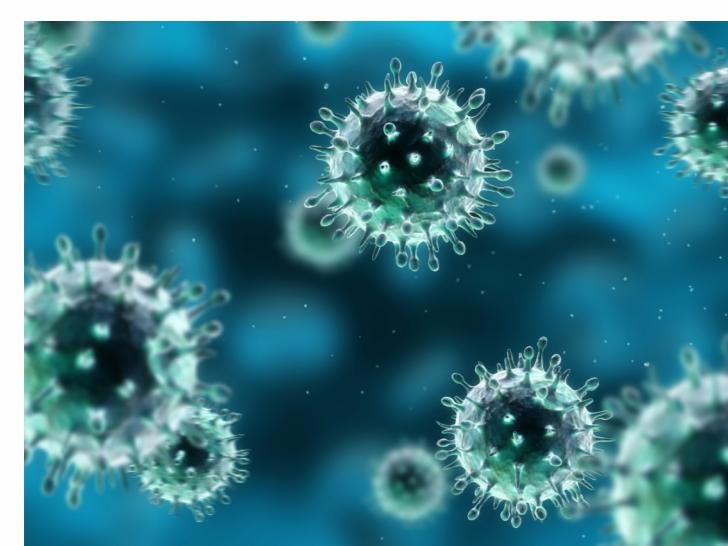


CHANGES IN ACTIVITY OF INFLUENZA VIRUS

IN THE PODLASKIE VOIVODESHIP IN POLAND IN THE YEARS 2009 - 2013



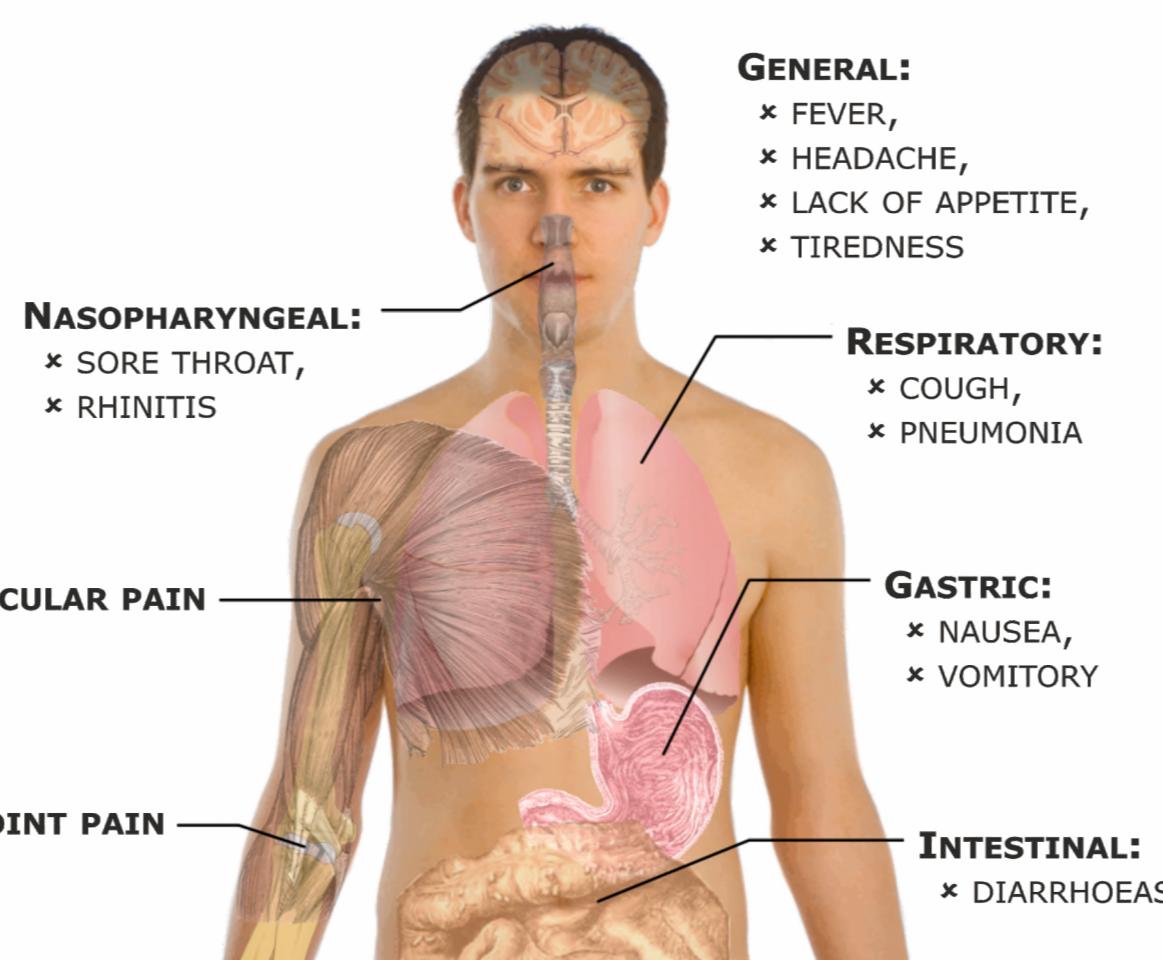
Influenza is an acute infectious disease caused by viruses of the Orthomyxoviridae family, assuming an epidemic form at seasonal and irregular times in the pandemic. It is a very important disease caused by a virus that attacks mainly the respiratory tract.

