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SEASONAL INFLUENZA IN POLAND– 2025/2026 SEASON EPIDEMIOLOGY, COMPLICATIONS, TREATMENT – LITERATURE REVIEW

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ABSTRACT

Seasonal influenza caused by the influenza virus remains an important respiratory disease in the world. The World Health Organization (WHO) estimates that seasonal influenza causes about a billion infections per year, including 3-5 million severe cases and 290,000-650,000 deaths from respiratory causes. The 2025/2026 season in Europe started early: by mid-December 2025, WHO Europe was reporting intense influenza activity in more than half of the reporting countries and indicating the K subset of virus A (H3N2) as the main transmission factor in the general population. In Poland, official communications from the Chief Sanitary Inspectorate (GIS) similarly described an early acceleration of the disease, especially among children, without evidence of unusual virulence or clinically significant resistance to oseltamivir. The highest age-specific peaks were recorded among children aged 0-4 years (1,746.4 per 100,000) and 5-9 years (1,464.1 per 100,000). Vaccination coverage improved: the same official data export recorded 2,305,395 vaccinations against influenza in the 2025/2026 season to April 2026, compared to 1,805,695 in the 2024/2025 season. Current literature confirms that influenza is not just a self-limiting upper respiratory tract infection; It is associated with bacterial pneumonia, cardiovascular events, neurological complications and decompensation of chronic diseases. Modern management should therefore combine annual vaccinations, early diagnosis of complications, timely antiviral treatment in hospitalized, severe or progressive patients or those belonging to high-risk groups, as well as rational antibiotic therapy.

KEYWORDS

Seasonal Flu, Poland, 2025/2026, Vaccinations, Antiviral Treatment, Complications

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Introduction

Influenza is an acute viral infection of the respiratory tract caused mainly by influenza A and B viruses. Influenza A viruses are classified according to the surface proteins of hemagglutinins and neuraminidases, and the subtypes A(H1N1)pdm09 and A(H3N2) are currently circulating seasonally in the human population. Influenza B viruses, on the other hand, are divided into lines, with the B/Victoria line dominating the current circulation [1]. Symptomatic clinical syndrome often begins suddenly and includes fever, cough, sore throat, muscle aches, malaise, headache and rhinitis; However, the importance of influenza for public health results from its ability to cause severe lower respiratory tract disease, trigger systemic complications and destabilize the condition of particularly vulnerable patients [1,12].

The 2025/2026 season is clinically and epidemiologically important because it combined early onset, intensive paediatric transmission, and the antigenically altered K subclade of the A(H3N2) virus dominant in the first part of the season [2,14,15]. WHO Europe stated in December 2025 that the season in the Region started about four weeks earlier than usual, and the K subclade A(H3N2) accounted for a large proportion of the characterized influenza viruses; At the same time, the available evidence did not indicate that this strain was clinically more severe on its own [2]. The ECDC similarly described early and intense influenza activity in the EU/EEA and reported that children aged 5-14 years had the highest percentage of positive results in primary care settings. Influenza-related hospitalizations, on the other hand, were concentrated among adults aged 65 years and older [14].

The aim of this literature review is to summarize the epidemiology of seasonal influenza in the 2025/2026 season, with particular emphasis on Polish, and to discuss clinically relevant complications, treatment, vaccination and prevention.

Methodology

The manuscript is a literature review prepared in May 2026. The literature was identified through PubMed, PubMed Central, publishers' websites, WHO and CDC clinical guidelines, ECDC supervisory studies, and Google Scholar. Search terms included combinations of terms: influenza, seasonal influenza, A(H3N2), subclade K, Poland, 2025/2026, complications, bacterial co-infection, pneumonia, myocarditis, acute myocardial infarction, encephalopathy, acute necrotizing encephalopathy, oseltamivir, baloxavir, antiviral resistance, vaccine effectiveness and influenza vaccination. In particular, the focus was on the evaluation of systematic reviews, meta-analyses, WHO/CDC/ECDC guidelines, and official national public health statistics published between 2020 and 2026.

Epidemiological statistics were limited to official or high-reliability public health sources. Polish national statistics were taken from the official report on infectious diseases prepared in cooperation with the Ministry of Health, the e-Health Centre and GIS, with data current as of 26 April 2026 [3]. Additional contextual data concerning Polish came from GIS and WSE/GIS messages published in gov.pl domains [4-6]. International statistics came from WHO, WHO Europe, ECDC and CDC [1,2,7,8,14]. Medical evidence for complications, treatment, and vaccination was taken from PubMed/PMC or from official clinical guidelines [12,13,15-30].

