Mass immunisation campaign in a Roma settled community created an opportunity to estimate its size and measles vaccination uptake, Poland, 2009

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During a mass immunisation campaign following an outbreak of measles in a Roma community settled in the town of Pulawy, Poland, we performed an estimation of the size of this Roma population and an assessment of its vaccination uptake. We obtained a list of Roma residing in Pulawy from the local municipality and estimated using a simple capture-recapture formula that Pulawy had 377 Roma residents (43% under 20 years old), which was 27% more than the 295 registered at the municipality. During the vaccination campaign, demographic information was recorded that could be linked to information from the municipality list as well as to prior immunisation status. Among the people whose data were recorded during the vaccination campaign, 14% were not registered at the primary healthcare centres, and were therefore deprived of access to healthcare. Among 102 screened subjects under the age of 20 years, 51% were vaccinated according to schedule. Vaccine uptake for the first dose of measles-containing vaccine was 56% (54/96) and for the second dose 37% (18/49). The present study indicates the need to get a better demographic overview of Roma communities living in Poland and to understand the barriers limiting their access to healthcare and social services. Organisation of catch-up immunisations of this vulnerable population is necessary.

Background

From 2003 to 2005, Poland was approaching the World Health Organisation's measles elimination target, with the recorded incidence of locally-acquired cases below one per million inhabitants. In 2008 and 2009, several measles outbreaks were notified in Poland, many of which were related to cases imported from United Kingdom [1]. Also in other European countries, an increase in measles incidence was observed in those years, mainly due to ongoing transmission among different vulnerable populations [2-4].

Vaccination against measles is mandatory and free of charge in Poland. Since 1975 the first dose of monovalent measles vaccine had been recommended at the age of 13-15 months, and in 1991 a recommendation for the second dose at the age of six years was introduced. Since 2004, the vaccine has been given as the combined measles-mumps-rubella (MMR) vaccine at the age of 13-15 months and 10 years. In 2008, the national vaccination coverage for measles for three year old children with the first dose was 98% and for 11 year-olds with the second dose 97% [5]. The vaccination coverage in high-risk groups or in any sub-populations in Poland is not routinely assessed.

From 22 June to 30 August 2009, an outbreak of measles with 41 registered cases occurred in a Roma community in the town of Pulawy in eastern Poland [6]. An interventional vaccination campaign was organised in the affected community in order to stop further spread of measles. The objective of the present study was to estimate the size and age distribution of the Roma population in Pulawy based on data collected during the mass immunisation, and to assess prior vaccination coverage against measles in the studied population.

Methods

To estimate the size of the Roma community in Pulawy, we obtained the list of Roma residents registered at the local administrative authority of the municipality of Pulawy (status: mid-July 2009), including the social security number (PESEL), name, surname, sex, date of birth and address of residence. According to Polish law, each person residing in a given location for a period exceeding two months has to be registered at the local municipality. Residents registered at the municipality are entitled to social benefits and have access to school and healthcare systems. The list from the municipality included the Roma ethnic status, which was additionally verified by the municipality administrators responsible for Roma ethnic minority.

During the vaccination campaign, which was organised at the beginning of August 2009, we recorded the demographic information, prior vaccination status, the registration rate at a primary healthcare centre and registration at the municipality. The immunisation campaign was organised at a local healthcare unit. It was advertised by social workers going from house to house within the Roma community, through newspaper and website advertisements in Polish language and through regional Roma leaders. During the campaign, immunisation was offered to Roma residents between the age of nine months and 60 years.

The capture-recapture method was used to estimate the population size and age distribution of the community. Because of high mobility of the Roma communities, it was assumed that only part of the Roma residents were registered at the local municipality. Therefore, the campaign was considered as an opportunity of re-capturing some of the persons who were not registered. The following standard formula was used for the calculation:

$$\text{Estimated Roma population} = \frac{\text{(Registered at municipality) x (Attending mass immunisation)}}{\text{Registered individuals attending mass immunisation}}$$

The immunisation status recorded during the vaccination campaign was further verified with actual documentation from general practitioners. Because of incomplete documentation for adults, which is true for all Polish citizens, the present analysis of vaccine uptake was limited to individuals under the age of 20 years.

