



August 2019

Summary Report - The 2018/2019 Influenza Season

Main Findings:

Laboratory Surveillance:

- In the 2018/2019 winter season, the surveillance network numbered 32 clinics distributed throughout Israel. The sentinel clinic network operated from the first week of October 2018 (Week 40) until the second week of April 2019 (Week 15).
- A total of 1,487 specimens for influenza and RSV were collected from the sentinel network, of which some 40% were positive for influenza viruses and 10% were positive for RSV (Respiratory Syncytial Virus).
- Of the specimens that were positive for influenza viruses, approximately 99% were positive for influenza A and approximately 1% of the specimens were positive for influenza B.
- Of the specimens that were positive for influenza A, approximately 76% were positive for influenza A/H3N2 and approximately 24% were positive for influenza A/H1N1pdm09.
- The rate at which the influenza virus was identified in specimens from the sentinel clinics peaked in Week 3 of 2019, reaching approximately 76%.
- In the 2018/19 influenza season in Israel, the dominant strain of influenza was subtype A/H3N2, which was identified in 70% of all cases in the community. Molecular characterization of influenza strain revealed that most influenza viruses of subtype A/H3N2 belonged to clade 3C.3a, whereas the virus representing subtype A/H3N2 in the influenza vaccine for the 2018-2019 season belongs to clade 3C.2a1. Influenza viruses of subtype A/H1N1pdm09 were found to belong to clade 6B.1A, while the virus representing subtype A/H1N1pdm09 in the influenza vaccine given this season belongs to clade 6B.1.

Clinical Surveillance:

- In the 2018/19 season, the morbidity rate observed at the peak of the season was higher to that of the 2017/18 season and the 2016/17 season. The intensity of influenza activity in the community in the 2018/19 winter season is defined as medium or lower as per the thresholds calculated using the algorithm developed in the framework of the European influenza surveillance project.
- Similarly to the two previous winter seasons, this season also, the highest influenza-like morbidity rates in the community were observed for infants, children and youths up to the age of 18. For the elderly aged 65 and over, the rates were low.



- The rate of visits to "Maccabi Healthcare Services" physicians that ended in a diagnosis of pneumonia was particularly high among infants under the age of two years with a peak of some 85 visits per 10,000 infants, and for the elderly aged 65 years and over, with a peak of some 19 visits per 10,000 elderly persons.
- The proportion of pediatric emergency room visits that were due to pneumonia varied about the multi-annual average throughout the 2018/19 season.
- During most of the season, the percentage of visits to internal medicine (adult) emergency rooms with a diagnosis of pneumonia was above the multi-annual average.
- Throughout the 2018/19 winter season, the average hospital bed occupancy rate in internal medicine departments of general hospitals exceeded 100%.
- In pediatric departments, the average hospital bed occupancy rate exceeded 100% from Week 48 of 2018 until Week 7 of 2019 (second half of February 2019).
- During most of the 2018/19 winter season, the percentage of deaths due to pneumonia varied about the seasonally expected level.
- The all-cause mortality rate among the elderly aged 65 years and over in the 2018/19 winter season varied about the multi-annual average until Week 50 of 2018 (end of December 2018). From Week 51 of 2018 until Week 4 of 2019 (end of January 2019), an increase was observed in the mortality rate, which peaked in Week 4 (end of January 2019). During Weeks 2-4 of 2019 (January 2019), the mortality rate was above the multi-annual average. The mortality rate for the population below the age of 65 years was below the multi-annual average throughout the season, with the exception of Weeks 41 and 43 of 2018 (the second week for October 2018 and the second half of October 2018, respectively), when the mortality rate exceeded the multi-annual average.

Immunization against Influenza:

- In the 2018/19 winter season, the following influenza vaccines were registered in Israel: inactivated vaccines against four strains, inactivated vaccines against three strains and live attenuated vaccines against four strains.
- The inactivated vaccine against 3 or 4 strains is recommended for the overall population aged 6 months and over.
- Infants aged from half a year to two years may receive inactivated vaccine only.
- 2-49 year olds may receive live attenuated vaccine or inactivated vaccine.
- From age 50 and over, only inactivated vaccine is recommended.
- During the period from September 2018 until mid-February 2019, 2nd, 3rd and 4th grade pupils received a quadrivalent influenza vaccine (in the preceding year, only 2nd and 3rd grade pupils received the influenza vaccine), in the framework of the routine vaccinations given in schools through the Student Health Service. Approximately 45% of 2nd grade pupils, approximately 36% of 3rd grade pupils and approximately 30% of 4th grade pupils were immunized against influenza in the 2018/19 season.



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- In the 2018/19 season, some 1,750,000 people were immunized against seasonal influenza, constituting approximately 20% of the total population of Israel. Immunization coverage in the elderly group, of persons aged 65 years and over, reached approximately 60%. Immunization coverage for infants and children aged 6-59 months reached approximately 18%.



Background:

The influenza surveillance system in Israel is administered by the Israel Center for Disease Control (ICDC) in the Ministry of Health, and is based on two arms: a laboratory arm and a clinical arm. The laboratory surveillance is based on nasopharyngeal swab specimens collected from patients presenting to one of the sentinel clinics with influenza-like illness, and tested for the presence of influenza virus at the Central Virology Laboratory of the Ministry of Health. The clinical surveillance is primarily based upon information regarding patient visits to clinics in the community and to hospital emergency rooms due to influenza-like illness, upper respiratory tract inflammation and pneumonia.

All the information collected from the various information sources is analyzed by the staff of the Infectious Diseases Unit of the ICDC, and summarized in weekly reports during the influenza season, and distributed to the management of the Ministry and to specific groups of physicians. The reports may be viewed on the Ministry of Health website in Hebrew and in English¹.

The objectives of the influenza surveillance system are to present an up-to-date picture of morbidity from influenza and its complications, to describe the burden on the health system and to characterize the active influenza strains. The surveillance is usually conducted from October until April of the following year².

1. Laboratory Surveillance

Starting from the winter of 1996/97, the ICDC has been operating a network of sentinel clinics in the community to identify the influenza viruses that are active during the influenza season. In the 2018/19 winter season, the surveillance network numbered 32 clinics distributed throughout Israel, from Dimona in the South to Akko in the North (Appendix 1 shows the distribution of the sentinel clinics). The medical staff in these clinics have been instructed to take nasopharyngeal swabs from patients who are in the first to fourth day of their illness and meet the case definition for influenza-like illness (temperature of 37.8°C or higher accompanied by one or more of the following signs: cough, sore throat, muscle pain, runny nose, chills, etc.). The nasopharyngeal swabs are stored under refrigeration, and are transported once per week to the Central Virology Laboratory of the Ministry of Health (which constitutes one of the public health laboratories), where they are tested for the presence of influenza virus and of RSV. In the laboratory, the influenza viruses are characterized at the level of type (A or B), and strain; and genetic and antigenic changes are identified. The degree of correspondence of the influenza viruses to the seasonal vaccine and the degree of correspondence to the strains that are prevalent internationally is also assessed.



1.1 Virological Surveillance via the Sentinel Clinic Network: Winter 2018/19

The sentinel clinic network operated from the first week of October 2018 (Epidemiological Week 40) until the second week of April 2019 (Week 15). Table 1 shows the overall number of specimens received in the laboratory for each of the weeks of the surveillance period, for the under-18 and the 18-and-over age groups. The findings of the Central Virology Laboratory's testing of the specimens collected during the above period is shown in Tables 2-4. Of the influenza-positive specimens, approximately 99% were found to be positive for influenza A and approximately 1% were found to be positive for influenza B. Of the specimens that were positive for influenza A, approximately 76% were found to be positive for influenza A/H3N2 and approximately 24% were found to be positive for influenza A/H1N1pdm09 (Table 4).