Polish e-health exports report a weekly incidence per 100,000 inhabitants, rather than a traditional, consolidated, end-of-season clinical registry; Therefore, national weekly indicators were used to characterise the timing, intensity and age distribution, while GIS messages were used to represent reported cumulative cases, hospitalizations, and deaths at the appropriate mid-season observation point [3,4].

Statistics and epidemiology

Global and European context

Globally, the WHO continues to describe seasonal influenza as a recurrent cause of about one billion infections per year, including 3-5 million severe cases and 290,000-650,000 deaths from respiratory causes [1]. In April 2026, the WHO Global Respiratory Virus Activity Update No. 574 reported that the global percentage of positive influenza tests fell below 10%, with decreasing activity in the temperate zone of the Northern Hemisphere, while influenza activity remained regionally diverse [7].

In Europe, the 2025/2026 season started early and was largely induced by the K subclade A(H3N2) [2,14]. The ECDC reported in December 2025 that the preliminary European estimates of VEBIS indicated a 52-57% efficacy of the vaccine against A(H3N2) infection in primary care settings, while emphasizing that vaccination, respiratory hygiene and protective measures for high-risk groups remained clinically relevant [14]. Euro Surveillance's multi-country interim analysis of 19 European countries between September 2025 and January 2026 showed the efficacy of the influenza A vaccine in all age groups at 25-45% including in outpatient and inpatient settings, with higher estimates in children in several studies [15].

Outside of Europe, the United States also experienced a significant flu burden in the 2025/2026 season. CDC FluView for week 16, ending in April 2026, estimated at least 32 million cases, 380,000 hospitalizations, and 23,000 deaths during the season, and reported 155 influenza-related pediatric deaths; among genetically characterized viruses A(H3N2) 93% belonged to the K subclade [8].

Poland: official country data

The official Polish report on infectious diseases, with data current until April 2026, showed a sharp increase in the reported incidence of influenza from the end of 2025 to the beginning of 2026 [3]. The report shows that the incidence of influenza increased from 17.54 per 100,000 in week 48 of 2025 to 83.26 in week 50, 111.29 in week 51, and then peaked at 410.01 per 100,000 in week 5 of 2026 [3]. The corresponding highest weekly rate in the comparable window of the 2024/2025 season was 366.17 per 100,000 in the 4th week of 2025 [3]. By week 17 of 2026, the weekly maturity had dropped to 5.27 per 100,000, which was consistent with the late-season fade of activity [3].

GIS messages help interpret early acceleration. On December 23, 2025, GIS described a national increase in acute respiratory infections, especially among children under 14 years of age, and reported that the K subset A(H3N2) accounted for about half of new flu cases; The announcement also indicated that the strain did not show particular resistance to oseltamivir or unusual virulence, and the vaccine for the 2025/2026 season was supposed to protect against severe consequences [5]. In February 2026, GIS reported more than 430,000 cases of influenza since the start of the season, more than 21,600 hospitalizations due to complications, and more than 1,000 deaths, while noting, that these cumulative values were still lower than at a comparable point in the 2024/2025 season [4].

Vaccination data also improved compared to the previous season. The official report recorded 2,305,395 flu vaccinations in the 2025/2026 season, compared to 1,805,695 in the 2024/2025 season and 1,647,007 in the 2023/2024 season [3]. Most of the reported vaccinations were performed before or near an early increase in incidence, particularly in September and October 2025 [3].

Table 1. Selected age-specific weekly reported influenza incidence in Poland during the 2025/2026 season. Source: official Ministry of Health/e-Health Centre/GIS export [3].

Age group (years)	Peak week	Peak weekly incidence per 100,000	Week 17/2026 incidence per 100,000
0-4	2026-W05	1,746.38	16.68
5-9	2026-W05	1,464.10	9.06
10-14	2026-W05	844.27	4.40
15-19	2026-W05	439.19	4.23
30-34	2026-W06	399.74	6.39
35-39	2026-W05	401.93	6.48
60-64	2026-W06	181.82	3.04
65-69	2026-W06	151.45	2.67
70-74	2026-W06	141.28	2.98
75-79	2026-W06	133.38	2.52
80-84	2026-W06	127.39	2.53
85+	2026-W06	130.54	2.48

Table 2. Recorded influenza vaccinations in Poland by season. Source: official Ministry of Health/e-Health Centre/GIS export [3].

