



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



2006

EPIDEMIOLOGY OF INVASIVE GROUP A STREPTOCOCCAL DISEASE IN IRELAND



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Further information:

More information can be obtained via the HPSC website:

<http://www.ndsc.ie/hpsc/A-Z/Other/GroupAStreptococcalDiseaseGAS/>

Summary

- **There were 61 cases (1.4 per 100,000) of iGAS notified in 2006, a rise of 20% on the 49 cases (1.2 per 100,000) notified in 2005. The incidence rate remains lower than in the UK and other European countries**
- **Average incidence rates over last three years varied from 0.3 to 2.0 per 100,000 for the different HSE-Areas**
- **In December 2006 iGAS enhanced fields, relating to isolate details, risk factors, and clinical and epidemiological features, were added to the CIDR system**
- **Enhanced data fields were entered for 41 (67%) of the 61 cases reported in 2006. Bacteraemia and cellulitis were common clinical features. Necrotising fasciitis, streptococcal toxic shock syndrome and other severe conditions were also reported. One patient presented with puerperal sepsis. One case was hospital-acquired. Risk factors for iGAS included skin/wound lesions, intravenous drug and steroid use**
- **Ten patients were known to require surgical intervention and five ICU admission**
- **Nearly half of the patients, whose eventual outcome was known, had died, and in a third of these, GAS was the main cause of death**

Introduction

Group A streptococcus (GAS - *Streptococcus pyogenes*) causes a range of diseases in humans including pharyngitis, soft tissue infection, scarlet fever, septicaemia, rheumatic fever and post streptococcal glomerulonephritis. Invasive Group A streptococcal infection (iGAS), are infections associated with the isolation of the bacterium *S. pyogenes* from normally sterile body or from a non-sterile site in the presence of streptococcal toxic shock syndrome (STSS), and may be life-threatening. The clinical presentation of iGAS may include: STSS, necrotising fasciitis (NF), bacteraemia with no identified focus, cellulitis, myonecrosis or focal iGAS (eg: pneumonia, puerperal sepsis, osteomyelitis, surgical wound infections).¹

Invasive GAS became notifiable in Ireland in 2004.² Most Departments of Public Health use the Computerised Infectious Diseases Reporting (CIDR) system to make the notifications, and details are analysed at the HPSC for this annual report.

There were 35 notifications in 2004 (this represents an incidence rate of 0.8 per 100,000 population) and 49 cases (1.2/100,000) in 2005, the rise owing largely to a cluster of cases in HSE-Western area in early 2005.³ The HPSC Scientific Advisory Committee set up a multidisciplinary sub-committee in mid-2005 to produce guidelines on the diagnosis, surveillance and management of iGAS Infections in Ireland. The recommendations were published in 2006.⁴

This report is an analysis of the cases reported in 2006 and, as well as regional distribution of the rates, includes information on clinical features and risk factors.

Case Definition²

Clinical Description

An acute febrile illness which may be associated with STSS. STSS is characterised by hypotension (fifth percentile of systolic blood pressure in children, or <90mmHg systolic pressure in adolescents and adults) and two or more of the following:

- Renal impairment (creatinine greater than twice upper limit of normal for age)
- Coagulopathy (platelets $<100,000 \times 10^6/l$ or evidence of disseminated intravascular coagulation)
- Liver dysfunction (ALT, AST or bilirubin more than twice upper limit of normal for age)
- Acute respiratory distress syndrome (pulmonary infiltrates and hypoxaemia without cardiac failure or generalised oedema)
- Generalised erythematous rash that may desquamate
- Soft tissue necrosis (necrotising fasciitis, myositis, gangrene)

Laboratory criteria for diagnosis

Isolation of group A streptococcus (*S. pyogenes*) from a normally sterile site (e.g. blood, cerebrospinal fluid, pleural fluid).

For probable case (STSS only)

Isolation of group A streptococcus from a nonsterile site (e.g. throat, sputum, vagina).

Case classification

Possible: N/A

Probable (STSS): A clinically compatible case and meeting the probable laboratory criteria

Confirmed: A case that is laboratory confirmed.

Materials and Methods

Data for this report were extracted from CIDR on 1st October 2007. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Enhanced data fields (see Appendix 1) were made available on CIDR in December 2006 and Departments of Public Health in six HSE-Areas were able to enter the additional data retrospectively for 2006. Data from the remaining two Departments of Public Health were entered onto CIDR on their behalf at the HPSC upon receipt of paper surveillance forms.

The 2006 census of population was used to calculate the incidence rates. Rates from the previous two years were re-calculated using the 2006 census, and therefore may vary from previously published figures.