Table 1: Number of nasopharyngeal specimens by epidemiological week and age group*, Winter 2018/2019^{1,3}:

Week	Year	Total No. of Specimens*	No. of Specimens from Children (< 18 years old)	No. of Specimens from Adults (≥18 yearsold)
40	2018	4	2	2
41	2018	22	14	8
42	2018	32	15	17
43	2018	44	30	14
44	2018	36	21	15
45	2018	39	14	25
46	2018	52	27	25
47	2018	59	33	26
48	2018	47	24	23
49	2018	62	34	28
50	2018	77	47	30
51	2018	78	52	26
52	2018	87	60	27
1	2019	115	76	39
2	2019	96	58	38
3	2019	102	66	36
4	2019	84	43	41
5	2019	120	64	56
6	2019	102	49	53
7	2019	77	39	38
8	2019	38	21	17
9	2019	42	29	13
10	2019	28	14	14
11	2019	18	7	11



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Week	Year	Total No. of Specimens*	No. of Specimens from Children (< 18 years old)	No. of Specimens from Adults (≥18 yearsold)
12	2019	7	3	4
13	2019	8	2	6
14	2019	9	3	6
15	2019	2	0	2
Total		1,487	847	640



Table 2: Distribution of influenza- and RSV-positive nasopharyngeal specimens collected at the sentinel clinics, 2018/19 Season^{1,3}: Numbers and Percentages

Total No. of Specimens Sent	N=1,487	% from total
Influenza-positive specimens	601	40.4
RSV-positive specimens	143	9.6
Specimens negative for influenza and for RSV*	751	50.5

*2 specimens during the current season were found to be positive both for influenza A/H1N1 2009 and for RSV, and 2 additional specimens were found to be positive both for influenza A/H3N2 and for RSV. Four additional specimens were found to be positive for influenza A/H1N1 2009 and for influenza B.

Figure 1 shows the influenza sub-types isolated from specimens in the sentinel network. A similar pattern of subtype isolations was also identified in hospitalized patients with respiratory illness diagnosed at the Central Virology Laboratory.

Figure 1: Nasopharyngeal specimens collected at the sentinel clinic network, by laboratory influenza detection and epidemiologic week of specimen collection, 2018/19 Season^{1,3}: Numbers and percentage of Influenza-positive specimen

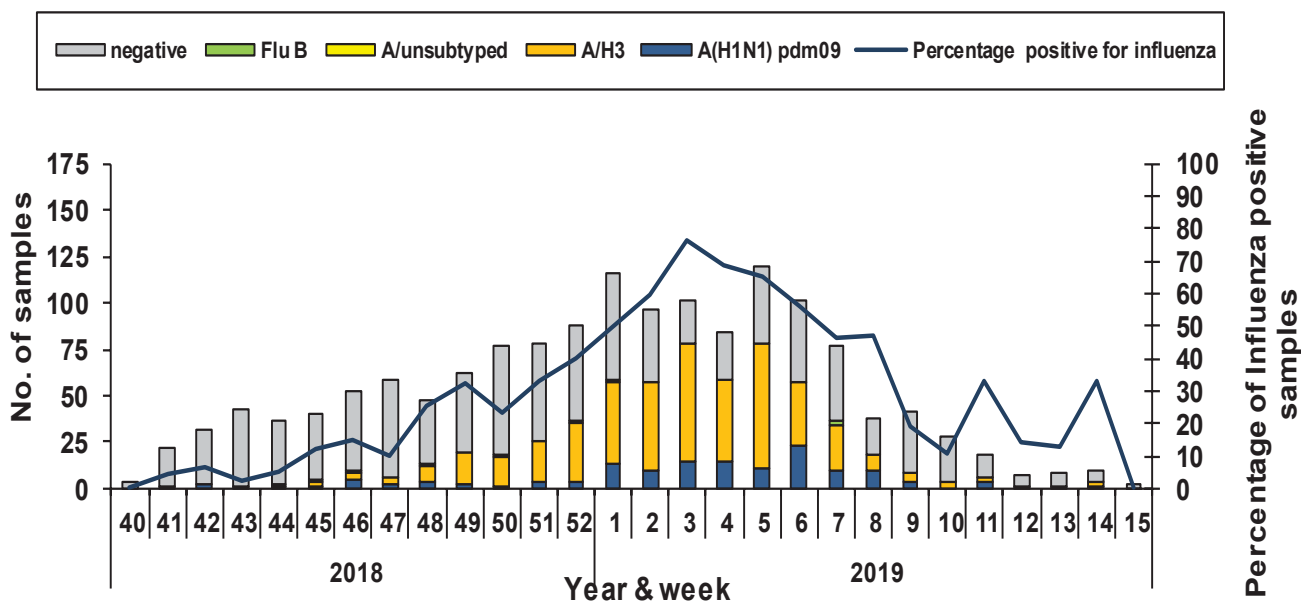




Table 3: Distribution of nasopharyngeal specimens positive for influenza and RSV, By age group, 2018/19 Season³: Numbers and percentages

Age group	Influenza-positive specimens	RSV-positive specimens	Total Specimens
	N (%) [*]	N (%) [*]	
0-4	143 (29.6)	110 (22.7)	483
5-17	221 (60.7)	7 (1.9)	364
18-44	143 (38.5)	7 (1.8)	371
45-64	62 (34.8)	12 (6.7)	178
65+	28 (30.7)	6 (6.6)	91
Total	597	142	1,487

^{*} % of all specimens sent for each age group



Table 4: Distribution of influenza-positive nasopharyngeal specimens, by type and subtype, 2018/19 Season^{1,3}: Numbers and percentages

Type of Influenza Virus	N	%
Type A influenza	592	98.5
A/H1N1 2009	139	23.5
A/H3	453	76.5
A/H1	0	0
Type B influenza	9	1.5
Total No. of influenza-positive specimens	601	100