Season	Recorded influenza vaccinations
2023/2024	1,647,007
2024/2025	1,805,695
2025/2026	2,305,395

Complications

The most important conclusion resulting from the current state of knowledge about influenza virus infection is that it should not be reduced to a short-term infection of the upper respiratory tract. Severe illness can result from direct viral pneumonia, secondary bacterial pneumonia, acute respiratory distress syndrome, myocarditis, acute myocardial infarction, heart failure, arrhythmia, stroke, encephalopathy, encephalitis, myositis and exacerbation of chronic pulmonary, cardiac, renal, metabolic or neurological diseases [1,4,18-24].

The most common source of severe disease is respiratory complications. Research by Qiao et al. showed a total incidence of bacterial co-infection at the level of 20.3% and found that bacterial co-infection was associated with a higher chance of death, admission to the intensive care unit and the use of mechanical ventilation than influenza itself [18].

Clinically persistent or recurrent fever, focal auscultation symptoms over the lungs, physiology of sepsis, hypoxaemia, imaging densities or late deterioration after initial improvement should suggest a secondary bacterial disease. Cardiovascular complications deserve special attention because they can occur even when respiratory symptoms dominate the initial picture. Ouranos et al. They showed in hospitalized patients with confirmed influenza that 690 of 6,936 patients (9.9%) developed an evaluated cardiovascular endpoint; Total cumulative frequency estimates included heart failure at 17.47%, arrhythmia 6.12%, myocarditis 2.56%, acute myocardial infarction 2.19%, and stroke or transient ischemic attack 1.14% [19]. Another study shows that the incidence of acute myocardial infarction was about six times higher in the first seven days after a laboratory-confirmed influenza infection than in the control periods [20]. These data justify a low threshold for cardiac diagnostics in the elderly and in patients with chest pain, dyspnea disproportionate to respiratory changes, syncope, new arrhythmia, symptoms of heart failure or elevated cardiac biomarkers.

Neurological complications are less common than respiratory complications, but also clinically significant. A French analysis of the national database on influenza-related neurological manifestations showed that seizures predominated among hospitalized children with neurological symptoms, while encephalitis/encephalopathy and myositis were clinically relevant subgroups [21]. The CDC reported cases of

influenza-related encephalopathy and acute necrotizing encephalopathy in children during the 2024/2025 season in the U.S., with frequent use of intensive care units and significant mortality in severe presentations [22,41]. Alarming symptoms include impaired state of consciousness, seizures, persistent severe headache, focal neurological defects, symptoms of increased intracranial pressure, severe weakness or rapidly progressing deterioration.

In children, influenza can also cause otitis media, febrile seizures, croup, a picture similar to bronchiolitis and dehydration, while in the elderly it can cause deterioration of fitness, falls, delirium and decompensation of chronic diseases [1,21-24]. These complications justify both prevention and early escalation of care, especially in infants, pregnant women, the elderly, immunocompromised people, and patients with chronic cardiopulmonary, metabolic, renal, hepatic, or neurological diseases [1,12,13,50,51].

Table 3. Major complication domains relevant to clinical practice.

Complication domain	Evidence signal	Clinical implication
Bacterial co-infection and pneumonia	Pooled prevalence of bacterial co-infection 20.3%; higher odds of death, ICU admission and ventilation [18].	Look for secondary deterioration, consolidation, hypoxemia, sepsis, persistent fever; use antibiotics when bacterial disease is plausible.
Cardiovascular events	9.9% of hospitalized laboratory-confirmed influenza patients developed a cardiovascular outcome; AMI risk rises markedly in the first week [19,20].	Consider ECG, troponin, BNP, echocardiography or cardiology input when symptoms or risk profile warrant.
Neurological syndromes	Seizures, encephalopathy, encephalitis, myositis and acute necrotizing encephalopathy are reported, especially in children [21-23].	Urgent escalation for altered consciousness, seizure, focal deficit, severe headache or rapid decline.
Chronic disease exacerbation	WHO identifies older age, pregnancy and chronic disease as major risk categories for severe influenza [1].	Prioritize vaccination, early antivirals, oxygenation assessment and continuity of chronic-disease management.