Results

Overall

In Ireland there were 61 cases (1.4/100,000) of iGAS notified in 2006, a rise of 20% on the 49 cases (1.2/100,000) notified in 2005.

Regional Breakdown

The average incidence rate for the eight HSE-Areas over the last three years (2004 to 2006) varied from 0.3 to 2.0 per 100,000 (table 1). The higher rate in HSE-West is largely due to a cluster of cases occurring in early 2005, however, the number of cases reported in HSE-W in 2006 also remained high.

Table 1. Breakdown of notifications of iGAS in 2004 to 2006 by HSE Areas with incidence rates per 100,000 population.

HSE-Area	2004	2005	2006	Total over three years	Average incidence rate by area
Eastern	25	19	37	81	1.8
Midland	0	1	2	3	0.4
Mid-Western	1	3	2	5	0.5
North-Eastern	1	3	5	9	0.8
North-Western	0	3	1	4	0.6
South-Eastern	7	1	4	12	0.9
Southern	1	1	3	5	0.3
Western	0	18	7	25	2.0
Ireland	35	49	61	145	1.1
Incidence rate	0.8	1.2	1.4		

Seasonal Breakdown

The monthly breakdown of notifications over the last three years (2004 to 2006) shows that there is no apparent seasonal pattern (figure 1). Seven of the nine cases in July of 2006 were from HSE-E. The number of cases from September to November in 2006 showed an increase from previous years' trend, however, the number of cases remained low and there were no regional clusters seen.

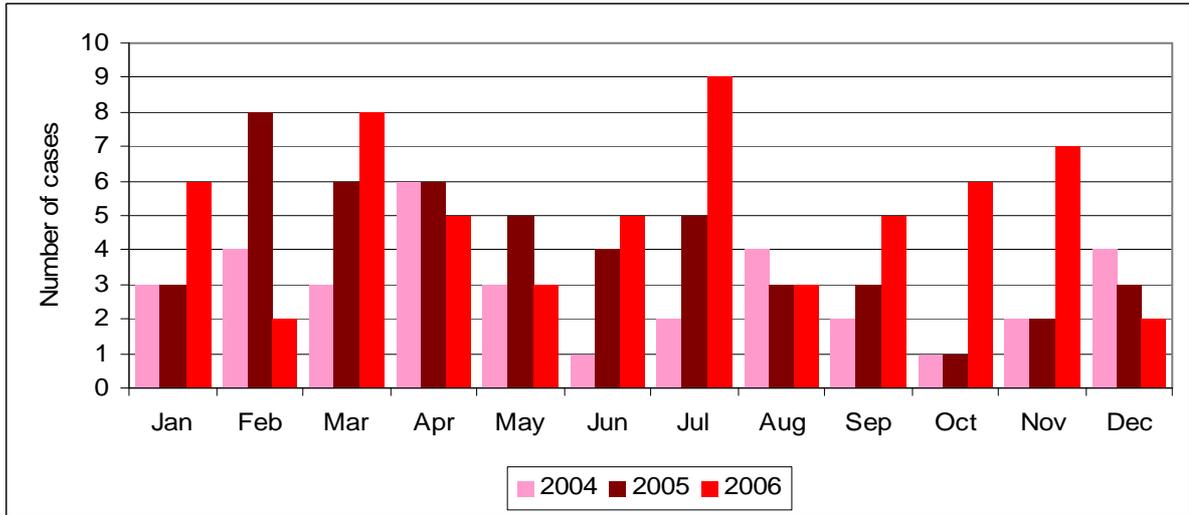


Figure 1. Number of notifications of iGAS in 2004, 2005 & 2006 by month in Ireland.

Age and Sex Breakdown

The age breakdown for the three years (2004 to 2006) combined showed that all age groups were affected but the incidence was higher among the very young and the elderly; 31% of all infections occurred in those aged 65 or over. Overall, slightly more males (52%) were affected than females.