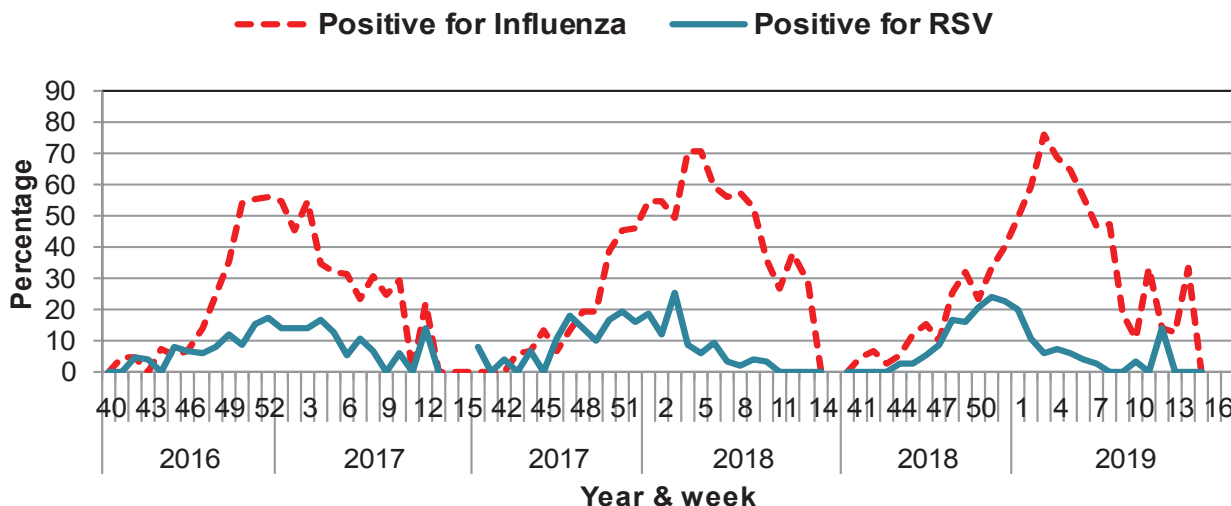
Figure 2 shows the results of testing for influenza viruses and RSV by the Central Virology Laboratory of specimens collected at the sentinel clinics during the surveillance season, by Week. The percentage of RSV-positive specimens began to increase in the second week of December 2018 (Week 50). The percentage of positive specimens continued to increase until the end of December 2018, when it reached a peak of 24% of all specimens. From the second week of January 2019, a decrease began in the percentage of RSV-positive specimens in the sentinel network, and starting from Week 11 of 2019 (second half of March 2019), only a few percent of the specimens were positive for RSV³. The percentage of influenza-positive specimens began to increase in the first week of November 2018 (Week 45). In the second half of January 2019, the percentage of specimens positive for influenza reach a peak of some 76%, after which the percentage of positive specimens began to decrease. Specimens positive for influenza were found throughout almost the entire surveillance period, until Week 15 of 2019 (second week of April 2019), when there were no specimens positive either for influenza or for RSV.



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Figure 2: Nasopharyngeal specimens positive for influenza and for RSV, by epidemiologic week of specimen, 2016-2019^{1,3}: Percentages



2. Clinical Surveillance

The clinical surveillance is based on a number of information sources:

- Data regarding persons insured by the two largest HMOs in Israel ("Maccabi Healthcare Services"⁴ and "Clalit" Health Services⁵) who presented to community physicians and were clinically diagnosed as having influenza or influenza-like illness, or pneumonia. Detailed non-identified information about these patients is conveyed to the ICDC daily, and stored in a dedicated database.
- Daily data regarding the number of patients who presented to the emergency rooms of "Clalit" Health Services' eight general hospitals and were diagnosed with pneumonia.
- Daily data regarding hospital bed occupancy rates in the general hospitals.
- Data regarding deaths in the community and in hospitals.
- Weekly data regarding overall deaths in Israel due to all causes and due to pneumonia, which were reported to the Epidemiology Division of the Ministry of Health.

2.1 Surveillance of Influenza-Like Illness in the Community

Figure 3 shows weekly influenza-like illness rates, based upon patient visits to "Maccabi Healthcare Services" physicians in the community during the period May 2016 to May 2019. This period includes the three last winter seasons. Additionally, a plot representing



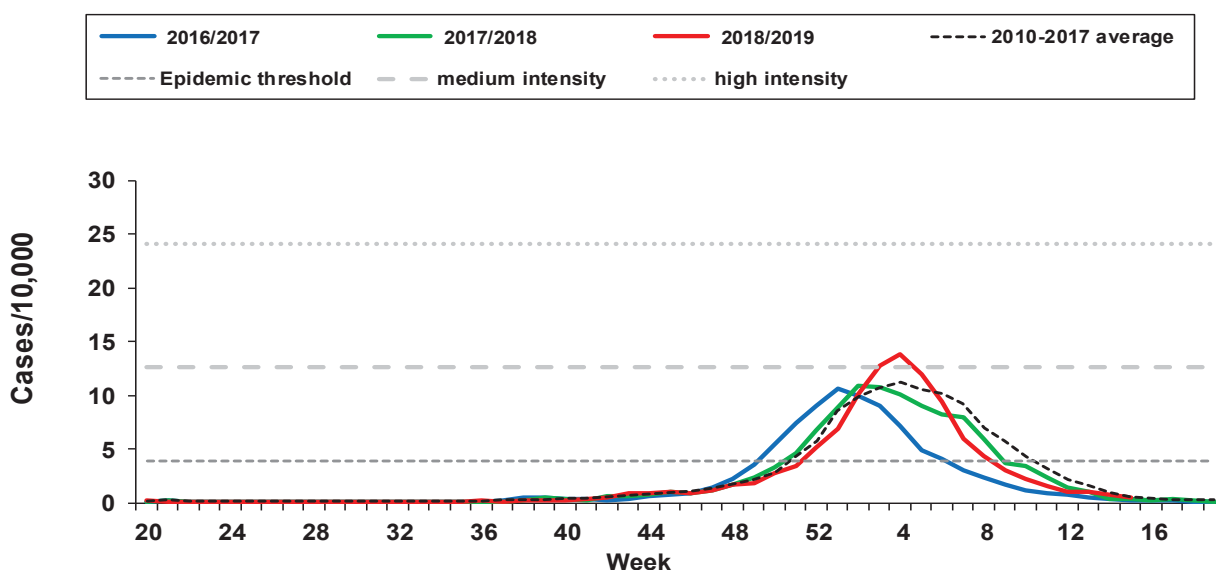
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the multi-annual average showing seasonal influenza-like illness in the community is also displayed for the years 2010-2017 (excluding the 2009/10 season, which deviated from the norm due to the appearance of a new strain of A/H1N1 influenza, which caused a pandemic). This season, we have again displayed the baseline level in the figure, which is intended to indicate the beginning of the influenza season and the intensity of influenza activity. The baseline level and the intensities were calculated using an algorithm that was developed in the framework of the European influenza surveillance project (EuroFlu), based on past data accumulated at the ICDC regarding visits to "Maccabi Healthcare Services" clinics due to influenza-like illness. Morbidity rates exceeded the baseline level for the first time in Week 52 of 2018 (last week of December 2018), and remained above it until Week 8 of 2019 (second half of February 2019). Influenza intensity in the community in the 2018/19 winter season is defined (by peak morbidity) as medium or lower as per the thresholds calculated using the algorithm developed in the framework of the European influenza surveillance project.

In the 2018/19 season, the morbidity rate observed at the peak of the season was high in comparison to that of the 2017/18 season and the 2016/17 winter season. The highest morbidity rates observed were for infants, children and youths up to the age of 18 years. For these age groups, the rates were high in comparison to the two previous years (Figure 4).

Figure 3: Physician's visits per epidemiological week at "Maccabi Healthcare Services" clinics that ended with the diagnosis of influenza-like illness (ILI)*^{1,4}: Rates per 10,000



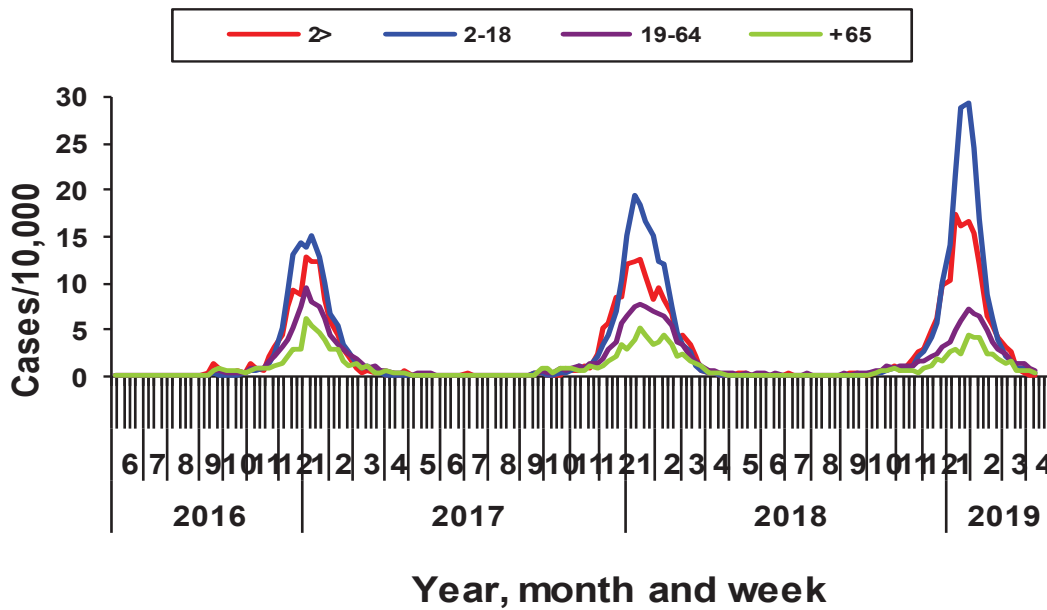
* The multi-annual average does not include the 2009/10 winter season.