Characteristic symptoms of influenza are: fever, cough, sore throat, runny nose, headache, muscle and joint pain and malaise. Etiology and specific diagnosis of influenza requires laboratory confirmation.



INTRODUCTION

SYMPTOMS OF INFLUENZA



The aerogenically transmitted **influenza viruses** normally replicate in the mucosa of the nasopharynx, resulting in a pharyngitis or at most a tracheobronchitis. Pulmonary dissemination of the infection can result from an upper respiratory infection or manifest without one, whereby the prognosis in the latter case is less favorable. Pneumonia caused solely by the influenza virus is rare.

The **influenza surveillance** and monitoring activity in Poland and the other countries which are members of WHO collects and analyzes virological and epidemiological data from around the world. The open and transparent sharing of influenza monitoring data by the participating countries allows GISRS (Global Influenza Surveillance and Response System) to describe critical features of influenza epidemiology including risk groups and transmission characteristics.



THE AIM OF WORK

- Statistical analysis of epidemiological data from the years 2009 to 2013 on the influenza incidence in the Podlaskie Voivodeship.
- Ascertaining in which months the influenza virus is the most active, calculated by the highest incidence rate.



MATERIAL AND METHODS

To calculate the data we used the **incidence rate (the incidence)** - the measure of frequency of the disease described as the ratio of the number of people who become ill in the definite time (e.g. a month) to population exposed in the same period of time. This rate is expressed as number of new cases of illness per 100 thousand inhabitants.

In order to calculate the flu incidence the following data was used:

- number of influenza and influenza-like cases in the years 2009 - 2013, which come from epidemiological reports from National Institute of Public Health - National Institute of Hygiene,
- the population number of the Podlaskie Voivodeship in the years 2009 - 2013 appearing in the publication of the Statistical Office in Białystok.

The incidence rate (**Table 1, Fig. 1, 5**) was used to calculate the statistical values such as the arithmetic mean, median, lower and upper quartile, minimum and maximum (**Table 2, Fig. 2-4**) using **Microsoft Excel 2013** and **StatSoft STATISTICA 10** programmes. The charts have been prepared in the **StatSoft STATISTICA 10** programme.

RESULTS

Table 1. The incidence of flu in the years 2009 - 2013

YEAR \ MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
2009	465.3	144.5	26.7	9.2	0.5	0.2	1.5	0	0.6	91.8	1068.8	665.4
2010	121.2	125.4	176.9	99.2	104.7	59.3	43.1	25.5	114.4	195.6	221.1	240.9
2011	324.3	507.4	655.7	216.5	120.2	72.5	25.7	19.9	53.8	217.6	251.4	261.4
2012	366.1	385.3	385.7	217.3	78.2	66.0	28.6	20.1	93.5	223.5	367.6	792.1
2013	2391.5	1381.2	1541.3	579.1	199.1	146.7	111.9	50.1	152.3	425.3	419.9	441.7

