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Outbreak of Chikungunya Fever in Ravenna, Italy

Introduction

During the month of August, Italian health authorities identified an unusually high number of cases of febrile illness around Ravenna, Northern Italy.¹ Initial investigations suggested an arboviral illness. Serological testing and PCR confirmed the diagnosis of chikungunya fever. At the same time, chikungunya virus was detected by PCR in *Aedes albopictus* mosquitoes, now considered to be the most likely vector of the outbreak.

As of 13 September 2007, 254 cases and one death have been reported. Seventy eight cases have been laboratory confirmed, with the most recent confirmed case experiencing the start of symptoms on 2 September 2007. Most of those affected recovered within a few days. The case who died was an 83-year old man with severe co-morbidity.

The index case was believed to be a non-resident foreigner who came from an affected area in the Indian subcontinent. He arrived in Italy on 21 June 2007 and developed symptoms on 23 June. The peak of the outbreak was in the third week of August. The cases appearing in the area most recently have been sporadic cases.

The Italian authorities have put in place control measures, including the use of insecticides, to control mosquito populations around the city of Ravenna. Beyond the area around Ravenna, the risk of chikungunya fever is considered to be low. There is active surveillance in place throughout Italy for the implicated vector.

Epidemiology

The causative agent, chikungunya virus is an arbovirus (family *Togaviridae*) transmitted by *Aedes* mosquitoes. It is endemic in Africa below the Tropic of Cancer, the Indian sub-continent (including Pakistan) and across Southeast Asia as far as Papua New Guinea. There have been a number of large outbreaks, the most notable being in the Indian Ocean basin in 2006. During that outbreak there were over 250,000 cases on the island of Réunion alone.

Clinical features

Chikungunya tends to be a mild self-limiting illness. It is characterised by high fever, arthralgia/arthritis (in about 70% of presenting cases) typically affecting the knees, ankles and small joints of the hands and feet, headache, myalgia and a maculopapular rash. Most cases recover over a period of a few weeks. However, 5-10% of cases will experience chronic joint pains, stiffness and swelling.² More severe disease is more likely in elderly and debilitated patients.

The incubation period ranges from 1 to 12 days, with an average of 4 to 7 days.

Treatment

Treatment is symptomatic only (non-steroid anti-inflammatory medication and simple antipyretics).

Ireland

Ireland has no known pools of *Aedes albopictus* at this time. However, this vector is found in many parts of Europe. If local mosquito-borne transmission is confirmed in the Ravenna outbreak, it will be the first known episode of transmission of chikungunya virus by mosquitoes within Europe. The situation in Ireland and Europe is being kept under review.

HPSC has alerted relevant healthcare professionals and the Irish Blood Transfusion Service about the situation in Ravenna. In addition, a factsheet has been published and health protection advice for holidaymakers and their advisors is available at <http://www.ndsc.ie/hpsc/A-Z/Vectorborne/ChikungunyaFever/Factsheet/>.

HPSC is not advising travel restrictions at this time, merely that travellers take adequate steps to protect themselves, their children and dependents against the threat of biting mosquitoes when in the Ravenna area or in other parts of the world in which this vector is endemic. Pregnant women, those living with significant immunosuppressive disease, and patients suffering from severe chronic illness are being advised to consult their physicians prior to travelling to areas of high risk.

The National Virus Reference Laboratory in Ireland can provide the necessary diagnostics for suspected cases of chikungunya fever. Serological testing (IgM and IgG) and PCR on individuals who have suspicious symptoms can readily identify the presence of the virus and requires only a 10ml sample of clotted blood.

Discussion

This outbreak was detected in Italy by a very small number of doctors who became aware of a number of people with unusual symptoms. The reporting of this group of people with similar symptoms as a *syndrome outbreak* is what allowed this infection to be spotted at an earlier stage than it might otherwise have done. This underlines the value of syndromic surveillance and of practitioners reporting unusual symptoms or events promptly to their local departments of public health.

