit (ICU) (compared to 11 in 2011). This included 18 patients with STSS, one patient with necrotising fasciitis and five patients with both STSS and necrotising fasciitis.

Risk factors for patients admitted to an ICU included skin and wound lesions (n=18), age over 65 years (n=12), varicella infection (n=5), alcoholism (n=4), diabetes mellitus (n=2), NSAID use (n=2), steroid use (n=3), childbirth (n=2) and malignancy (n=2). Twenty patients had one risk factor, nine had two risk factors and one each had three, four and five risk factors, respectively. No risk factors were identified in four patients. No risk factor data were available for four patients.

Length of ICU stay was provided for 21 cases, ranging from one to nine days (mean, 3.6 days; median, 3 days).

Other epidemiological information
Three cases (one with bacteraemia; one with bacteraemia and cellulitis; and one with STSS and peritonitis) were reported as hospital-acquired (compared to two in 2011).

In 2012, one family outbreak of iGAS was notified (compared to none in 2011). In addition, there were two reported outbreaks of scarlet fever in 2012 (compared to one in 2011), and one reported outbreak of non-invasive GAS infection (strep throat) in 2012 (compared to none in 2011).

Outcome
Outcome at seven-days following GAS isolation was reported for 64 cases:
- 55 were still alive
- Nine patients died: GAS was the main or contributory cause of death for eight patients

The seven-day case fatality rate (CFR) for iGAS disease was 13% in 2012 (similar to that in 2011; 12%).

Of the twenty-six STSS cases, five patients died due to GAS resulting in a CFR of 19%. Two other patients with STSS died but GAS was not identified as the cause of death.

Antimicrobial susceptibility
Antimicrobial susceptibility data were reported on 80 iGAS isolates (72 from blood and eight from other specimens) by 20 laboratories in 2012 (note: these were reported via the EARS-Net Antimicrobial Resistance Surveillance Network). All isolates tested were susceptible to penicillin (n=78) and vancomycin (n=58). Resistance to erythromycin was reported in four (5%) of 80 isolates, to clindamycin in two (6%) of 34 isolates and to tetracycline in five (17%) of 29 isolates.

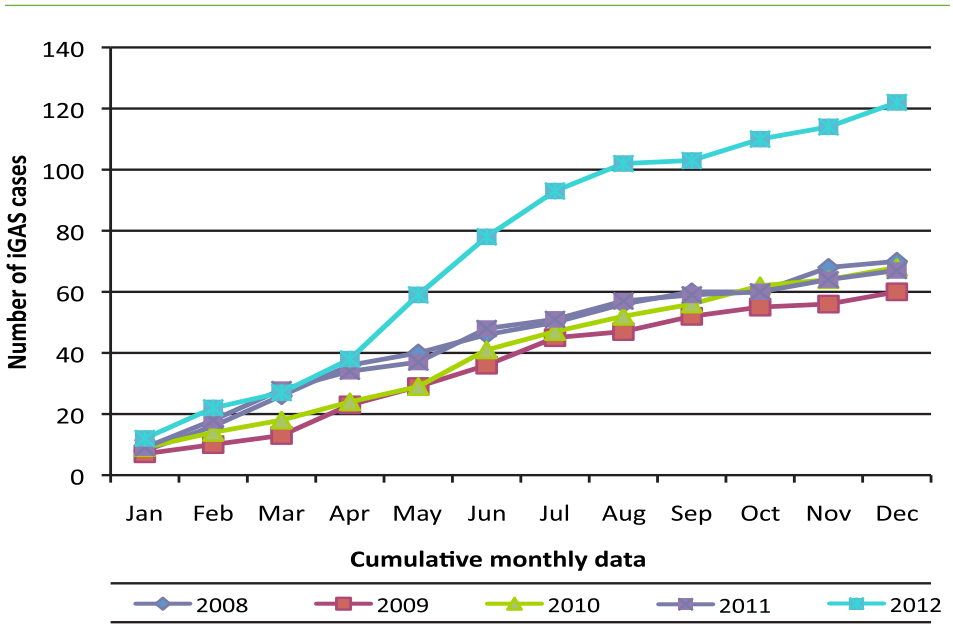

Figure 3. Cumulative monthly numbers of iGAS cases, 2008-2012

Conclusion

In 2012, 122 cases of iGAS infection were notified in Ireland, which is the highest annual number reported to date and represents an increase of 82% on 2011 (n=67). The crude incidence rate increased from 1.46 per 100,000 population in 2011 to 2.66 per 100,000 in 2012 and this was found to be statistically significant.

iGAS is a potentially life-threatening disease with an overall case fatality rate (CFR) of 13%, and even higher CFR (19%) for patients presenting with STSS, in 2012. Last year, more patients presented with STSS than in previous years: 26 cases, comprising 23% of 111 cases for which clinical presentation was provided, the highest proportion reported to date.

Emm-typing was undertaken on a national basis for the first time in 2012 with the establishment of a GAS typing service by the Epidemiology and Molecular Biology Unit (EMBU), Children's University Hospital, Temple Street. Laboratories were asked to submit all iGAS isolates for 2012, and 2011 if possible, for comparison purposes. In 2012, one *emm*-type, type 1.0 (representing 50 of 108 isolates), comprised 46% of all isolates typed, compared with 29% (8 of 28 isolates) in 2011. Certain *emm*-types, including type 1.0, are associated with STSS, and STSS in turn is strongly associated with increased mortality. Although typing data were available for just 42% of isolates in 2011, it is likely that the large increase in iGAS cases in 2012 is in part at least due to the proliferation of GAS isolates belonging to *emm*-type 1.0.

Ongoing surveillance is essential, specifically completion of the enhanced data questionnaire, to gain a greater understanding of iGAS, to enable early detection of clusters/outbreaks, to ensure prompt implementation of infection prevention and control precautions and appropriate management of contacts. Epidemiological typing as provided by the EMBU is another vital element to help us understand what is happening with GAS as certain *emm*-types are associated with greater morbidity and mortality.

Antimicrobial susceptibility data confirm that iGAS remains susceptible to penicillin and that penicillin should continue to be the first line treatment where iGAS is suspected.

HPSC would like to thank participating microbiology laboratories and public health departments for their contribution to the iGAS enhanced surveillance scheme.

All microbiology laboratories are encouraged:

- to return enhanced iGAS surveillance forms for all patients with iGAS
- to submit all iGAS isolates to the Epidemiology and Molecular Biology Unit (EMBU) at the Children's University Hospital, Temple Street for *emm*-typing
- to submit antimicrobial susceptibility data on all iGAS cases along with their EARS-Net quarterly returns

The enhanced surveillance form can be downloaded from the HPSC web site at: www.hpsc.ie/hpsc/A-Z/Other/GroupAStreptococcalDiseaseGAS/SurveillanceForms/

Further information on iGAS disease in Ireland, including factsheets for patients and contacts, national guidelines and a new quarterly report, is available at: www.ndsc.ie/hpsc/A-Z/Other/GroupAStreptococcalDiseaseGAS/

The figures presented in this summary are based on data extracted from the Computerised Infectious Diseases Reporting (CIDR) System on 26th August 2013.