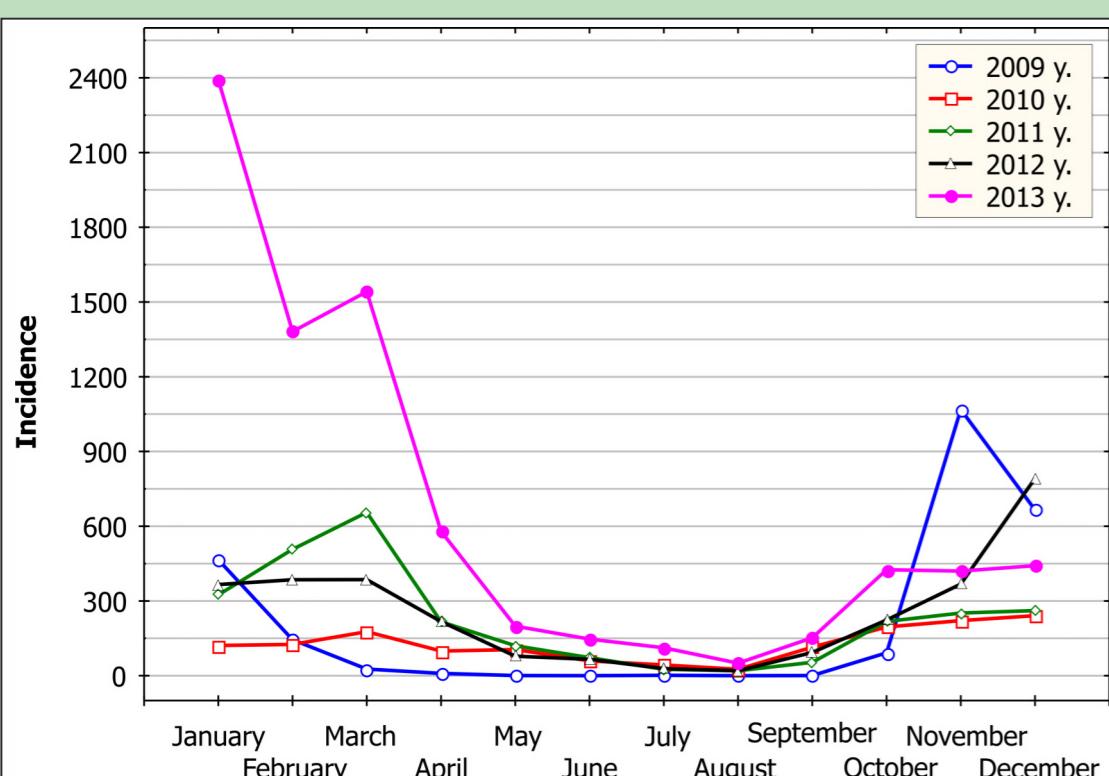


Fig. 1. The incidence of flu in the years 2009 - 2013

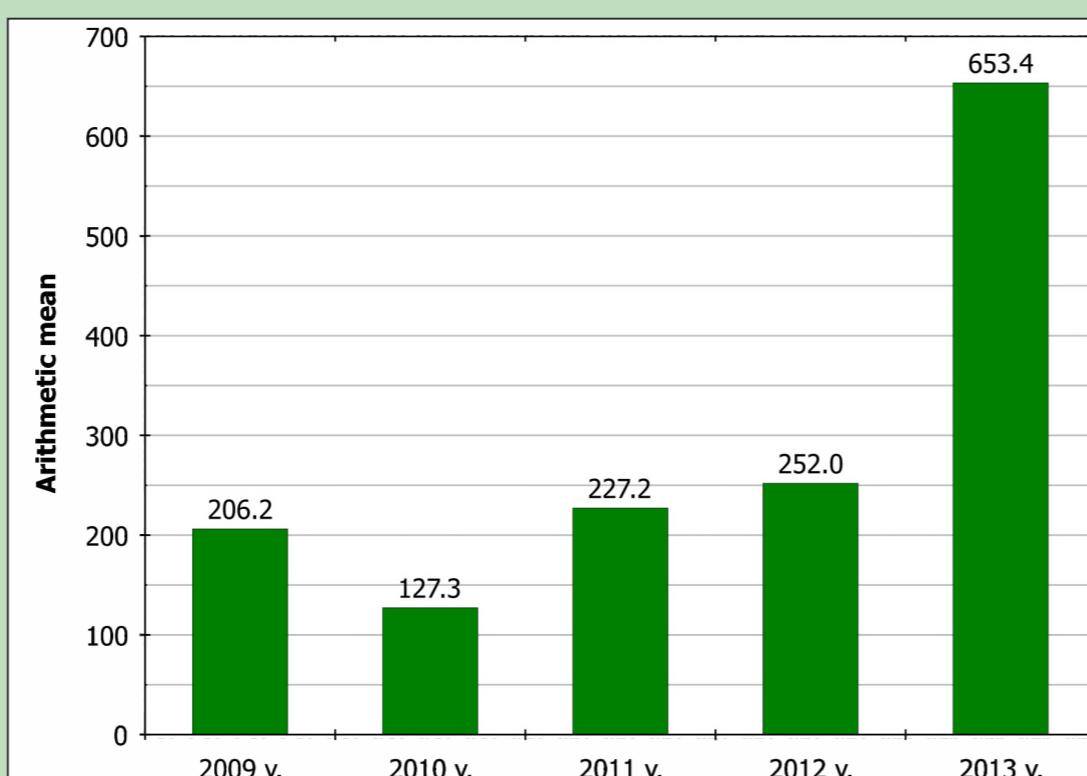


Fig. 2. Value of the arithmetic mean of the incidence of flu in the years 2009 - 2013

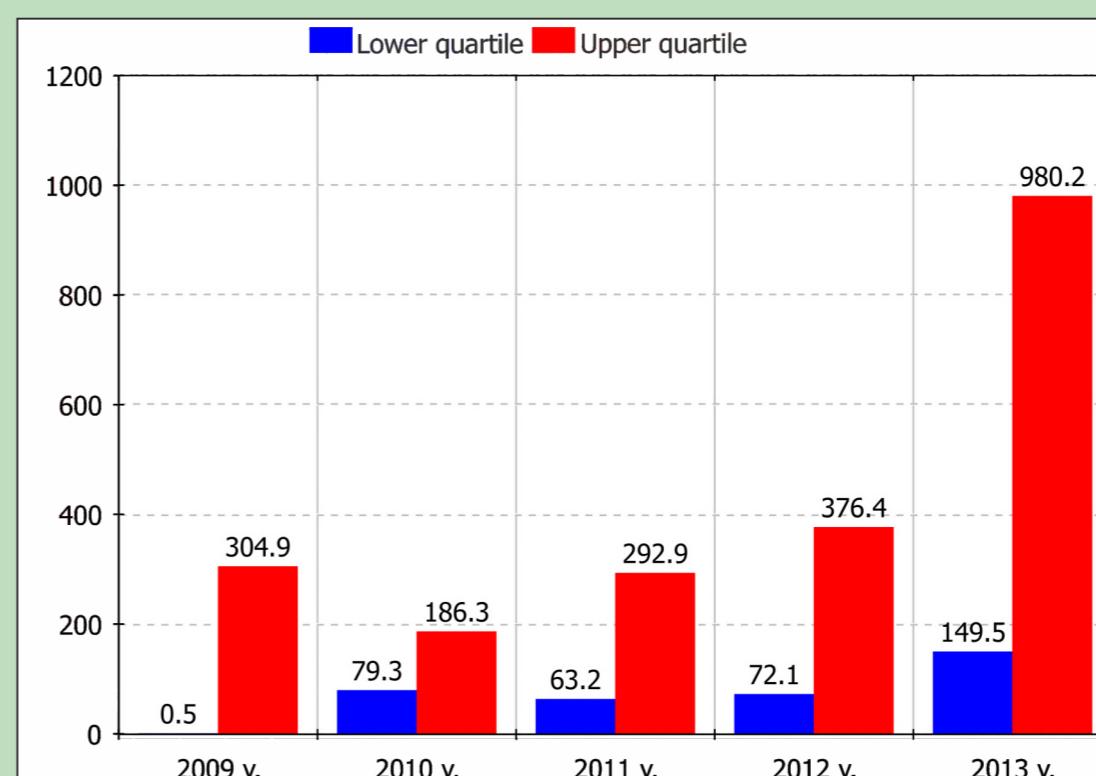


Fig. 3. Value of the lower and upper quartile of the incidence of flu in the years 2009 - 2013

In the period of five years since year 2009 (**Fig. 1**) in the Podlaskie Voivodeship found a different incidence of people with the flu: the biggest was in the winter months, while the smallest in the summer months. In each tested year, the lowest activity of influenza virus was observed in August.