Further information can be found on the HPSC website at www.ndsc.ie/hpsc/A-Z/Vectorborne/ChikungunyaFever/ and the ECDC website at www.ecdc.eu.int/Health_topics/Chikungunya_Fever/Chikungunya_Fever.html.

Paul McKeown, HPSC

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Salmonellosis in Ireland, 2006

Introduction

Salmonellosis is one of the most common zoonotic diseases in humans in Ireland and worldwide. At present, over 2,460 serotypes of *Salmonella* have been identified. Two serotypes, however, *S. enterica* serotype Enteritidis and *S. enterica* serotype Typhimurium have accounted for the majority of cases of human salmonellosis in recent years.

Salmonellosis presents clinically as an acute enterocolitis, with sudden onset of headache, abdominal pain, diarrhoea, nausea and occasionally vomiting. Fever is almost always present. Dehydration, especially amongst vulnerable populations such as infants, the immunocompromised and the elderly, may be severe. *S. Typhi* and *S. Paratyphi* can cause enteric fever, a severe systemic life threatening condition, but this is very rare in Ireland and mainly travel-associated.

Salmonella is a zoonoses and a wide range of domestic, wild animals and birds, as well as humans, can act as the reservoir for this pathogen. Prevention, surveillance and control of *Salmonella* infections are of major public health importance.

Methods

The National Salmonella Reference Laboratory (NSRL) was established in 2000 in the Department of Medical Microbiology, University College Hospital, Galway. This laboratory accepts *S. enterica* isolates from all clinical and food laboratories in Ireland for serotyping, phage typing and antimicrobial susceptibility testing.

This report reviews data available from the NSRL and weekly events of salmonellosis extracted from the CIDR system for the year 2006. These data enable us to provide an overview of the epidemiology and burden of disease caused by *Salmonella* infections in Ireland today.

Results

Demographic information

There were 430 clinical isolates of *S. enterica* referred to NSRL in 2006. The female:male ratio was 1.3:1. The highest number of cases was seen in children under five years of age. When age-specific incidence rates were calculated (figure 1), the burden of illness in this age group was even more evident.

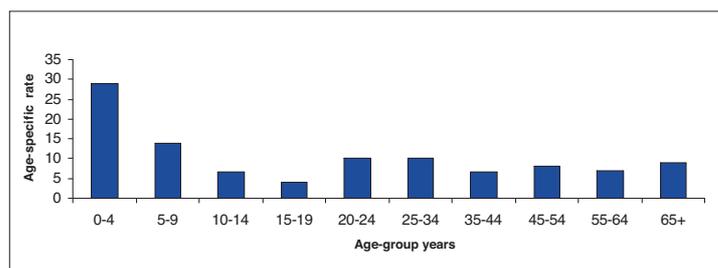


Figure 1. Age-specific incidence rate per 100,000 population of human salmonellosis in Ireland, 2006