Treatment and vaccination

Clinical management and antiviral therapy Most adults with uncomplicated flu can be treated symptomatically, by recommending hydration, antipyretic medication, rest, isolation during fever and information about alarm symptoms and situations that require re-contact with a doctor. The threshold of intensification of management changes in hospitalized patients, patients with severe, complicated or progressive disease, and people with an increased risk of complications. The CDC recommends that antiviral treatment be given as soon as possible in hospitalized patients with suspected or confirmation of influenza, in outpatients with severe or progressive disease and in outpatients in high-risk groups; Treatment in these groups should not be delayed pending laboratory confirmation [13].

Oseltamivir remains the antiviral drug with the best evidence of efficacy in influenza requiring hospitalization or severe course. CDC lists oral oseltamivir, inhaled zanamivir, intravenous peramivir, and oral baloxavir as antiviral options in uncomplicated influenza, when treatment can be started within 48 hours, while recommending oseltamivir as soon as possible in influenza requiring hospitalization [13]. In uncomplicated influenza in adults, the standard dose of oseltamivir is 75 mg twice daily for five days, with dose adjustment in children and in renal impairment according to product characteristics [13]. The 2024 WHO Clinical Practice Guidelines make an important distinction between routine treatment of mild influenza in low-risk people and treatment of severe or high-risk cases. The WHO generally advises against the routine use of oseltamivir in non-severe seasonal influenza when the expected benefit is limited, with the scope of the guidelines explicitly covering decisions on severe influenza, non-severe influenza, and post-exposure prophylaxis [12]. In practice, this supports individualized treatment: early antiviral drugs are paramount, when risk, severity, progression, hospitalization, or focus control considerations make the likelihood of benefit clinically significant [12,13]. Baloxavir is an important outpatient option, but should not be interpreted as a universal replacement for oseltamivir in severe disease. A cohort study conducted by Huang I et al. [29], comparing 73,899 outpatients treated with oseltamivir with 1,592 outpatients treated with baloxavir, showed lower rates of hospitalization and emergency department visits among baloxavir users, with similar mortality rates in both groups. Efficient antibiotic therapy is an essential component of influenza care. The WHO strongly recommends against the

routine use of antibiotics for confirmed non-severe influenza when the likelihood of bacterial co-infection is low [12]. However, the use of antibiotics is appropriate when bacterial pneumonia, sepsis, otitis media, sinusitis, or another bacterial complication is clinically suspected, especially since bacterial co-infection significantly worsens treatment outcomes [12,18].

Antiviral drug resistance surveillance

In the main summaries available for the 2025/2026 season, antiviral drug resistance remained rare, but continued monitoring is necessary. CDC FluView at week 16 reported a low percentage of viruses with reduced or significantly reduced inhibition by oseltamivir among the viruses studied and no reduced susceptibility to baloxavir among the viruses evaluated for baloxavir markers in this report [8]. The CDC also notes that the H275Y neuraminidase mutation in A(H1N1)pdm09 viruses confers resistance to oseltamivir and may reduce the efficacy of peramivir [30].

The need for surveillance is reinforced by a 2024 multi-country report showing the spread of A(H1N1)pdm09 viruses carrying the neuraminidase substitutions I223V and S247N, which resulted in approximately 13-fold reduced inhibition by oseltamivir while maintaining normal susceptibility to other antivirals [28]. A global analysis from 2020 to 2023 also found that most influenza viruses tested remained susceptible to neuraminidase inhibitors and baloxavir but documented sporadic signals of reduced inhibition or reduced susceptibility requiring ongoing surveillance [27].

Vaccination

Vaccination remains the primary preventive intervention for seasonal influenza. The WHO recommends annual vaccination for groups at high risk of severe influenza, including pregnant women, children aged 6 months to 5 years, the elderly, people with chronic diseases, immunocompromised individuals, and healthcare workers [1,31-36,39]. The WHO vaccine recommendation for the 2025/2026 season included A/Victoria/4897/2022 (H1N1)pdm09, A/Croatia/10136RV/2023 (H3N2), and B/Austria/1359417/2021 (B/Victoria lineage)-like viruses for egg-based trivalent vaccines; cell culture- or recombinant-produced trivalent vaccines used A/Wisconsin/67/2022 (H1N1)pdm09, A/District of Columbia/27/2023 (H3N2), and B/Austria/1359417/2021-like components [9]. For quadrivalent products, WHO allowed the inclusion of a B/Phuket/3073/2013-like virus from the B/Yamagata lineage where quadrivalent formulations were still used [9,38].