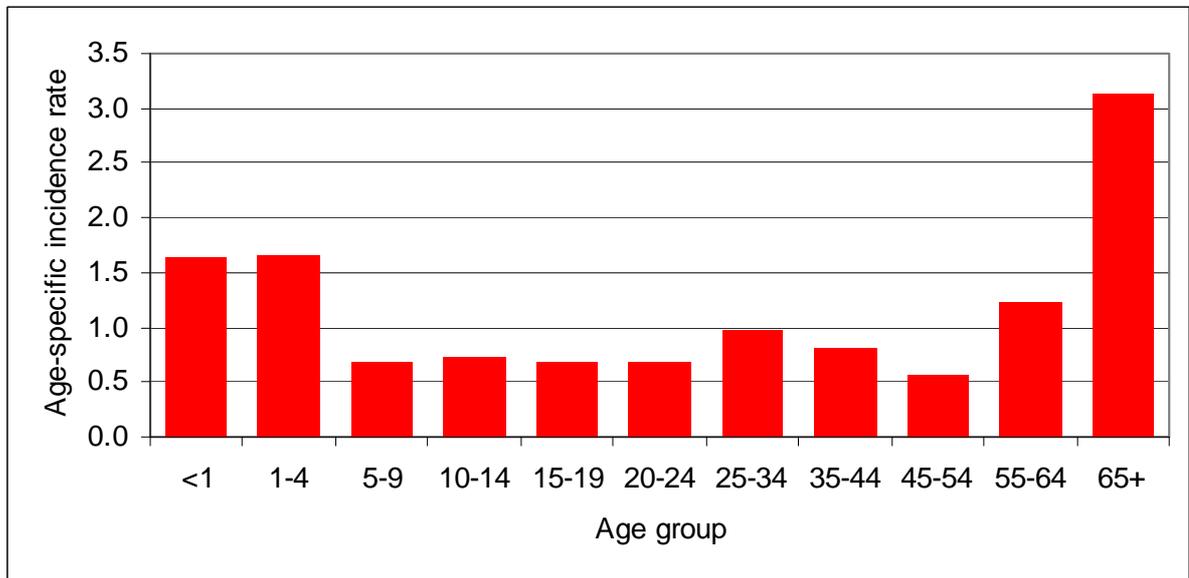


Figure 2. Age-specific incidence rate (per 100,000) of iGAS cases for 2004 to 2006 combined.

Enhanced Data

There was an increase in enhanced data received in 2006. One or more enhanced data fields were entered for 41 (67%) of the 61 cases reported in 2006 (table 2). The following is a summary of the enhanced data available for 2006. See Appendix 1 for a full list of data fields.

Table 2: Enhanced data for iGAS cases 2005-2006

	2005	2006
Total iGAS cases notified	49	61
Enhanced data received	28 (57.1%)	41 (67.2%)
Source of isolate known¶	25 (89.3%)	35 (85.4%)
- Blood	17	31
- CSF	1	1
- Deep tissue	4	3
- Joint fluid	1	-
- Sputum	1	-
- Abscess	1	-
iGAS risk factors*		
- Wound/skin lesion	2	7
- IVDU	1	3
- Steroid use	1	3
- Alcoholism	1	2
- Malignancy	-	2
- NSAID use	1	2
- Diabetes mellitus	1	1
- Varicella infection	-	1
Clinical presentation*		
- Bacteraemia	3	8
- STSS	1	3
- Cellulitis	3	6
- Myositis	-	1
- NF	3	2
- Osteomyelitis	1	-
- Septic Arthritis	1	1
- Pneumonia	1	3
- Meningitis	1	1
- Peritonitis	1	-
- Abscess	2	-
- Puerperal sepsis	-	1
- Unknown	8	25
Hospital acquired case	-	1
Recent travel	-	-
Management		
- ICU admission	7	5
- Surgical intervention	6	10
Total patients where outcome known	15 (54%)	22 (54%)
- Recovered	11	12
- Died	4	10

* A patient could have more than one clinical feature and risk factor

¶ Percentages of cases with enhanced data

The source of the isolate was known for 35 cases. *S. pyogenes* was isolated from blood in 31 of the cases, from deep tissue in three cases and cerebrospinal fluid (CSF) in one case. Strain typing data were only available for two isolates: the types were T1/*emm1* and T2/*emm1*. Antibiotic resistance data are not yet available nationally.

Details regarding clinical presentation of iGAS were provided for 16 patients. Bacteraemia was present in eight, STSS in three and NF in two cases. Other clinical features were cellulitis (six cases), pneumonia (three cases), and meningitis, myositis, septic arthritis, meningitis and puerperal sepsis (one case each). Note that a patient could have more than one of these clinical features.

Skin lesion or wounds were known to be risk factors in seven of the cases. Three of the cases were recorded as injecting drug users and three further cases were indicated as using steroidal drugs. Other risk factors were alcoholism, malignancy and non-steroidal anti-inflammatory drugs (two cases each), and diabetes (one case). In one case varicella was recorded as a risk factor while one further case was recorded as hospital-acquired. Four patients were admitted to hospital from closed institutions. None of the 61 cases of iGAS in Ireland 2006 were known to have travelled abroad.