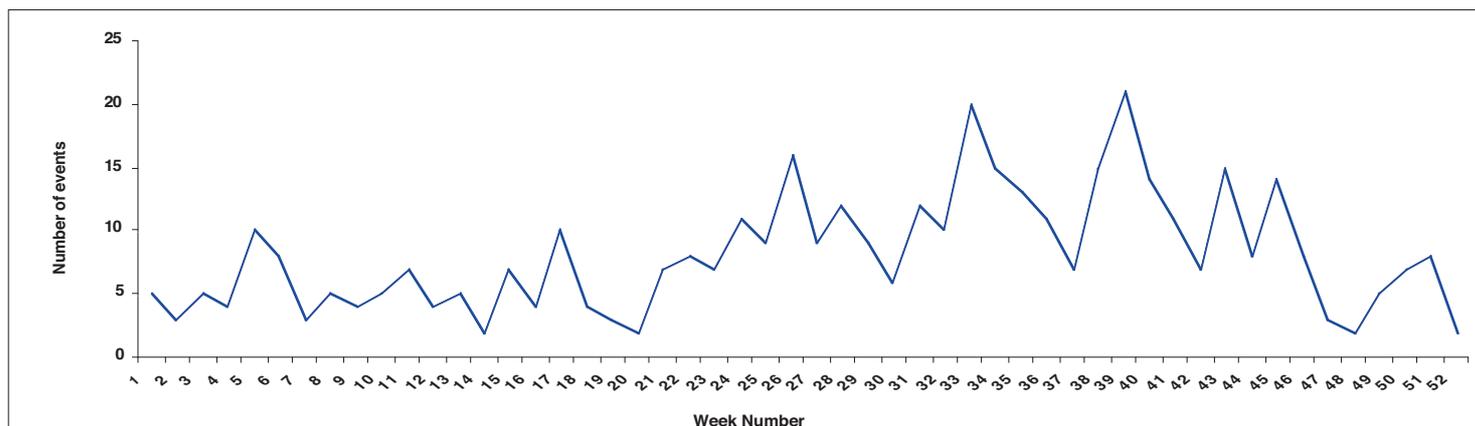


Figure 2. Number of salmonellosis notifications by week, 2006 (data from CIDR)

Seasonality

Analysis of the number of salmonellosis events notified to HPSC by week in 2006, revealed peaks in incidence from mid-August to October (figure 2). Seasonal peaks are typically seen each year at this time.

Serotyping, phage typing and antibiotic susceptibility results

Serotyping

As has been the trend in recent years, the predominant serotype causing human illness in 2006 was *S. Enteritidis* (n=158), followed by *S. Typhimurium* (n=101). Table 1 shows the changing shift in the more common serotypes in the past number of years. In 2006, after *S. Enteritidis* and *S. Typhimurium*, the next most commonly isolated serotypes were *S. Hadar* (n=11), *S. Infantis* (n=11) and *S. Virchow* (n=10). There were seven cases of *S. Typhi* and one isolate of *S. Paratyphi A* detected in 2006.

Table 1. Serotypes of *S. enterica* referred to NSRL, 2000-2006

Serotype	2000	2001	2002	2003	2004	2005	2006
<i>S. Enteritidis</i>	239 (36)	248 (46)	165 (40)	205 (42)	172 (41)	145 (41)	158 (37)
<i>S. Typhimurium</i>	284 (43)	165 (30)	140 (34)	135 (28)	125 (30)	85 (24)	101 (23)
<i>S. Agona</i>	6 (1)	2 (0)	5 (1)	5 (1)	2 (0.5)	10 (3)	5 (1)
<i>S. Virchow</i>	9 (1)	16 (3)	10 (2)	10 (2)	10 (2)	9 (3)	10 (2)
<i>S. Hadar</i>	11 (2)	4 (1)	6 (1)	21 (4)	4 (1)	8 (2)	11 (3)
<i>S. Dublin</i>	10 (2)	12 (2)	9 (2)	5 (1)	4 (1)	5 (1)	4 (1)
<i>S. Kentucky</i>	15 (2)	4 (1)	1 (0.2)	10 (2)	7 (2)	4 (1)	4 (1)
<i>S. Bredeney</i>	24 (4)	11 (2)	2 (0.5)	3 (1)	11 (3)	3 (1)	6 (2)
All others	63 (10)	81 (15)	78 (19)	92 (19)	83 (20)	88 (25)	131 (30)
Total	661	543	416	486	418	357	430

Phage typing

The predominant phage types of *S. Typhimurium* and *S. Enteritidis* are summarised in tables 2 and 3. The commonest phage type of *S. Typhimurium* reported in 2006 was DT104b (30%), followed by DT104 (25%). PT 4 was the commonest phage type of *S. Enteritidis* detected (21%). This was an increase from 2004 and 2005.

Travel-association

In 2006, 92 out of 430 isolates (21%) reported to NSRL were identified as being associated with travel outside of Ireland. The most commonly reported countries were Spain (n=17), India (6), Turkey (6), Croatia (5), Portugal (5), Tunisia (4) and Bulgaria (4). The popularity of a given destination is likely to be a significant factor in determining the number of cases of infection associated with that destination.