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Figure 4: Physician's visits per epidemiological week at "Maccabi Healthcare Services" clinics that ended with the diagnosis of influenza-like illness (ILI), by Age Group^{1,4}: Rates per 10,000



2.2 Surveillance of Pneumonia Morbidity in the Community

Figure 5 shows weekly visit rates to "Maccabi Healthcare Services" physicians that ended with a diagnosis of pneumonia during the period May 2016 to May 2019, as compared to the multi-annual average, excluding the 2009/10 season. Throughout the season, clinic visit rates varied about the multi-annual average. Peak morbidity was in the fourth week 2019 (end of January 2019) (Figure 5).

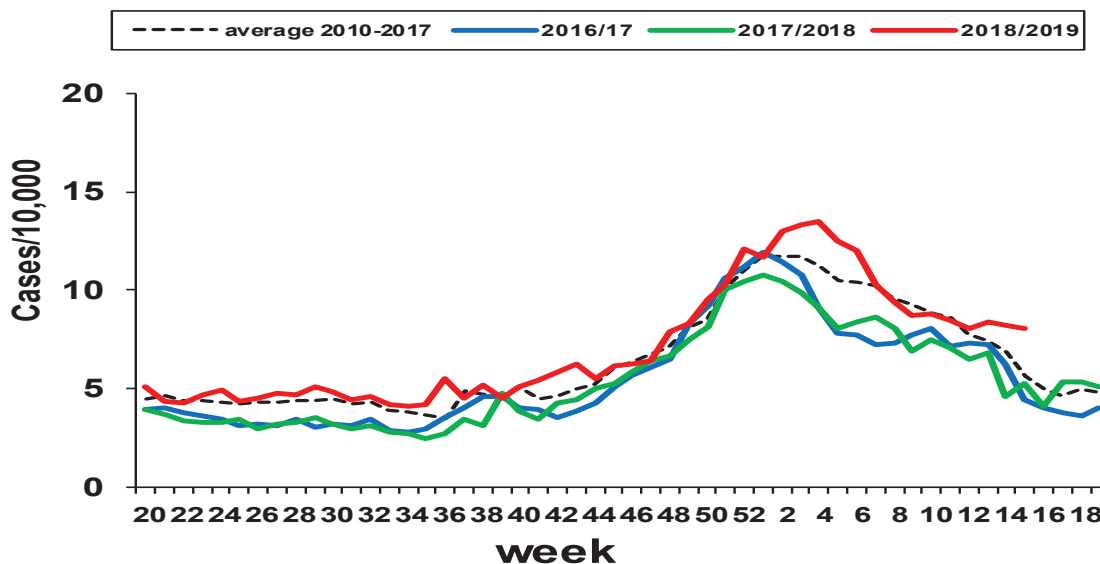
The rate of visits due to pneumonia in the group of infants under the age of two years reached a peak of some 85 per 10,000 HMO members in the 2018/19 winter season; in the group of children and youths aged 2-18 years, the visit rate reached a peak of 18 per 10,000 HMO members; and the visit rate for the group of the elderly, aged 65 years and over, reached a peak of some 19 visits per 10,000 HMO members. For the group of adults aged 19-64 years, visit rates due to pneumonia were lower than the rates for the remaining age groups (a peak of 8 per 10,000 HMO members) (Figure 6).



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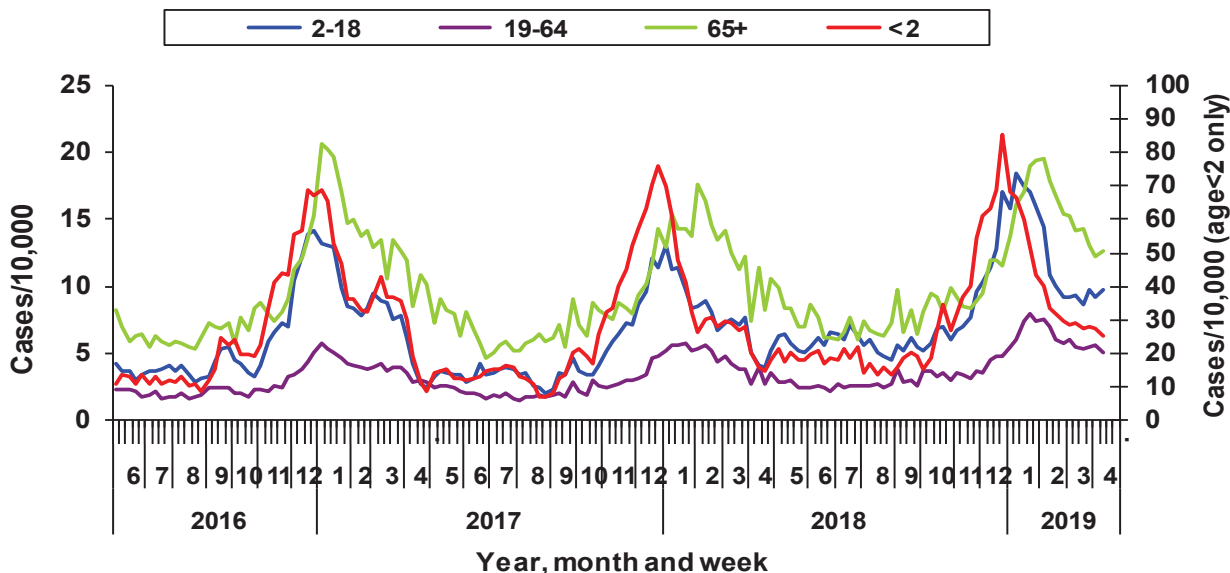
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Figure 5: Physician's visits per epidemiological week at "Maccabi Healthcare Services" clinics that ended with the diagnosis of pneumonia^{1,4*}: Cases per 10,000



* The multi-annual average does not include the 2009/10 winter season.