Results

Description of the studied community

The capture-recapture assessment is summarised in Table 1. Altogether, 297 Roma (130 persons <20 years) were registered in the Pulawy municipality. From 195 attendants at the vaccination campaign, 156 (82 subjects <20 years) were registered. Based on our performed computation, the estimated size of Roma population in Pulawy was 377 persons (162 subjects <20 years), which was 27% more than the registered population.

The age-by-sex distribution of the estimated population of Roma residents was compared to the official statistics for the entire population of Poland (Figure 1). Altogether, 39 of 195 (20%) Roma attending the vaccination campaign were not registered in the municipality, including 20 of 102 persons under the age of 20 years (20%). In addition, 27 of 195 Roma (14%), including 20 of 102 under the age of 20 years (20%), were not registered in any of the primary healthcare facilities in Pulawy.

Sporadic unstructured interviews with members of the studied community indicated that it was common practice for young people or families with children to live for several weeks to several months with relatives in another community in Poland or abroad.

Assessment of vaccination coverage

In total, 102 persons under the age of 20 years attended the vaccination campaign. Five were younger than 13 months, which constitutes the age limit of the first vaccination according to the national schedule and were therefore excluded from the denominator. Vaccine uptake for the first dose was 56% (54/97) and for the second dose 37% (18/49) (Table 2).

Among the screened subjects under the age of 20 years, 51% were vaccinated according to the national schedule (Figure 2). Considering the previously estimated size of the Roma population under 20 years of age, this would mean that 83 persons in the studied population were insufficiently vaccinated.

Table 1

Estimation of Roma population size, Pulawy, Poland, July-August 2009

	Age (years)									Total
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	
Registered at municipality	63	67	49	40	43	26	4	4	1	**297**
Male	21	36	22	17	25	11	1	0	0	**133**
Female	42	31	27	23	18	15	3	4	1	**164**
Attending mass vaccination	50	52	26	24	19	24	0	0	0	**195**
Male	19	30	9	10	9	12	0	0	0	**89**
% registered	68	87	78	50	78	75	0	0	0	**75**
Female	31	22	17	14	10	12	0	0	0	**106**
% registered	84	77	77	93	90	92	0	0	0	**84**
Estimated Roma population	81	82	63	59	52	31	4	4	1	**377**
Male	31	42	28	34	32	15	1	0	0	**183**
Female	50	40	35	25	20	16	3	4	1	**194**