Table 2. Phage types of *S. Typhimurium* in human isolates, 2006

Phage type	No. of isolates (%)
DT104b	30 (30)
DT104	25 (25)
DT193	11 (11)
U302	7 (7)
DT41	4 (4)
DT2	2 (2)
DT85	2 (2)
Others	11 (11)
RDNC*	7 (7)
Unknown	2 (2)
Total	101

*RDNC – reacts but does not conform

Table 3. Phage types of *S. Enteritidis* in human isolates, 2006

Phage type	No. of isolates (%)
PT4	33 (21)
PT1	29 (18)
PT21	26 (16)
PT14b	19 (12)
PT8	17 (11)
PT6	4 (3)
PT3	4 (3)
PT5	3 (2)
PT6b	2 (1)
Others	7 (4)
Untypeable	2 (1)
RDNC*	11(7)
Unknown	1 (1)
Total	158

*RDNC – reacts but does not conform

Antimicrobial resistance

The antimicrobial susceptibility patterns of the most commonly isolated serotypes in 2006 are presented in table 4. The most notable feature of the data as in previous years was the significant percentage of *S. Typhimurium* isolates which were multi-drug resistant (four or more antibiotics). High levels of the penta-resistance phenotype ACSSuT were seen among *S. Typhimurium*, predominantly DT104 or closely related groups.

Table 4. Antimicrobial susceptibilities of human *Salmonella enterica* serotypes isolated in Ireland in 2006 (NSRL)

Serotype	% resistance						
	Amp	Chl	Strep	Sulph	Tet	Trim	Nal
Enteritidis (158)	8	0.6	2	2	0.6	0.6	0
Typhimurium (101)	69	58	64	68	66	6	6
Agona (5)	20	0	20	40	20	0	40
Virchow (10)	30	20	30	60	50	60	100
Hadar (11)	45	0	100	18	100	18	45
Stanley (6)	33	0	50	50	50	33	0
Typhi (7)	43	43	43	43	0	43	57
Kentucky (4)	25	0	25	25	25	0	25
Bredeney (6)	0	0	0	0	0	0	0

Amp = Ampicillin, Chl = Chloramphenicol, Strep = Streptomycin, Sulph = Sulphonamide, Tet = Tetracycline, Trim = Trimethoprim, Nal = Naladixic acid

Clinical notification data

There were 422 salmonellosis events on CIDR in 2006 giving a crude incidence rate of 10.0 per 100,000 population, which was an increase in the rate observed in 2005 (8.4/100,000) (figure 3). In 2006, the highest incidence was reported from the HSE North West and the lowest rate from the HSE South East.

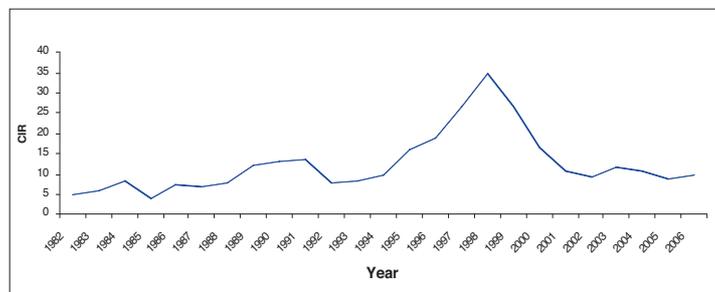


Figure 3. Crude rate of salmonellosis in Ireland per 100,000 population, 1982-2006 (CIDR)

Outbreaks

In 2006, there were 20 outbreaks of *S. enterica* notified; five general and 15 family outbreaks. All of these were small outbreaks, with no more than five persons reported ill in any outbreak. Eleven of the outbreaks were reported to have been associated with travel outside of Ireland. Of the general outbreaks, one was associated with a crèche and four were travel-associated.

Discussion

Salmonella enterica continues to be an extremely significant cause of gastroenteritis in Ireland, with an increase in the incidence of salmonellosis in 2006 (10.0/100,000 population) compared to 2005 (8.4/100,000). A similar incidence was reported in Northern Ireland¹ in 2006 (11.7/100,000), but higher rates were reported from England and Wales² (23.2/100,000) (provisional) and Scotland³ (20.3/100,000).