In Poland, the Szczepienia.Info portal indicated that in the 2025/2026 season only inactivated influenza vaccines administered by injection were available, and vaccination could be performed in medical facilities and in selected pharmacies in accordance with specific qualification rules [10,37]. The same public information sources described reimbursement or free access pathways: influenza vaccination was free for children and adolescents, pregnant and postpartum persons, and adults aged 65 years or older, while selected quadrivalent vaccines were reimbursed at 50% for adults aged 18-64 years, and the high-dose vaccine was reimbursed at 50% for adults aged 60 years or older [10,11].

Early European data have shown moderate efficacy against influenza A in the context of A(H3N2) subclade K drift, with higher protection in children in some analyses [14,15]. In England, early estimates for the 2025/2026 season of influenza-related emergency department visits and hospital admissions have shown efficacy of 72–75% in children and adolescents and 32–39% in adults, consistent with clinically meaningful protection against illness requiring medical attention and severe outcomes [16]. Interim estimates from the US CDC for the same season showed that vaccination reduced outpatient and hospitalization outcomes in both children/adolescents and adults, again supporting vaccination even in a season dominated by antigenically shifted A(H3N2) [17,40].

Vaccination may also provide cardiovascular benefits in high-risk adults [41]. A meta-analysis by Behrouzi et al. showed that 3.6% of vaccinated patients experienced a major adverse cardiovascular event within 12 months, compared with 5.4% of placebo or control subjects, and the benefit was greatest among patients with a recent acute coronary syndrome [25]. Subsequent studies also confirm a reduction in major cardiovascular events, myocardial infarction, and cardiovascular death among vaccinated high-risk adults [26].

Discussion

The 2025/2026 Polish influenza season was characterized by an early onset with an acceleration phase, dominance of the A(H3N2) K subclade in the first phase, a distinct pediatric peak in incidence, significant hospitalizations and mortality in GIS reporting in the middle of the season, and improved vaccination coverage compared to the 2023/2024 and 2024/2025 seasons [3-5]. The official weekly profile indicates that the national peak occurred in week 5 of 2026 with 410.01 reported cases per 100,000 inhabitants, followed by a steady decline to 5.27 per 100,000 in week 17 [3]. This pattern is consistent with the early and intense European season described by WHO Europe and ECDC [2,14].

The highest reported incidence was observed in children, particularly those aged 0-4 and 5-9 years [3]. This does not mean that children had the highest risk of death; rather, it highlights their role in community transmission and disease requiring contact with healthcare. Severe outcomes from influenza remain concentrated among infants, the elderly, pregnant individuals, immunocompromised patients, and individuals with chronic diseases [1,12,13]. The clinical challenge is therefore twofold: preventing transmission in pediatric groups and high-incidence settings and protecting high-risk individuals from hospitalization, complications, and death.

Polish data show an increase in vaccination coverage – 2.3 million vaccinations recorded by April 26, 2026, represented progress compared to the previous two seasons, but this number still represents only a minority of the Polish population [3]. Because the effectiveness of the influenza vaccine varies depending on age, season, subtype, and antigenic match, its value should be assessed primarily through the prism of preventing disease requiring contact with medical care, hospitalization, severe complications, and death, rather than through the prism of immunity completely preventing infection [14-17,52]. Studies on cardiovascular complications further strengthen the argument for the use of vaccine prophylaxis in elderly and cardiac patients [19,25,26,49].

Treatment strategies should be stratified by risk. Low-risk patients with uncomplicated disease often require symptomatic treatment and recommendations regarding alarm symptoms, while hospitalized patients with severe or progressive disease, or those in high-risk groups, should receive prompt antiviral treatment without waiting for test confirmation [12,13]. Oseltamivir remains the first-line treatment for influenza requiring hospitalization, while baloxavir is a useful outpatient option in selected uncomplicated cases [42-48]. Antibiotics should not be routinely used in uncomplicated viral influenza, but bacterial co-infection should be actively considered when the clinical picture suggests pneumonia, sepsis, or deterioration of the patient's general condition despite previous treatment [12,18].

Conclusions

Seasonal influenza in the 2025/2026 season in Poland and Europe was not a trivial respiratory infection, but a clinically significant multisystem disease. The Polish season demonstrated early growth, a high pediatric peak in incidence, significant hospitalizations and deaths, and increased but still insufficient vaccination coverage [3-5]. The most justified clinical and public health response remains annual vaccination, targeted protection of high-risk groups, rapid diagnosis of complications, early use of antiviral drugs in appropriate patients, and disciplined, rational antibiotic therapy [1,12,13,18-30].

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