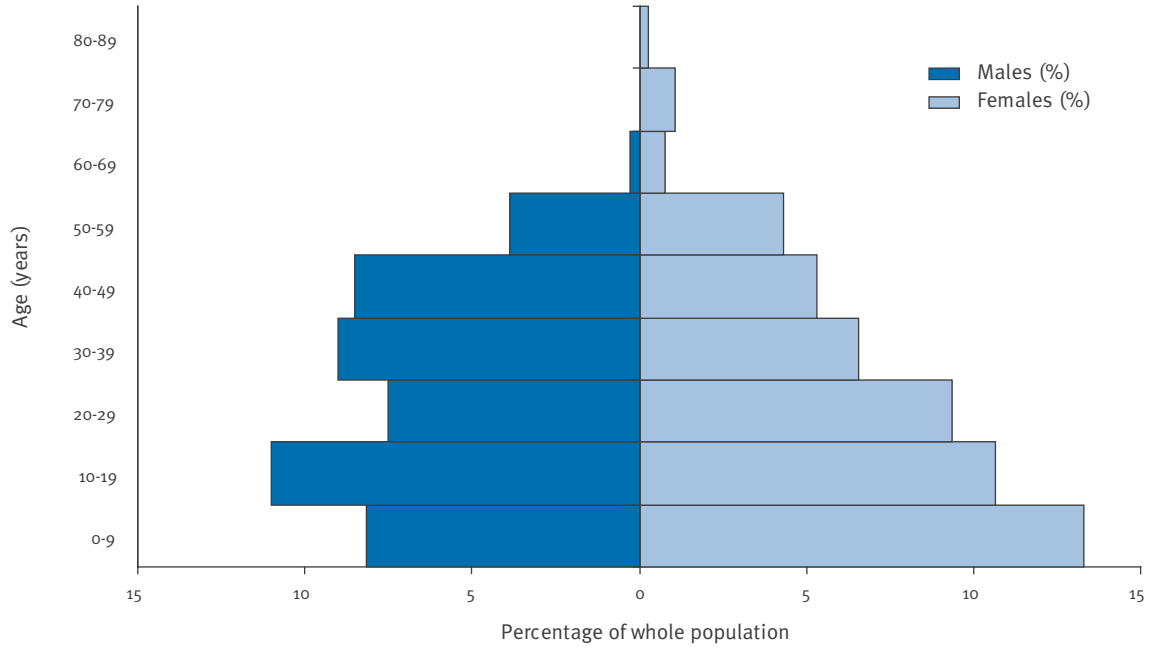
Discussion

One of the possible limitations of this study is the low representativeness of the evaluated Roma population. Roma communities greatly differ in terms of size and integration with the local population, and are usually quite mobile. We attempted to evaluate the population settled in a single town, which could be captured during a mass immunisation event. A considerable number of Roma residents attended the campaign because the event was organised in proximity to the Roma settlements and measles was recognised as a potentially severe disease after one of the early cases in this outbreak had developed serious complications [6]. In addition, persons aged 60 years and older were not captured during the mass immunisation, thus

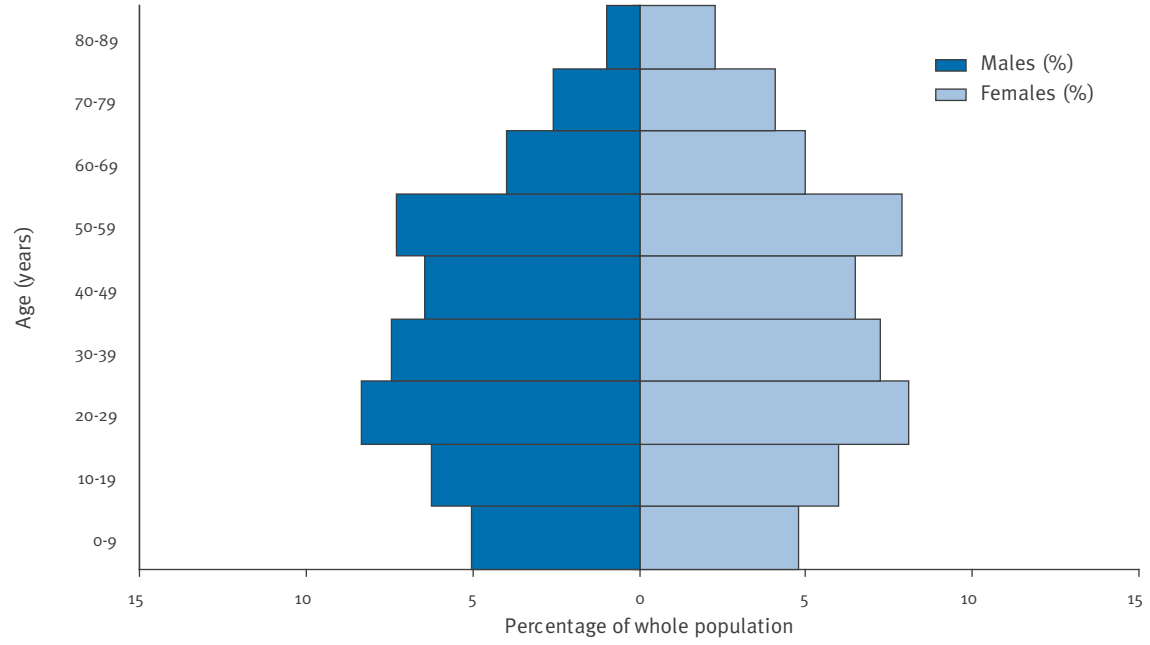
Figure 1

Age-by-sex distribution of the estimated Roma population of Pulawy (a), compared with the population of Poland as a whole (b), 2009

(a) Roma community in Pulawy, August 2009



(b) Polish population, census 30 June 2009



Note: The population older than 60 years was underestimated because they were not invited for the mass immunisation (recapture opportunity).