Figure 6: Physician's visits per epidemiological week at "Maccabi Healthcare Services" clinics that ended with the diagnosis of pneumonia, by age group^{1,4}: Cases per 10,000 (the y-axis for infants up to the age of two years is on the right hand side of the Figure, and the y-axis on the left hand side of the Figure is for all the remaining age groups)





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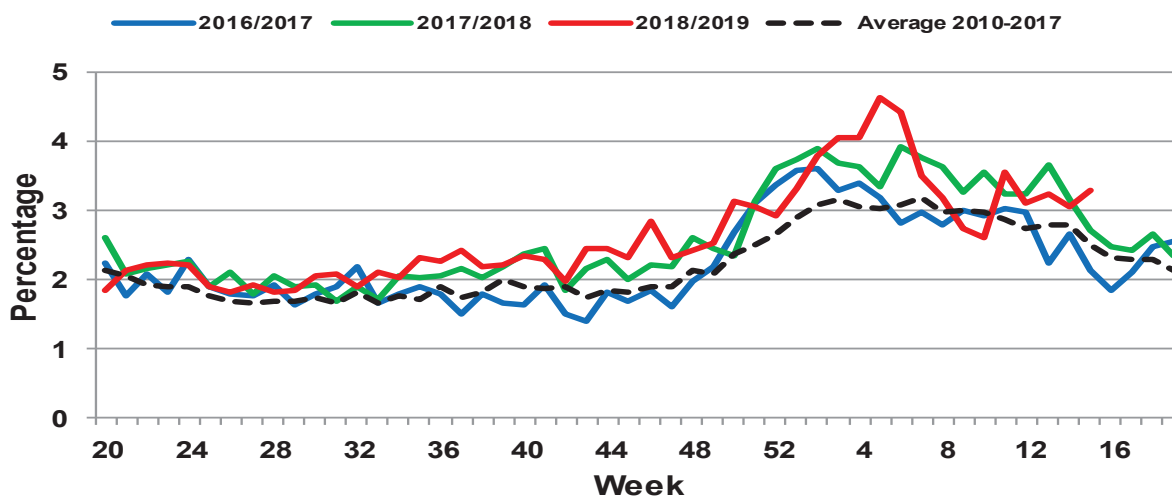
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2.3 Surveillance of Emergency Room Visits that ended with a Diagnosis of Pneumonia

Influenza morbidity is generally accompanied by increased emergency room visits due to pneumonia. Figures 7 and 8 show visits that ended with a diagnosis of pneumonia, as a percentage of all emergency room visits that ended with any diagnosis, for adults (internal medicine) and for children, in "Clalit" Health Services' 8 general hospitals.

- Adult (internal medicine) emergency rooms: From Week 20 until Week 32 of 2018 (beginning of August 2018), the percentage of visits varied about the multi-annual average. From Week 33 of 2018 (middle of August 2018) until Week 8 of 2019 (second half of January 2019), the percentage of visits was above the multi-annual average (Figure 7)⁵; a peak was observed in the percentage of visits in Week 3 of 2019 (first half of January). From Week 9 of 2019 (end of February 2019), a decrease was observed in the percentage of visits, and from Week 10 until Week 14 (during March 2019), the percentage of visits was high in comparison to the multi-annual average (Figure 7)⁵.
- Pediatric emergency rooms: The percentage of visits due to pneumonia to pediatric emergency rooms varied about the multi-annual average throughout the entire season, even though the peak was observed in Week 1 of 2019 (Figure 8)⁵.

Figure 7: Visits to adult (Internal Medicine) emergency departments at "Clalit Health Services" hospitals that ended with the diagnosis of pneumonia, May 2016 - April 2019, and the Multi-Annual Average*^{1,6} (expressed as a percentage of all visits that ended with any diagnosis)



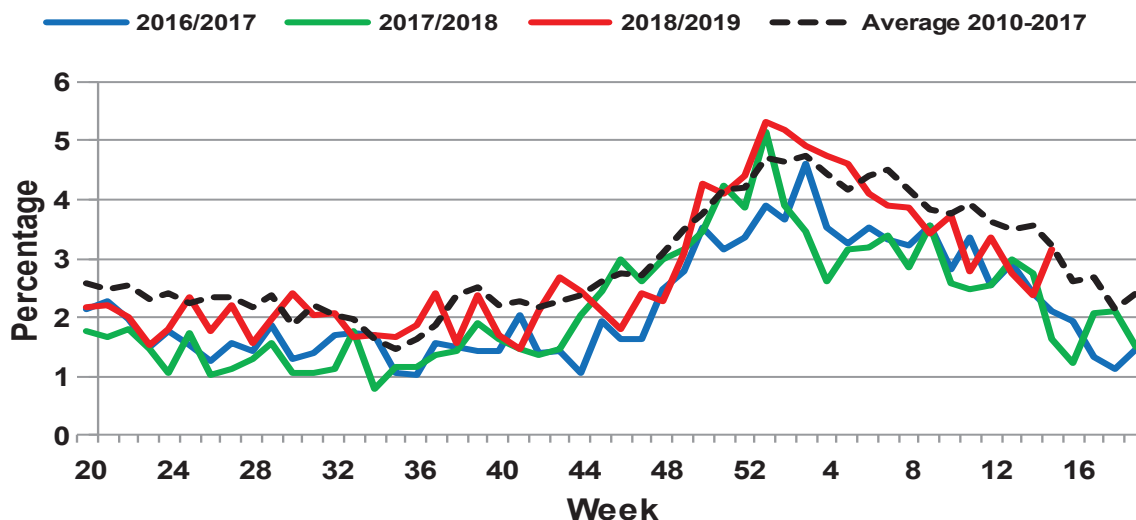
* The multi-annual average does not include the 2009/10 winter season.



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Figure 8: Visits to pediatric emergency departments at "Clalit Health Services" Hospitals that ended with the Diagnosis of Pneumonia, May 2016 - April 2019, and the Multi-Annual Average*^{1,6} (expressed as a percentage of all visits that ended with any diagnosis)



* The average does not include the 2009/10 winter season.

2.4 Surveillance of emergency department visits that ended with the diagnosis of bronchiolitis

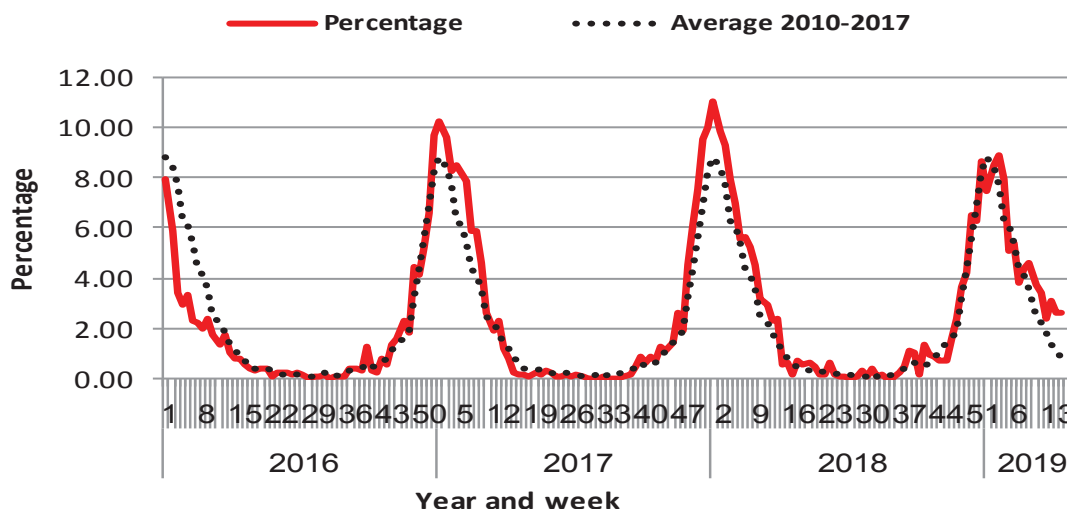
Figure 9 shows the percentage of visits of infants under the age of two years to pediatric emergency rooms due to bronchiolitis in the years 2016-2019. It can be seen that the wave of morbidity commenced this year in Week 48 of 2018, and the percentage of visits peaked in Week 3 of 2019 (second half of January 2019).



