OUTBREAK OF INVASIVE MENINGOCOCCAL DISEASE AMONG SOLDIERS IN SKWIERZYNA, POLAND, MARCH 2006

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Published online 6 July 2006
Citation: Euro Surveill 2006;11(7):E060706.4.
Available from
http://www.eurosurveillance.org/ew/2006/060706.asp#4

The outbreak

Four cases of invasive meningococcal disease were reported between 22 and 24 March 2006 in newly recruited soldiers in Skwierzyna in Lubuskie, a western province of Poland. Two soldiers had been referred to a physician on 21 March with influenza-like symptoms, and one of them had consulted a physician in a local hospital, but was not admitted to hospital for treatment. On 22 March both soldiers had sudden onset of petechial rash, general discomfort and fever. They were immediately admitted to the intensive care unit of the regional hospital in Gorzow Wielkopolski. A third soldier had similar symptoms of malaise and signs of meningeal irritation on 23 March. He was admitted to the local hospital for observation, where he developed a petechial rash. A fourth soldier developed pharyngitis on 23 March, and was also admitted to the local hospital for observation, where he developed severe headache and vomiting on 24 March. Both soldiers were admitted to the intensive care unit in Gorzow Wielkopolski immediately after symptom onset. Preliminary investigation of blood and cerebrospinal fluid samples at the National Reference Centre for Bacterial Meningitis revealed that all cases were caused by *Neisseria meningitidis* serotype C.

Further investigations

An investigation was begun, led by epidemiologists at the Wojewodzki Osrodek Medycyny Prewencyjnej (Military Preventive Medicine Centre) in Wroclaw. The laboratory facilities of three military centres (Wroclaw, Bydgoszcz and Krakow) and the provincial Sanitary-Epidemiological Station in Gorzow Wielkopolski were used for this investigation. All four soldiers had recently been recruited to this army unit and had lived in the army barracks for 14 days. If the sub-unit living in the barrack is considered as the exposed group, the overall attack rate was 4/250 (1.6%). The affected soldiers lived in four different rooms on the same corridor (Table 1).

Investigation of throat swabs collected from close contacts (roommates, n=61)) between 23 and 27 March revealed that six were carriers of N. meningitidis serotype C. Molecular typing indicated that strains collected from all four cases and six contacts were identical (serogroup C, clonal type ST11/ET37, serotype PFGE A2) and were identical to a strain isolated in 2005 from a soldier residing in the same army unit. Samples collected from all other residents of the Skwierzyna Army Unit (n=1300) allowed isolation of different *N. meningitidis* strains.

Control measures

The affected army sub-unit was quarantined from 24 March until 4 April and all soldiers of this sub-unit (n=250) received prophylactic treatment of 500 mg of ciprofloxacin. After confirmation of the bacterial strain causing the outbreak, prophylactic treatment was extended to all residents of the unit, including civil personnel (n=1300). Movement of soldiers within and outside the army unit was restricted between 21 March and 4 April. All staff members in the intensive care unit in Gorzow Wielkopolski were given rifampicin as prophylactic treatment.

Discussion

Invasive meningococcal disease is an acute bacterial disease, characterised by early onset of symptoms of meningitis, septicaemia and/or other syndromes, and a moderate to high case-fatality rate [1]. In recent years, the incidence of meningococcal disease has been decreasing in Poland, but the proportion of cases caused by group C strains has been increasing (Table 2), causing small-scale outbreaks each year [2]. The incidence of meningococcal disease is underestimated in Poland. Surveillance of the disease was implemented in the 1970s, and was based on passive reporting of diagnosed cases by physicians to local health departments. Up to 2004, only neuroinfection cases were reported. Since 2004, all cases of meningococcal disease have been mandatorily reportable. Meningococcal vaccine is recommended for children over 2 months of age, and for all people without a spleen, but is not available free of charge. According to recent official data, fewer than 2000 doses of meningococcal vaccine have been administered each year. Meningococcal vaccine uptake is low compared with other vaccines which are also not usually available free of charge, such as *Haemophilus influenzae* b (given to 7% of children under 4 years in 2004) influenza (over 1.3 million doses given to people of all ages in 2004), streptococcal vaccine (given to 6658 people in 2005) and chickenpox vaccine (given to 4452 people in 2005). Poland's routine childhood immunisation schedule can be seen at the World Health Organization's Centralized Information System for Infectious Diseases (CISID) website (http://data.euro.who.int/cisid/)

The outbreak described here was extensively reported in the Polish media, making the investigation and implementation of control measures very difficult. All four patients were severely ill with fulminant septicaemia (three cases) or meningitis (one case), but there were no deaths. The index patient is still in intensive care and a rehabilitation of several months is foreseen.