Table 2

Immunisation status[a] of Roma residents under the age of 20 years, as recorded during mass vaccination campaign, Pulawy, Poland, July-August 2009 (n=102)

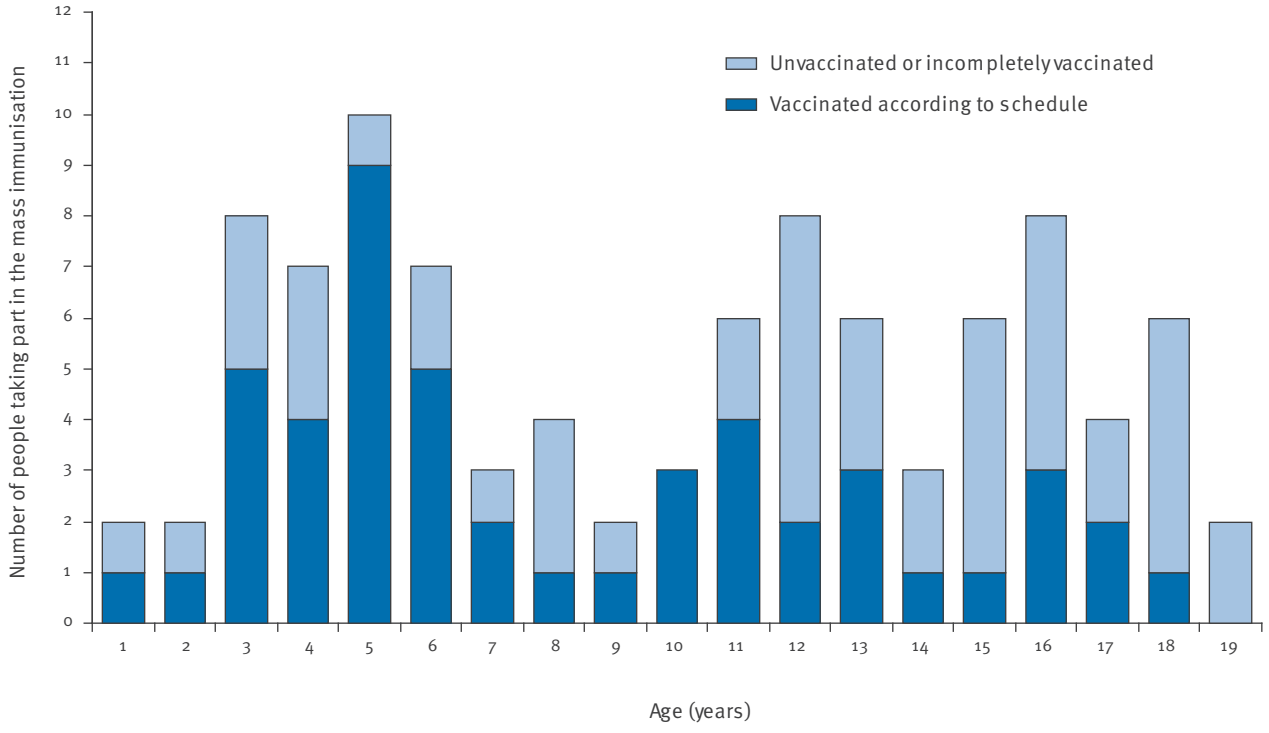
Year of birth	Age (years)	Number of prior doses					Total number of children	1-dose uptake	2-dose uptake
		0	1	2	3	Unknown			
2009	0	2[b]				1[b]	3[b]	-	-
2008	1	3[b]	1				4[b]	1 of 2	-
2007	2	1	1				2	1 of 2	-
2006	3	3	5				8	5 of 8	-
2005	4	2	4			1	7	4 of 7	-
2004	5	1	9				10	9 of 10	-
2003	6	1	5			1	7	5 of 7	-
2002	7	1	2				3	2 of 3	-
2001	8		1			3	4	1 of 4	-
2000	9		1			1	2	1 of 2	-
1999	10		2		1		3	3 of 3	1 of 3
1998	11		1	4		1	6	5 of 6	4 of 6
1997	12	2	1	1	1	3	8	3 of 8	2 of 8
1996	13		1	2	1	2	6	4 of 6	3 of 6
1995	14			1		2	3	1 of 3	1 of 3
1994	15	2	2	1		1	6	3 of 6	1 of 6
1993	16			3		5	8	3 of 8	3 of 8
1992	17	1		2		1	4	2 of 4	2 of 4
1991	18			1		5	6	1 of 6	1 of 6
1990	19					2	2	0 of 2	0 of 2
Total		**19**	**36**	**15**	**3**	**29**	**102**	**56%**	**37%**