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Figure 9: Visits to (pediatric) emergency departments at "Clalit Health Services" hospitals that ended with the diagnosis of bronchiolitis, January 2016 - April 2019, and the multi-annual average^{1,6} (expressed as a percentage of all visits that ended with any diagnosis)



2.4 Surveillance of weekly hospital bed occupancy rates in general hospitals

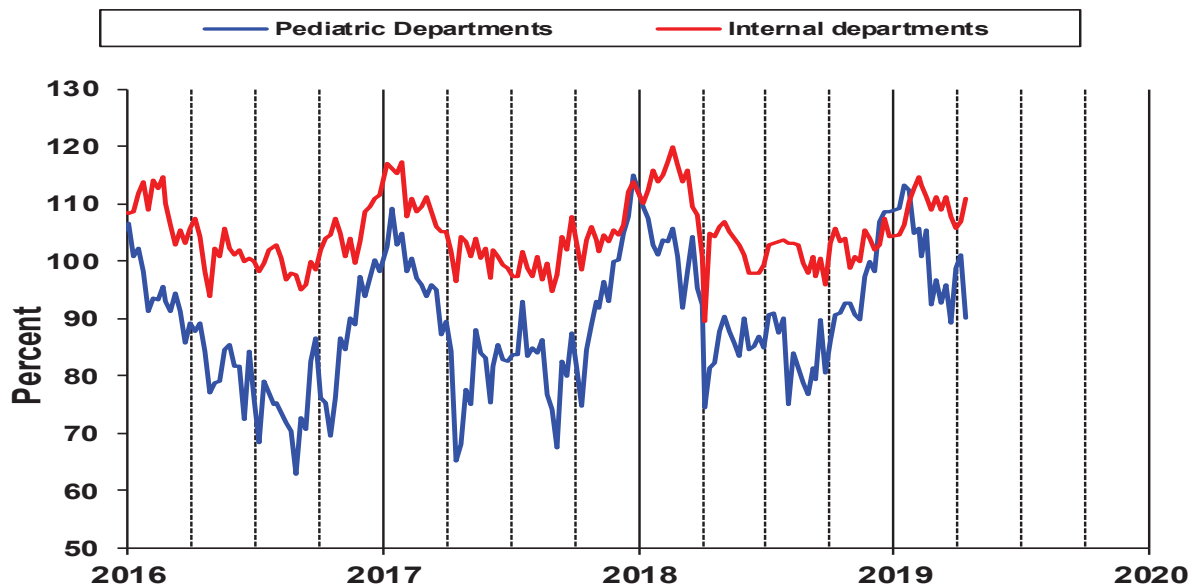
Throughout the entire 2018/19 winter season, the average hospital bed occupancy rate in internal medicine departments of general hospitals exceeded 100%, peaking at 114% in Week 5 of 2019 (last week of January 2019). In pediatric departments, the average occupancy rate was lower than in internal medicine departments. From Week 48 of 2018 until Week 7 of 2019 (second half of February 2019), the occupancy rate exceeded 100%, peaking at 113% in Week 2 of 2019. In pediatric departments, this year's peak occupancy rate was lower than the peak recorded in the previous influenza season, but higher than that observed two years ago. Similarly, also in internal medicine departments, the peak hospital bed occupancy rate was lower than the peaks recorded in the two previous influenza seasons.



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Figure 10: Weekly hospital bed occupancy rates in internal medicine and pediatric departments, at general hospitals, 2016-2020¹: Average percentage



2.5 Surveillance of Mortality

2.5 Mortality Rates during the 2018/19 Influenza Season

In order to assess the severity of influenza during the winter seasons, two measures of mortality were utilized: mortality due to all causes (Figures 11+12), and mortality due to pneumonia as a percentage of all cases of death in Israel (Figure 13).

The all-cause mortality rate (per 100,000) for the elderly aged 65 years and over during the 2018/19 winter season (Figure 11) varied about the multi-annual average until Week 50 of 2018 (end of December 2018). From Week 51 of 2018 until Week 4 of 2019, an increase was observed in the mortality rate, which peaked in Week 4 (end of January 2019). During Weeks 2-4 of 2019 (January 2019), the mortality rate was above the multi-annual average (Figure 11). The mortality rate for the population below the age of 65 years (Figure 12) was below the multi-annual average throughout the season, with the exception of Weeks 41 and 43 of 2018 (second and fourth weeks of October 2018, respectively), when the mortality rate exceeded the multi-annual average (Figure 12).

During the current season, the percentage of deaths due to pneumonia varied about the seasonally expected level, with the exception of Week 9 of 2019 (end of February 2019) and

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Week 11 of 2019 (first half of March 2019), when the percentage of deaths crossed the epidemic threshold (Figure 13).

Figure 11: Weekly all-cause mortality rate among elderly aged ≥ 65 Years old, as compared to the multi-annual average, 2014-2019: Rates per 100,000

Figure 12: Weekly all-cause mortality rate among individuals < 65 years old, as compared to the multi-annual average, 2014-2019: Rates per 100,000

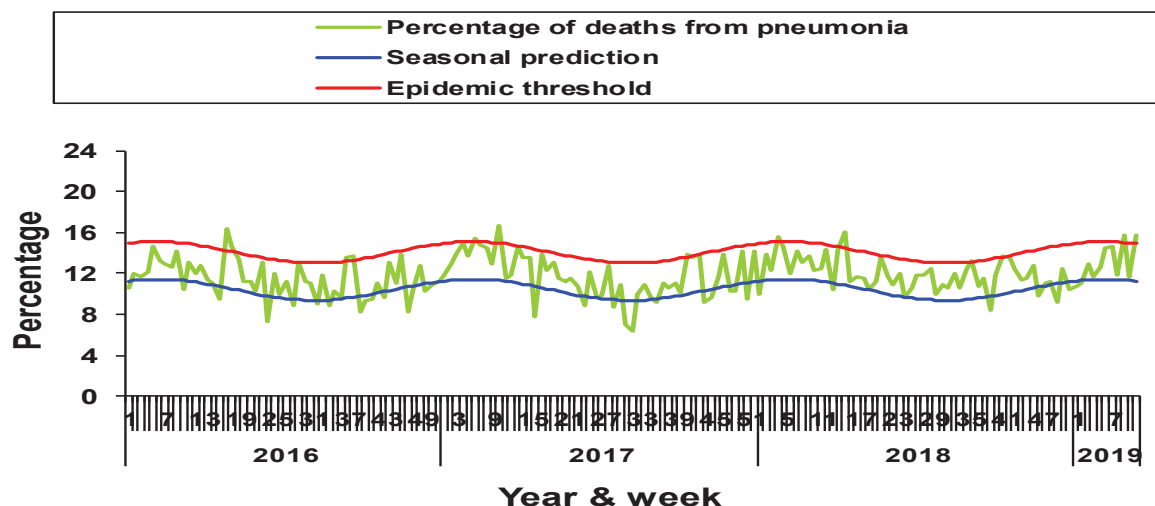
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Figure 13: Deaths per epidemiological week due to pneumonia, as compared to level expected from multi-annual data, 2016-2019: Percentage of all cases of death



2.6 Data from hospitalized patients who meet the case definition for Severe Acute Respiratory Infection (SARI) in the Hospitalized Patients Influenza Surveillance Network*

The case definition for SARI has been determined by the World Health Organization. In the framework of this surveillance, specimens are taken from hospitalized patients with a temperature of 38⁰C or higher (or reported temperature) and cough, within 10 days of onset of the illness.

