

INTENSITY OF THE PHENOMENON OF REFUSAL TO SUBJECT CHILDREN TO PREVENTIVE VACCINATIONS IN THE YEARS 2002-2016 BASED ON ANALYSIS OF PRIMARY HEALTH CARE MEDICAL RECORDS

LUCYNA SOCHOCKA^{1 A,C-G}

• ORCID: 0000-0002-8158-6140

ANNA WIDERA^{1,2 A-F}

KATARZYNA SZWAMEL^{1,3 D,E}

¹ Faculty of Medical Sciences, Department of Nursing, Opole Medical School, Poland

² "Vita" Non-Public Health Care Unit Okos, Horbowy-Hordyńska, Partnership Company of Doctors, Opole, Poland

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ABSTRACT

Background: Vaccinations are the most effective method for preventing infectious diseases. Massive implementation of long-term vaccinations strategies has resulted in elimination or a reduced incidence of many infectious diseases.

Aim of the study: To evaluate the intensity of the phenomenon of refusal to subject children to preventive vaccinations by attempting to characterize the parental group who refuse to vaccinate their children, determining the type and number of unrealized vaccinations, and identifying the reasons for being unvaccinated.

Material and methods: The research material was medical records from the Non-Public Health Care Unit in Opole. It concerned implementation of the Protective Vaccine Program over the years 2002-2016. A method of retrospective analysis of medical records using modern technology was applied.

Results: The phenomenon of refusal to subject children to preventive vaccinations is increasing. In the years 2002-2016, our retrospective analysis identified that 81 vaccinations (0.8% of the 10,057 vaccinations) were not carried out. The largest percentage of unrealized vaccinations involved hepatitis B (23.4%). Parents refusing to vaccinate their children were adults (Median = 31 years old, range: 27-36 years) and predominantly living in cities (87.88%). The reasons for abandoning mandatory vaccinations were not reporting with a child for vaccination (48.1%), deliberate refusal to subject a child to the vaccination (28.4%) and postponement of vaccination due to contraindications (23.5%).

Conclusions: The vaccination coverage level in the study area was assessed as satisfactory and is comparable to the results obtained on the national scale. The scale of the refusal for preventive vaccinations is not an epidemiological threat currently. However, it requires constant monitoring, and educational and information actions directed at parents/guardians.

KEYWORDS: vaccination, public health, preventive medicine

BACKGROUND

The first vaccination campaigns in Poland date back to the beginning of the 19th century and involved protection against smallpox. Poland's first law requiring vaccination against this disease was made in the year 1922. Subsequent legal regulations for mandatory vaccination were undertaken in the interwar years of the last century at the initiative of the Polish Institute of Hygiene. These vaccinations were against cholera, typhoid fever, typhus fever and tuberculosis. The first

Protective Vaccine Program was designed by the Polish Institute of Hygiene and was introduced in 1994. It included obligatory vaccinations financed in full from public funds as much as recommended vaccinations (vaccine preparation financed by patients own sources but medical examination and procedure financed from public funds) [1]. The legal aspects regarding implementation of preventive vaccinations in Poland are regulated by the provisions of the Act on the Prevention and Control of Infections and Infectious Diseases

in Humans (5th December 2008). By 31st October each year, the Chief Sanitary Inspector announces the Protective Vaccine Program that will be in force the following year. It is included in the Official Journal of the Minister of Health as form of a message. People living in the Polish territory are obliged to undergo specific protective vaccinations [2]. One condition to ensure legality of the preventive action is that individual patient consent must be obtained. The legal obligation to undergo preventive vaccinations in the Act of 5th December 2008 (referred to above) interferes with an individual patient's rights under Article 15 of the *Patients' Rights and Patients' Rights Ombudsman Act*, to consent to (or refuse) a health benefit in the form of vaccination. In this case, the protection of public health prevails over protection of an individual's rights. Evasion of the obligation to vaccinate is related to administrative coercion and legal responsibility regulated in the Petty Offences Code. A person evading vaccination may be punished through a fine or reprimand. A fine may be imposed repeatedly to enforce vaccination [3].