[a] Immunisation status prior to any vaccinations received during the campaign.

[b] Children below legal age of first dose (12-15 months)

Figure 2

Vaccine uptake in the Roma population by age, Pulawy, Poland, July-August 2009 (n=97)



limiting the precision of estimates for older residents. Moreover, participation in the campaign was not independent of registration in the municipality. Therefore it is likely that the crucial assumption for the capture-recapture computation was not met.

We have no definite explanation why 20% of residents were not registered at the municipality. It could be explained by barriers to social services identified in previous studies, such as the high mobility of Roma communities, their stigmatisation, marginalisation and/or discrimination [6]. Another plausible explanation could be that several Roma residents from nearby communities may have come to Pulawy specifically to receive the vaccine injection. In any case, the present analysis illustrates that a considerable proportion of Roma are not officially registered, and therefore have limited access to social benefits including healthcare. Individuals who are not registered cannot find a legal job and cannot obtain health insurance. In theory everyone under the age of 18 years has free access to healthcare in Poland, irrespective of nationality and health insurance. The large number of attendants of the mass immunisation who were not registered in primary healthcare indicates, however, that those children did not have access to regular health checks, vaccination services or any kind of prophylactic programmes.

Another consequence of a substantial part of the Roma community not being registered could be underestimation of the size of the Roma population living in Poland. Lack of a good demographic overview of the local ethnic minorities makes it impossible to develop targeted social and public health programmes which would fit the needs of those vulnerable groups. According to the official national census data collected in 2002, 12,731 persons belonging to the Roma ethnic minority were living in Poland (0.033% of the population). This figure was mainly based on settled communities that the census could reach. The real number of Roma residents in Poland is probably higher, as illustrated in review published in 2000 [8]. The Roma ethnic group is the largest minority in several central and eastern European countries, comprising approximately seven million people [7]. In addition to a lack of research, interpretation of the literature is hampered by the absence of a standard definition of who is, and who is not, Roma [9].

The presented estimates indicate that the studied Roma population was young, with 61% of residents younger than 30 years. The demographic pyramid differs greatly from that of the overall population in Poland and the populations of most European countries. Because Roma communities have many children, they are good reservoirs for childhood infectious diseases. Access to healthcare and integration with health systems including immunisation programmes should be equal for all citizens of Poland irrespective of ethnicity.

An assessment of the measles vaccine uptake in the Roma population revealed a very low coverage with the second dose in the studied community. High vaccine uptake was observed in 5-7 year-olds, and 10-11 year-olds and may be related to health checks before entry to primary school (six-year-olds) and secondary school (12-year-olds).

The present findings are probably an indication of that the measles vaccination coverage among other Roma communities in Poland, and supposedly in other European countries may also be low. Populations with low vaccination coverage impede measles elimination in Europe. The current goal encompasses stopping transmission of indigenous measles by 2010 [10]. To reach this goal in Poland, a stronger commitment by decision makers to improve vaccination coverage in all sections of the population is needed and innovative measures to reach vulnerable groups should be explored.

Conclusions and Recommendations

1. We recommend an assessment of the size and vaccination status of Roma communities living in Poland to better integrate them in healthcare services including immunisation programmes. It will be necessary to approach Roma leaders and to understand the needs and motivations of this large ethnic minority.
2. Factors influencing low vaccination of Roma communities need to be assessed to better target health education campaigns.
3. Catch-up immunisations in Roma communities should be organised, including all age groups.

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