TABLE 1

Number of soldiers at risk and attack rates by barrack room, Skwierzyna Army Unit, Poland, 21-23 March 2006

Room number	Area (m²)	No. of soldiers sleeping in room	No. of cases	Attack rate
1	38	18	1	5.60%
2	36	16	1	6.30%
3	36	16	1	6.30%
4	38	15	1	6.70%

TABLE 2

Officially reported cases of meningitis caused by *N. meningitidis*, Poland, 1996-2004 [3]

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number of cases	144	140	129	121	110	100	90	76	119
Incidence per 100 000 inhabitants	0.4	0.4	0.34	0.33	0.28	0.27	0.24	0.2	0.31
Proportion of cases with serogroup confirmed	29.9	36.4	41.9	38.8	35.5	25	24.44	51.3	58
Proportion of serogroup C	23%	18%	9%	11%	18%	28%	32%	36%	27%

Since this is not the first outbreak of invasive meningococcal disease among newly recruited soldiers in Poland, a discussion of how to protect this population group has begun at national level, expressing a need to better monitor their health status and adopt procedures for immediate prophylaxis and treatment. Other countries, such as the United Kingdom, have introduced vaccination against meningococcal disease after establishing that armed forces recruits had a significantly increased risk of disease when compared with age-matched civilian counterparts [4].

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Twenty years of active paediatric surveillance in the UK and Republic of Ireland

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Published online 20 July 2006
Citation: Euro Surveill 2006;11(7):E060720.4.
Available from
http://www.eurosurveillance.org/ew/2006/060720.asp#4

In July 2006 the British Paediatric Surveillance Unit (BPSU, http://bpsu.inopsu.com/) celebrated its twentieth year of surveillance. The unit was founded in 1986 by the Public Health Laboratory Service (now the Health Protection Agency), the Royal College of Paediatrics and Child Health, the Institute of Child Health (London), the Royal College of Physicians (Ireland) and the Scottish Centre for Infection and Environmental Health (now Health Protection Scotland). The unit's aim was, and is, to undertake surveillance of rare conditions in childhood (0 to 15 years), including infections, and to provide a mechanism to rapidly investigate acute public health events affecting children.[1] The unit was created to address concerns from paediatricians and communicable disease consultants that conditions such as Reye's syndrome, haemolytic uraemic syndrome (HUS), Kawasaki disease and the then newly emerging condition of paediatric-AIDS were not being reported to existing 'passive' surveillance systems in sufficient numbers to enable meaningful analyses of data. The BPSU therefore set about establishing an 'active' surveillance system, seeking monthly reports from all consultant paediatricians in the United Kingdom and Ireland. Clinicians are asked to report any cases from a menu of conditions listed on the monthly report card and are asked to choose 'nothing to report' if no cases had been seen.

This active surveillance system has encompassed over 70 conditions during its first 20 years of operation, many of which have been related to infection. Compliance with reporting to the system has been high, with an average of over 90% of monthly reports completed per year [1].

The effectiveness of the BPSU's surveillance methodology has had a major impact on national policy on infectious diseases and related conditions. The BPSU has made important contributions to the monitoring of childhood diseases targeted by vaccination programmes as well as the safety of vaccines. Findings from reports of meningoencephalitis after MMR contributed to the withdrawal of the Urabe strain of the vaccine's mumps component [2]. Reports of congenital rubella contribute to monitoring the effectiveness of the national immunisation programme and the impact of the recent decline in coverage of MMR vaccination in the UK [3]. Surveillance of subacute sclerosing panencephalitis undertaken through the BPSU over 15 years, has provided good evidence that this known complication of measles infection is not associated with receipt of the measles component of the MMR vaccine [4]. BPSU data have contributed to evaluation of the effectiveness of the newly introduced *Haemophilus influenzae* b vaccine. Finally, a study of the incidence and severity of varicella infection in children admitted to hospital provided a baseline of the disease burden due to this infection in the pre-vaccination era and contributed to informing the development of national vaccination policy [5].

Throughout its history the BPSU has also provided a mechanism for responding to and investigating emerging public health concerns. Emerging diseases are usually rare and may remain unrecognised, potentially allowing the condition to spread. The HUS survey, undertaken in the 1980s through the BPSU, was one of the first studies to confirm the link between *Escherichia coli* 0157 and paediatric HUS in the UK. The study was replicated in the late 1990s in response to the Pennington Report [6], which highlighted the effectiveness of the BPSU methodology in identifying *E. coli* 0157 outbreaks. In 1997, a BPSU study clarified that diagnosed hepatitis C in children was largely the result of horizontal transmission through blood products rather than vertical transmission from mother to child [7]. More recently, childhood tuberculosis and malaria infection have been included in BPSU surveillance. In response to public health concern about the potential impact of variant Creutzfeld-Jakob disease (vCJD) on children in the UK, the BPSU is currently undertaking surveillance for cases of progressive intellectual and neurological deterioration in order to identify cases of vCJD and has reported six cases in children since 1997 [8].

Findings from the BPSU have influenced national screening policies. The BPSU's surveillance of HIV in children contributed to the policy introduced in England in 2000 to offer antenatal screening to all pregnant women [9]. Information about disease prevalence and the burden of disease for other neonatal and congenital infections, such as toxoplasmosis, herpes simplex and Group b streptococcal infections, has contributed to decisions not to initiate screening programmes for these conditions.

In summary, on review after 20 years of operation, there is evidence that the system is acceptable, sustainable and is producing high quality data about a range of relatively rare but important childhood conditions that are informing and influencing a variety of activities concerned with child health in the UK. The success of the BPSU surveillance system has encouraged similar surveillance schemes in the UK and abroad. In 1998, the International Network of Paediatric Surveillance Units (INoPSU, http://www.inopsu.com/) was established. This network now covers 14 countries (including eight within the European Union), and involves 10 000 paediatricians covering a population of 50 million children [10].

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