Many of the demographic features of the disease are quite consistent from year to year. However, there were slightly more female than male cases in 2006 (ratio 1.3:1.0). All age groups were affected in 2006 but, as seen in previous years, the highest incidence was noted in children less than five years of age. There is probably a bias here linked to more specimens being submitted from this age group for testing.

Analysis of serotyping data in 2006 revealed that there were 65 different serotypes identified by NSRL. Over a fifth of cases (21%) were reported to be associated with foreign travel in 2006. This is undoubtedly an under-estimate and it is thought that many of the more unusual serotypes detected are acquired abroad. *S. Enteritidis* and *S. Typhimurium* remain the commonest serotypes detected being identified in 60% of isolates in 2006.

From 2004 to 2006, there was a change in trend of *S. Enteritidis* phage types with non-PT4 types being more common. However, in 2006, PT4 emerged again as the most common phage type, contributing to 21% of all *S. Enteritidis* isolates. This is quite a notable increase from 13% in 2005. This phage type is primarily associated with egg and egg products.

In 2006, the NSRL launched a new molecular method for the analysis of *S. Typhimurium* DT104. PFGE has been shown to be of very limited value in subdividing DT104 isolates into smaller groups. The new method 'multiple-locus variable number tandem-repeat analysis', often referred to as MLVA is based on repetitive DNA sequences called variable number of tandem repeats (VNTR).⁴ Initial results from NSRL are very promising and this method should enhance the surveillance and outbreak detection of *Salmonella Typhimurium* in Ireland.

The array of typing methods now being performed by the NSRL continues to be an extremely discriminatory tool for outbreak detection especially for our commonest serovars, *S. Enteritidis* and *S. Typhimurium*.

A National Zoonoses Committee has been recently established in Ireland. It is hoped that through harmonisation of surveillance of *Salmonella* in animals, feed, food and humans, efforts can be targeted to control this zoonotic agent, which still accounts for a significant burden of illness in Ireland each year.

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Background

During 2005, an estimated 4.1 million people worldwide became newly infected with HIV and an estimated 2.8 million lost their lives to AIDS.¹ HIV infection remains a disease of major public health importance in the WHO European Region. Timely and complete HIV surveillance data are essential to accurately monitor trends in the epidemic. Data on HIV and AIDS in Ireland are obtained from the national HIV case based reporting system, a voluntary anonymised surveillance system.

HIV infections, to end of 2006

By the end of 2006, 4,419 diagnoses of HIV were reported in Ireland since surveillance began. The number of newly diagnosed HIV infections increased considerably from 120 cases in 1998 to a peak of 399 cases in 2003 followed by a decrease to 356 cases in 2004 and 318 cases in 2005. The number of newly diagnosed HIV infections has increased to 337 in 2006, representing a 6% increase on 2005 figures. These trends should be interpreted with caution as they do not represent HIV incidence and are dependent on uptake of HIV testing. As the presence of a sexually transmitted infection (STI) facilitates the transmission and acquisition of HIV, the ongoing increase in annual notifications of STIs (from 2,588 in 1994 to 10,142 in 2005) is of concern.^{2,3}

Figure 1 shows newly diagnosed HIV cases from 1994 to 2006 by probable route of transmission for the three most frequent routes, namely, heterosexual contact, men who have sex with men (MSM) and injecting drug users (IDUs). During 2006, probable route of transmission was categorised as 'other' for three newly diagnosed cases (0.9%) and information on probable route of transmission was unavailable for 22 cases (6.5%).