The arithmetic mean of incidence of the flu (**Fig. 2**) in 2009, 2011 and 2012 year was at a similar level. Only in 2010 year was almost two-fold smaller. However, in 2013 year it was observed almost three-fold increase. It was the peak of epidemiological diseases. The cause could be more active virus or inappropriate prophylaxis (no vaccination).

Analyzing the chart (**Fig. 3**), together with the data from Table 1, it was found that in the summer months (always in August, and mostly in June and July) about 25% of incidence is below the lower quartile, and in the winter months (December, January, February, March) about 25% of incidence is above the upper quartile.

The median of incidence of the flu has gradually increased. Analyzing the chart (**Fig. 4**), together with the data from Table 1, it was found that in the years 2009 - 2012 in the months from April to September, the incidence was below the median, in the other months was above. In 2013, from May to September and in November the incidence was below the median, while in the rest of months was above.

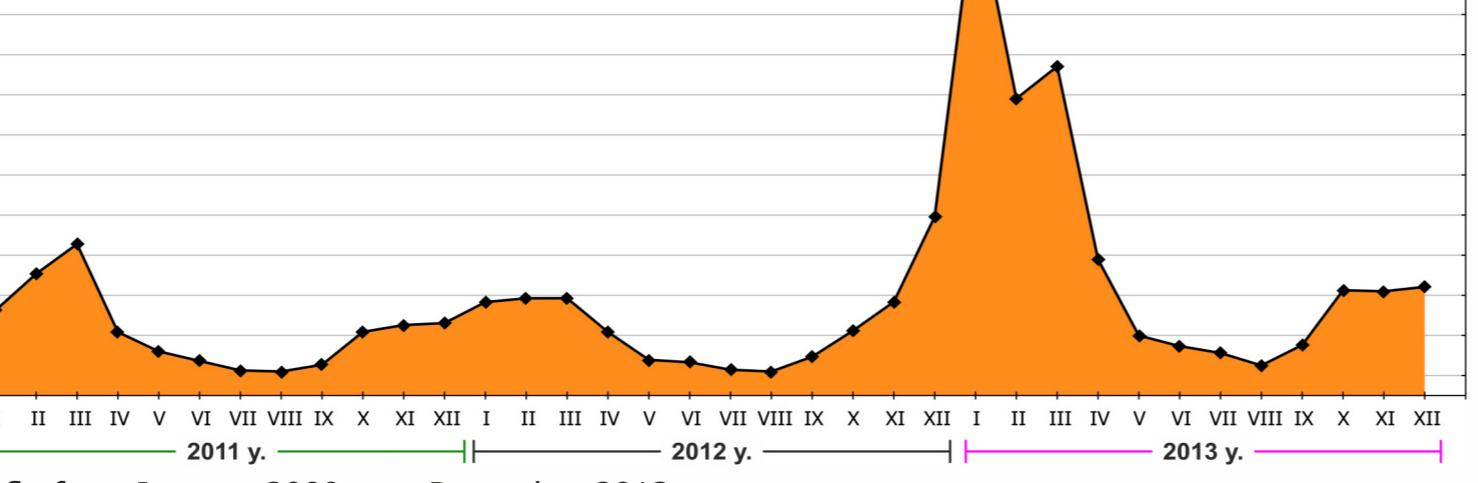


Fig. 5. The incidence of flu from January 2009 to December 2013.

In the Podlaskie Voivodeship from January 2009 to December 2013, the cyclic changes in the incidence of people with influenza were observed (Fig. 5).

Maximum incidence was recorded in January 2013, the minimum - in August 2009 (Table 1). The most interesting moment in the investigated influenza activity was the turn of the year 2012/2013, because it had the most activity in the analyzed period, i.e. 2009 - 2013.



CONCLUSIONS

- The highest incidence of flu in the Podlaskie Voivodeship in the years 2009 - 2013 were found in autumn and winter months (from November to March). However, in summer months (from June to August) recorded the lowest incidence.
- In the years 2009 - 2013 in the Podlaskie Voivodeship the lowest activity of influenza virus was observed in August.
- In the years 2009 - 2013 in the Podlaskie Voivodeship the cyclic activity of influenza virus was observed.
- The virus that causes the flu is a threat to humans, testify to the epidemiological data collected and increased sickness absence inhabitants of the Podlaskie Voivodeship in the autumn and winter.
- The influenza virus causes annual epidemics, because its activity tracking and transmission in the community is very important!



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