From Figure 14, it is seen that the number of influenza-positive specimens from SARI patients reached a peak (37 specimens) in Week 5 of 2019 (last week of January 2019), after which a decrease was observed in the number of specimens until Week 16 of 2019 (second half of April 2019).

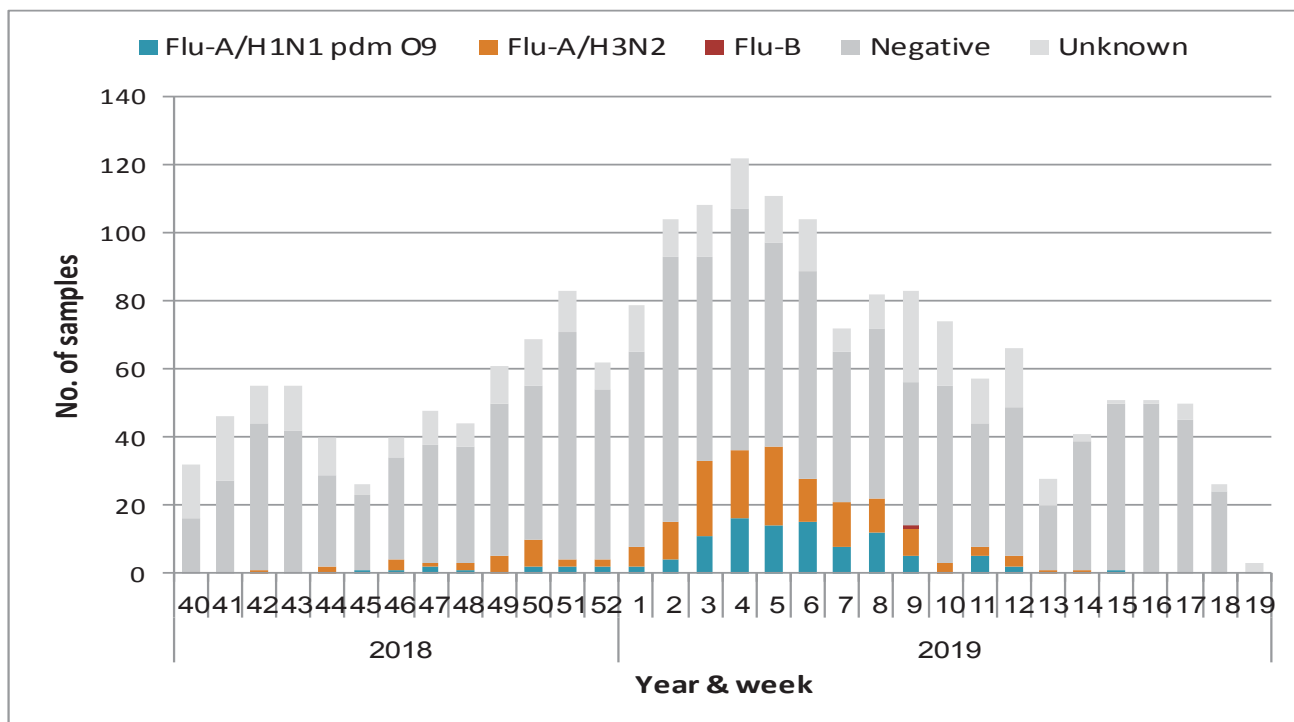
Also, 60% of all influenza A specimens were found to be positive for influenza subtype A/H3N2, and 40% of the specimens were found to be positive for influenza subtype A(H1N1)pdm09 (Figure 15). One specimen was found to be positive for influenza B.



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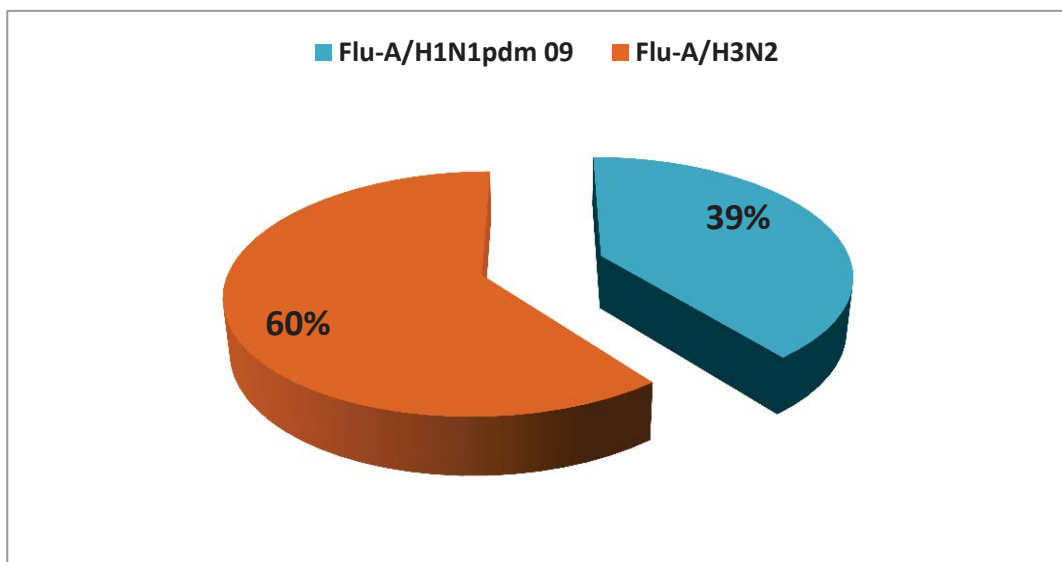
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Figure 14: Specimens positive for influenza out of total specimens collected the Hospitalized Patients Influenza Surveillance Network*, 2018-2019



*The network has selected departments from 2 medical centers (Sheba and Rambam).

Figure 15: Percentage of specimens positive for influenza A, by strain





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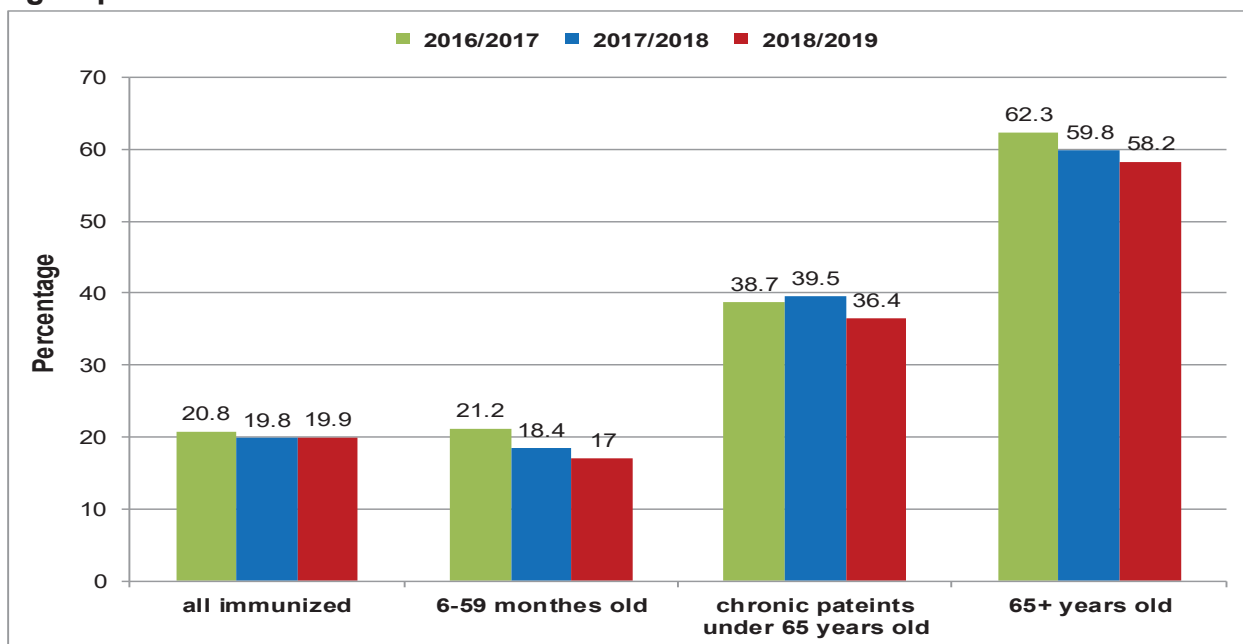
3. Vaccination against Influenza

Since 2011, there has been a recommendation for the entire population over the age of 6 months to be vaccinated against influenza. In the Vaccination Guide of the Division of Epidemiology⁸, detailed information regarding the influenza vaccine can be found.