Ten patients with iGAS required surgical intervention. Outcome was known in 22 patients. While 12 had recovered, ten patients were known to have died, three of which were recorded as having GAS as the main cause of death.

Discussion

In those European countries with adequate surveillance data, the iGAS incidence rate is around 3.8/100,000.⁵ In the United Kingdom, GAS bloodstream infections alone accounted for a rate of 2.2/100,000 in 2005.⁶ These rates are far in excess of the 2006 iGAS incidence rate in Ireland of 1.4/100,000, despite the 20% rise in notifications from the previous year. It is possible that there is under-reporting in Ireland or that the rate is actually low in Ireland. The cluster of cases in early 2005 in HSE-W has led to better reporting, in terms of frequency and quality of data, of iGAS in that area. The number of cases reported in 2006 in HSE-W was lower than in 2005 but was higher compared to other HSE-Areas. It is likely that the average 2004-2006 incidence rate for HSE-W of 2.0/100,000 is a truer indication of the level of iGAS in Ireland than the national rate.

The publication in 2006 of the recommendations for diagnosis, management and surveillance, may also have helped to increase awareness and there has been an overall rise in the number of iGAS cases reported in 2006. One of the recommendations was the commencement of enhanced surveillance and its reporting through CIDR. In December 2006 iGAS enhanced fields, relating to isolate details, risk factors, and clinical and epidemiological features, were put on to the CIDR system, and many HSE-Area Departments of Public Health provided back-dated information via this system. While the amount of information provided per case is limited, 41 of the 61 cases (67%) had some degree of enhanced data.

Invasive group A disease in Ireland, as in other countries, leads to severe disease and a poor outcome in patients. In cases where clinical details were reported to the public health in 2006, bacteraemia was usually present, furthermore there were two cases with NF and three with STSS. Ten patients were known to require surgical intervention. Nearly half of the patients, whose eventual outcome was known, had died, and in a third of these, GAS was the main cause of death.

Typing of *S. pyogenes* isolates associated with iGAS is essential in order to enable international comparisons of isolates, to determine evolutionary trends and to detect the emergence of virulent strains. Of the 61 cases of iGAS reported in Ireland in 2006, only two had typing data. The published guidelines recommend that all isolates should be sent for strain typing and that an Irish Streptococcal Reference facility is established. However, there is currently no Irish Reference Laboratory that for this purpose, and therefore the isolates are sent abroad for typing. Adherence to the published recommendations, coupled with a better quality of reporting, should provide a clearer epidemiological picture and help to control iGAS in Ireland in the future.

References

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Appendix 1: List of Enhanced Data Fields

Enhanced data field for iGAS Surveillance. See HPSC website for actual form. These fields are also available on CIDR.

ISOLATE DETAILS

Laboratory Name

Date of specimen

Strain type

Isolate stored?

Yes / No / Unknown

For confirmed cases, isolated from

Blood

Joint

Deep tissue

CSF

Abscess

Bone

Other sterile site

For probable cases, isolated from

Throat

Vagina

Sputum

Other non-sterile site

Other relevant pathogens isolated

CLINICAL PRESENTATION

Peritonitis

Myositis

Bacteraemia

Septic arthritis

Toxic shock-like syndrome

Necrotising fasciitis

Meningitis

Cellulitis

Pneumonia

Puerperal sepsis

Erysipelas

Other clinical presentation

DEGREE OF SEVERITY

Hypotensive shock

Renal impairment

Coagulopathy

Liver abnormality

Erythematous rash

Soft-tissue necrosis

Respiratory distress

CLINICAL MANAGEMENT

Admitted to ITU?	Yes / No / Unkown Number of days in ITU
Surgical intervention?	Yes / No / Unkown Surgical procedures
Outcome	Not known Recovering / Recovered Died, GAS main cause Died, GAS not main cause

RISK FACTORS

Steroid use	
Diabetes	
Injecting drug user	
Varicella	
Alcoholism	
Malignancy	
Non-steroidal anti-inflammatory drugs	
Skin lesion / wound	Trauma Insect bite Surgical wound Surgical procedures
Child birth	Type of delivery
Other risk factors	

OTHER INFORMATION

Recent overseas travel (in last 2 weeks)	Yes / No / Unknown Countries visited
Patient admitted from an institution?	Boarding school Student residence Hotel Tourist hostel Guest house Acute hospital General/district hospital Psychiatric hospital Geriatric hospital Nursing home Shelter for homeless Refugee accommodation Religious institution Prison Other residential institution
Infection hospital acquired?	Yes / No / Unknown Details of contact
Case part of an outbreak or cluster?	Yes / No / Unknown Details of cluster/outbreak

COMMENTS