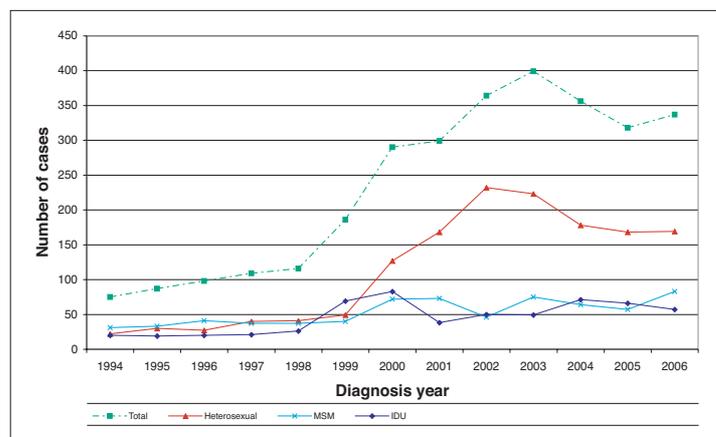


Figure 1. Annual number of HIV infections, 1994 to 2006

Heterosexual contact

Heterosexually-acquired cases have decreased from a peak of 232 in 2002 to 168 in 2005 and 169 in 2006. This is largely due to a decrease in heterosexually-acquired cases among people born in sub-Saharan Africa (SSA) from 183 cases in 2003 to 104 in 2006. This may reflect the decrease in the number of asylum seeker applications between 2002 and 2006 (from 11,634 to 4,314), with possibly fewer cases being detected through the asylum seeker screening programme. However, it is important to remember that people coming to Ireland from SSA do not form a homogeneous group and include students, immigrant workers, refugees, economic migrants, asylum seekers and others. The number of new diagnoses among heterosexuals born in Ireland remained steady between 2002 and 2006 with an average of 31 cases per year. Currently, heterosexual contact is the most frequent mode of transmission in most countries in western Europe.⁴

Of the 169 heterosexual cases in 2006, there were 95 females and 74 males. The mean age was 34.1 years. Seventeen (10.1%) of the 169

heterosexual cases diagnosed in 2006 were diagnosed late i.e. diagnosed with AIDS at the time of HIV diagnosis. Of these 17 late diagnoses in heterosexuals, 13 were born in SSA. Diagnosing HIV as soon as possible is vital for both the individual and the community and provides an opportunity for early intervention and treatment.

Men who have sex with men

There were 83 new diagnoses among MSM during 2006, an increase from the number diagnosed in 2005 (57 cases) and 2004 (64 cases). MSM continue to be a population at high risk for HIV infection and the number of HIV cases among MSM has increased by 55% between 1998 and 2005 in western European countries which report transmission group to EuroHIV.⁴ The mean age at HIV diagnosis in MSM in 2006 was 36.3 years. Of the 83 cases diagnosed in 2006, 57 (68.7%) were born in Ireland and 10 (12.0%) in western Europe. Six (7.2%) of the 83 cases in MSM were diagnosed late.

Injecting drug use

There were 57 new diagnoses among IDUs during 2006. There was a considerable jump in the number of cases in IDUs between 1998 and 1999 (from 26 to 69) with an average number of 60 cases per year since then. Of the 57 cases, 35 (61.4%) were born in Ireland, 41 (72%) were male and the mean age at HIV diagnosis was 32.2 years. Four (7.0%) of the 57 cases in IDUs were diagnosed late.

Mother to child transmission

HIV infection was newly diagnosed in three children in 2006. The probable route of transmission for two cases was mother to child transmission (MCT) but was unknown for the third case whose country of birth was SSA. The mothers of the two MCT cases were both born in countries with generalised HIV epidemics and were diagnosed after the birth of the child. In addition, there were 115 babies born to a HIV infected mother during 2006: 72 are not infected and 43 remain of indeterminate status (i.e. do not meet the criteria for HIV infection and are <18 months at time of test).

AIDS cases and deaths, to end of 2006

A total of 909 AIDS cases, including 194 (21.3%) in females, have been reported to the end of 2006. Of the 909 AIDS cases, 397 (43.7%) are reported to have died. The total number of deaths in HIV infected individuals (with or without an AIDS diagnosis) reported to the end of 2006 is 451. It is important to note that there is considerable underreporting and late reporting of AIDS cases and deaths among HIV and AIDS cases.

More detailed HIV and AIDS reports are available on the HPSC website at <http://www.ndsc.ie/hpsc/A-Z/HepatitisHIVAIDSandSTIs/HIVandAIDS/Publications/>.

Sarah Jackson, HPSC

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