Objections to vaccinations were observed over two hundred years ago. The first mass protest in the history of vaccinations took place in the second half of the nineteenth century. This was when an epidemic of dangerous infectious diseases appeared and when compulsory vaccinations were introduced in Great Britain and the United States [4]. In the Polish literature, the first mention of the negative impact of active opponents of vaccinations on their implementation appeared in the Medical Chronicles of Tymoteusz Stepniewski in 1931 and related to use of smallpox vaccines [5]. Over the past dozen or so years, an unsettling phenomenon has been observed globally, with the growing tendency for parents to abandon vaccinations of children [6]. A report from the Supreme Chamber of Control on the vaccination system indicates that the number of people evading vaccinations systematically grew by 40% each year from 2011-2014 [7]. Data from quarterly reports on the supervision of immunization cards and on persons evading compulsory preventive vaccinations provided by the Polish Institute of Hygiene showed the absolute number of individuals was 16,689 in 2015 [8].

AIM OF THE STUDY

Our objective was to evaluate the intensity of the phenomenon of refusal to subject children to preventive vaccinations through attempting to characterize a group of parents who refused to vaccinate their children, determining the type and number of unrealized vaccinations and identifying the reasons for not being vaccinated.

MATERIAL AND METHODS

The study lasted from 31st October to 23rd December 2016 and was conducted at the Non-Public Health Care Unit in Opole. Consent was obtained from the head of the facility and the Bioethical Commission of

the State Medical Higher Vocational School in Opole (approval no. KB – 46/2016). The research material was paper and electronic medical records belonging to the therapeutic entity and concerning children who did not receive the mandatory vaccinations. We analyzed 1683 immunization cards of children whose obligatory vaccinations fell in the years 2002-2016. The immunization cards for children born between 1983-1996 (622 cards) were obtained from the Non-Public Health Care Unit archive, while those from children born in the years 1997-2016 (1061 cards) were kept on site at the facility. The analysis also included copies of quarterly reports on protective immunization and the reports on persons evading mandatory preventive vaccinations submitted to the District Sanitary-Epidemiological Station in Opole. Copies of annual reports on protective vaccinations were made on the MZ-54 forms.

The method of retrospective analysis of medical records using modern technology was applied. The research tools comprised notes, bulk sheets and datasets in the form of tables. Data regarding children who were not subjected to mandatory vaccinations, the type of vaccination, the number of vaccine doses and the year of vaccination were obtained from the children's immunization cards. An additional information source was the copy of the reports on persons who evaded the obligation to vaccinate, which constituted an annex to the mandatory quarterly reports of protective vaccinations. The age and place of residence of the parents of unvaccinated children was obtained from the declaration of choice of the primary health care doctor and nurse, and the data collected in the electronic mMEDICA system, which is a computer program used in doctor's surgeries.

To analyze and interpret the data, the number (n) and percentage were calculated. The normality of distribution of quantitative variables was verified using the Shapiro-Wilk test with a statistical significance set at $p < 0.05$. The variables "age of parents of vaccinated children" and "age of parents of unvaccinated children" was characterized by a distribution not compatible with the normal distribution. Therefore, their median values, minimum and maximum were used for interpretation.

RESULTS

In the analyzed period, 10,138 vaccinations were planned and 10,057 were performed. There were 81 vaccinations not carried out, which accounted for 0.8% of the total number of due vaccinations. Only in the years 2006 and 2010 were all planned vaccinations administered (fig. 1).

The highest percentage of unrealized vaccinations was recorded in 2015 (2.94%) (tab. 1).

In the years 2002-2016, a total of 81 doses of vaccines were not administered including: 19 against hepatitis B (23.4%), 16 against diphtheria, tetanus and pertussis ('DTP'; 19.8%), 12 against measles, mumps and rubella (14.8%), 12 against Hib - Haemophilus influenzae type B vaccine (14.8%), 11 against polio-