In the 2018/19 season, some 1,750,000 people were immunized against seasonal influenza (approximately 20% of the total population of Israel). Immunization coverage in the elderly group, of persons aged 65 years and over, reached approximately 60%. Immunization coverage for infants and children aged 6-59 months reached approximately 17%.

The percentage of all members of all HMOs who were immunized was similar to the percentages recorded in the preceding winter seasons (Figure 16). For HMO members aged 6-59 months and chronically ill HMO members under the age of 65 years, the percentage immunized in the 2018/19 season was lower than that recorded in the two previous seasons. The percentage immunized of those aged 65 years and above approximated that observed last season.

Figure 16: Influenza vaccination percentages for the past three influenza seasons, by age group⁹:



During the period from September 2018 until mid-February 2019, 2nd, 3rd and 4th grade pupils received one dose of quadrivalent influenza vaccine (in the preceding year, only 2nd



and 3rd grade pupils received the influenza vaccine), through the Student Health Service. Approximately 45% of 2nd grade pupils, approximately 36% of 3rd grade pupils and approximately 30% of 4th grade pupils were immunized against influenza.

Table 5 shows the percentages immunized against influenza among infants and children aged 6 months to 5 years and among children and adolescents aged 5-18 years in the years 2013-2018.

Table 5: Percentages of infants and children vaccinated against influenza, 2013-2018⁹:

Season	6 months to 59 months	5-18 years
2013-2014	18.3	7.1
2014-2015	25.4	10.9
2015-2016	23.2	10.6
2016-2017	21.2	13.4*
2017-2018	18.4	13.9**
2018-2019	17	12.5***

*Only a portion of 2nd grade pupils are included in this figure

**Only a portion of 2nd-3rd grade pupils are included in this figure[^]

***Only a portion of 2nd-4th grade pupils are included in this figure[^]

[^]The incompleteness of the data stems from a delay in conveying data from the Student Health Service to the HMOs.

4. Molecular Characterization of Influenza Strain

- In the 2018/19 influenza season in Israel, the dominant strain of influenza was subtype A/H3N2, which was identified in 70% of all cases in the community.
- Molecular characterization of influenza strain revealed that most influenza viruses of subtype A/H3N belonged to Clade. 3C.3a. The virus representing subtype A/H3N2 in the influenza vaccine for the 2018-2019 season belongs to clade 3C.2a1. Influenza viruses of subtype A/H1N1 09 were found to belong to clade 6B.1A. The virus representing subtype A/H1N1pdm09 in the influenza vaccine given this season belongs to clade 6B.1.



5. International Comparison

USA¹⁰: During the 2018/19 season, A(H1N1)pdm09 was the predominant subtype.

The increase in the percentage of clinic visits due to ILI (influenza-like illness) in the 2018/19 winter season commenced in the second half of December 2018 (Week 50), crossed the national baseline level, and remained above it until Week 15 of 2019 (first half of April 2019). The current season commenced relatively early, and the peak levels were high in comparison to the 2016/17 influenza season, in which influenza A/H3N2 was dominant.

During the winter of 2018/19, the hospitalization rate reported as the result of influenza morbidity was 64.7 per 100,000. The hospitalization rate was particularly high for the elderly aged 65 years and over (216 per 100,000). Among hospitalized patients diagnosed with influenza A, 46.2% were diagnosed with A/H3N2 and 53.8% were diagnosed with A(H1N1)pdm09.

From Week 40 of 2018 (beginning of October 2018) until Week 17 of 2019 (second half of April 2019), 101 cases of child deaths from influenza were reported throughout the USA.

According to data from the public health laboratories in the USA, by Week 17 (ending 27-Apr-19), a total of 75,776 specimens were collected. Of these, 40,043 (52.8%) were found to be positive for influenza, of which 38,621 (96.4%) were positive for influenza A: 15,715 (40.7%) were found to be positive for influenza H3N2, 21,361 (55.3%) were found to be positive for influenza A(H1N1)pdm09 and 1,545 specimens (4.0%) were not yet subtyped. 1,422 additional specimens (3.6%) were found to be positive for influenza B, of which 39.2% were found to belong to the B/Yamagata lineage and 60.8% to the B/Victoria lineage.

Europe¹¹: The 2018/19 season began in Week 49 of 2018 (end of December 2018), with 10% of specimens positive for influenza. Between Week 3/2019 (first half of January 2019) and Week 7/2019 (second half of February 2019), the percentage of specimens that were positive reached more than 50%, peaking in Week 5/2019 (last week of January 2019). Combined activity of influenza A/H3N2 and influenza A/H1N1 2009 was reported, with dominance varying between the various countries.

Sensitivity to Antiviral Preparations: Both in Europe and in the USA, the influenza viruses were found to be highly sensitive to Oseltamivir and to Zanamivir, and highly resistant to Adamantanes^{10,11}.



Sources of Information:

1. Israel Center for Disease Control. Influenza Surveillance in the 2018-2019 Winter Season in Israel and Internationally.
https://www.health.gov.il/UnitsOffice/ICDC/Infectious_diseases/Flu/Pages/default.aspx
2. Bromberg, M., Kaufman, Z., Mandelboim, M., Sefty, H., Shalev, V., Marom, R., Mendelson, E., Green, M., Shohat, T. Clinical and virological surveillance of influenza in Israel: implementation during pandemic influenza. Harefuah 2009; 148 (9): 577-82.
3. Data by the courtesy of the Central Virology Laboratory, Ministry of Health, 2018-2019.
4. Data by the courtesy of "Maccabi Healthcare Services", 2018-2019.
5. Data by the courtesy of "Clalit" Health Services, 2018-2019.
6. Data by the courtesy of the Computing Division, Ministry of Health, 2018-2019.
7. Data by the courtesy of the Epidemiology Division, Ministry of Health, 2018-2019.
8. Vaccination Guide, October 2018 Update. Epidemiology Division, Ministry of Health.
http://www.health.gov.il/UnitsOffice/HD/PH/epidemiology/td/docs/tadrich_Chisunim.pdf
9. Data by courtesy of all 4 HMOs, 2018-2019.
10. Center for Disease Control and Prevention, Seasonal Influenza (Flu): Flu Activity and Surveillance. <http://www.cdc.gov/flu/weekly>
11. Flu News Europe- joint ECDC-WHO/Europe weekly influenza update.
<http://flunewseurope.org/>



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Appendix 1: National Distribution of the Sentinel Clinic Network