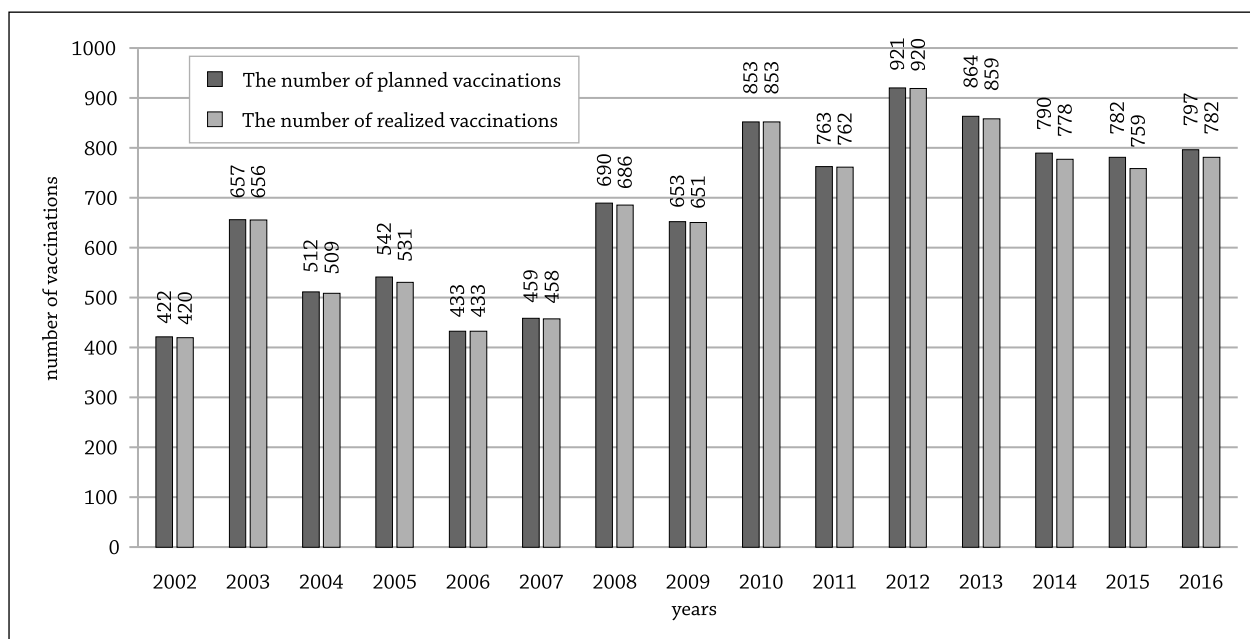


Figure 1. Total number of vaccinations planned and implemented in the years 2002-2016.

Table 1. Percentage of vaccinations unrealized in the years 2002-2016 in the study of the Non-Public Health Care Unit.

Year of implementation	Percentage of unrealized vaccinations
2002	0.47 %
2003	0.15 %
2004	0.59%
2005	2.03%
2006	0.00%
2007	0.22%
2008	0.58%
2009	0.31%
2010	0.00%
2011	0.13%
2012	0.11%
2013	0.58%
2014	1.52%
2015	2.94%
2016	1.88%

myelitis (13.6%) and 11 against diphtheria and tetanus ("Td"; 13.6%).

In seven cases, parents/guardians confirmed with a written signature their refusal to subject children to the following types of vaccinations:

- in 2008 – against measles, mumps and rubella using the MMR vaccine;
- in 2013 – against DTP and poliomyelitis;
- in 2014 – against DTP, Hib, poliomyelitis, hepatitis B;
- in 2015 – against measles, mumps and rubella (MMR), DTP, poliomyelitis, Hib;

- in 2016 – against hepatitis B, DTP, poliomyelitis, Hib.

The reasons for abandoning compulsory preventive vaccinations were: not reporting with a child for vaccination (48.1%), deliberate refusal to subject a child to the vaccination (28.4%) or postponement of vaccination due to contraindications (23.5%).

The median age of parents whose children were not subjected to mandatory vaccinations was 36 years (range: 25-46 years). In the group of parents who documented their decision to deliberately refuse to subject a child to the vaccination, the median age was 31 years (range: 27-36 years). The parents of unvaccinated children were usually the residents of cities (87.77%), with a minority of four cases (12.12%) residing in a village. The declaration on the deliberate refusal of the vaccination was signed by mothers (95.65%) in most cases, with fathers (4.35%) signing the remainder.

DISCUSSION

The fashion for abandoning vaccination in children reached Poland after Western European countries and the USA, and may contribute to the return of many illnesses eliminated with compulsory vaccinations. Research conducted in recent years showed that the percentage of unvaccinated children is increasing constantly [7]. Our study confirms this finding, and the outcomes obtained by Dáňová et al. in the Czech Republic in 2004-2014 [9].

From a public health perspective, the phenomenon discussed may constitute a potential epidemic threat. According to Paweł Grzesiowski, a specialist from the Experts' Team for the Protective Vaccine Program that operates at the Ministry of Health, vaccination evasion can lead to disappearance of collective resistance and emergence of limited epidemic outbreaks [10].

Collective resistance (collective protection) refers to the immunity of the entire population obtained with mass scale vaccination. Due to the high percentage of immunized people, the probability of contact between a susceptible person and an infected person decreases, as noticed by Rashid et al. [11]. Implementation of vaccination programs influences development of collective resistance. According to the National Consultant on Epidemiology, Iwona Paradowska-Stankiewicz, the risk of disease decreases in a non-immunized person if the percentage of immunized persons in a given population increases. Therefore, we conclude that vaccinations reduce the incidence of disease through direct protection of vaccinated people and indirect protection of non-immunized individuals [12]. According to the post-control conclusions on the implementation of preventive vaccinations provided by the Supreme Chamber of Control, vaccination of at least 95% of the population is sufficient to achieve population resistance against most infectious diseases [13].

Our study showed that the problem of avoiding preventive vaccinations was particularly visible in the years 2011-2015. These data correspond with the results of the audit carried out by the Supreme Chamber of Control concerning the children's preventive vaccination system in Poland from 2011-2015 [13]. According to this report, the number of children not subjected to obligatory vaccinations has grown systematically in Poland and although it is not an epidemiological threat currently, it requires constant supervision.

Analysis of our research material showed that the vaccination coverage level of children in the Non-Public Health Care Unit ranged from 97.06% to 100%. According to the data available, the vaccination coverage level against most infectious diseases covered by mandatory vaccinations until 2014 was at the similar level of 99.4% to 97% [13]. The percentage of vaccinations unrealized in individual years observed in our study is therefore acceptable. Further, vaccination performance indicators can be considered sufficient to achieve population resistance against most infectious diseases. Jan Bondar, a spokesman for the Chief Sanitary Inspectorate, described the current vaccination coverage level in children, in Poland, as sufficient protection against the spread of infectious diseases [14].

Analysis of medical records from the Non-Public Health Care Unit in Opole demonstrated that the highest percentage of unrealized vaccinations involved the hepatitis B vaccine (23.4%). For comparison, in the period considered, unrealized vaccinations against measles, mumps and rubella accounted for 14.8%. This situation could have been influenced by the necessity to administer three doses of basic type B hepatitis vaccination required by the Protective Vaccine Program provisions. In contrast, the measles, mumps and rubella vaccination schedule includes one dose of primary vaccination and one booster dose. Single cases of children not reporting for administration of hepatitis B vaccine were documented in the Non-Public Health Care Unit as

early as 2004, 2005 and 2007 i.e. before emergence of the anti-vaccine trend in Poland. The first cases of non-compliance with mandatory vaccinations against measles, mumps and rubella were reported in 2005, while the first deliberate refusals of this vaccination were observed in 2008. According to the literature, at the same time in Poland, the intensity of anti-vaccine movements increased [6]. Rudkowski pointed out the possibility of an outbreak of infectious diseases epidemics in the population having no acquired immunity [15].

Three basic types of reasons for not subjecting children to vaccinations were identified in this study. These were not reporting with a child for vaccination (48.1%), deliberate refusal confirmed by written signature of the parents/guardians (28.4%), and postponement of vaccination (23.5%). A survey from the Centre for Public Opinion Research (2013) concerned the opinion of Poles' on the subject of vaccination showed that only 2% of respondents admitted to abandoning compulsory vaccination of children. The most common reason cited was poor health of the child on the vaccination day. Occasionally, the reason indicated by the parents was concern about the adverse effects of vaccinations. Neglect to report for the vaccination also occurred [16].

In this work, we identified 23 people who avoided preventive vaccinations over 15 years. In 2016, 18 such people were identified in reports prepared for the District Sanitary-Epidemiological Station in Opole. In five cases, the parents did not report with children for vaccinations. In six, the parents signed the statement of informed decision not to vaccinate children. In the remaining seven cases, vaccinations were postponed due to contraindications. In the "Protective vaccinations in Poland in 2015" bulletin issued by the Polish Institute of Hygiene, indicators describing individuals who evaded vaccinations were presented per 1000 people in the 0-19 years age group. The highest values for these indicators were obtained in the following provinces: Pomorskie (5.6%), Śląskie (3.8%), Wielkopolskie (3.4%), Mazowieckie (2.6%) and Opolskie (2.1%), while the lowest value was in Podlaskie (0.4%) [8].

In the light of these results, the percentage of unrealized vaccinations (0.8% of the total number scheduled for the last 15 years) in the Non-Public Health Care Unit study indicates the discipline and positive attitude towards vaccination of most parents/guardians who submitted declarations of choice of the primary health care doctor and nurse for their children to this medical facility.

CONCLUSIONS

The vaccination coverage level in this study area is satisfactory and comparable to the result obtained for the entire country. The scale of refusals for preventive vaccinations is not an epidemiological threat currently. However, it requires constant monitoring and educational and information actions directed towards parents and guardians.

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Correspondence address:

Lucyna Sochocka

E-mail: l-sochocka@wp.pl

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