



2022-2023절기 대한민국 인플루엔자 국가예방접종 지원사업 결과

안서현, 권승현, 송민주, 전성수, 이재영, 박진희, 배현아, 이재은, 이형민*

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초 록

우리나라는 65세 이상 어르신, 임신부, 생후 6개월부터 13세 어린이를 대상으로 인플루엔자 국가예방접종 지원사업을 시행하고 있다. 이 글에서는 2022-2023절기 인플루엔자 국가예방접종 지원사업에 대한 주요 결과를 소개하고자 한다. 각 대상군 접종률은 어르신 81.9%로 전년 대비 1.4%p 증가하였고, 임신부와 어린이는 50.4%와 71.0%로 전년 대비 3.8%p와 2.8%p 감소하였다. 인플루엔자 예방접종 후 이상반응 신고는 총 118건으로 예년과 비슷한 수준이었다. 2022-2023절기 주요 결과를 살펴봄으로써 향후 인플루엔자 국가예방접종 지원사업 발전을 위한 기초자료로 활용할 수 있을 것으로 기대한다.

주요 검색어: 인플루엔자; 예방접종; 접종률

서 론

인플루엔자는 인플루엔자 바이러스에 의해 발생하는 질환으로 38℃ 이상의 갑작스러운 발열, 근육통, 두통 등 전신 증상과 인후통, 기침 등 호흡기 증상이 나타난다. 주로 11월부터 다음 해 4월까지 유행하며, 65세 이상 고령층, 5세 미만 소아, 만성질환자는 합병증, 입원, 사망의 위험이 높은 것으로 알려져 있다[1].

우리나라는 1997년부터 보건소에서 65세 이상 어르신을 대상으로 인플루엔자 국가지원 예방접종을 시행하여 2015년부터는 민간 위탁의료기관 접종까지 지원 대상을 확대하였다. 어린이 인플루엔자 국가예방접종 지원사업은 2016년 생후

6개월부터 12개월 미만의 영유아, 2017년 생후 6개월부터 59개월 어린이, 2018년 생후 6개월부터 12세 어린이, 2020년 생후 6개월부터 13세 어린이까지 국가지원 대상을 점차 확대하였다[2]. 임신부는 인플루엔자에 감염될 경우 폐렴 합병증 발생 등의 위험이 크고, 태아 건강 보호 및 감염에 취약한 출생 후 6개월 미만 영아 보호를 위해 2019년부터 지원 대상에 포함되었다.

2020-2021 절기에는 코로나바이러스감염증-19(코로나19) 유행으로 인한 인플루엔자와 코로나19의 동시 유행을 대비하기 위해 62세부터 64세 어르신, 14세부터 18세 청소년, 장애인 연금·수당, 의료급여 수급권자를 대상으로 한시적으로 인플루엔자 예방접종 지원 대상을 확대하였다.

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핵심요약

① 이전에 알려진 내용은?

인플루엔자 국가예방접종은 65세 이상 어르신과 임신부 및 생후 6개월부터 13세 어린이를 대상으로 시행하고 있다.

② 새로이 알게 된 내용은?

2022-2023절기 인플루엔자 접종률은 어르신 81.9%로 지난 절기보다 증가하였고, 임신부 50.4%, 어린이 71.0%로 지난 절기보다 감소하였다. 또한, 인플루엔자 예방접종 후 이상반응 신고는 118건으로 전년 수준과 유사하였다.

③ 시사점은?

2022년 하반기부터 인플루엔자 바이러스가 계절 특성을 회복하고 있어 호흡기 감염에 취약한 어린이 및 고령층에서 감염에 주의가 필요하므로 전 대상의 인플루엔자 접종률 향상을 위한 다양한 방안이 마련되어야 할 것이다.

이 글에서는 2022-2023절기 인플루엔자 국가예방접종 지원사업의 주요 결과를 살펴보고, 향후 인플루엔자 국가예방접종 사업 운영을 위한 기초자료로 활용하고자 한다.

본 론

1. 2022-2023절기 인플루엔자 국가예방접종 지원사업 개요

2022-2023절기 인플루엔자 국가예방접종 지원사업은 65세 이상 어르신, 임신부, 생후 6개월부터 13세 어린이를 대상으로 시행하였다. 인플루엔자 예방접종은 접종 약 2주 후부터 항체가 생성되며 평균 6개월 정도 지속되는 점과 이전 절기 유행 시기 등을 고려하여 사업기간을 선정하였다(표 1). 어린이 사업은 2회 접종이 필요한 소아의 적절한 면역획득(1차 접종 후 최소 4주 간격으로 2차 접종)을 위해 9월부터 사업을 시작하고, 어르신의 경우 사업 초기 접종이 집중되므로 안전한 접종을 위해 연령별로 접종 시기를 구분하였다.

인플루엔자 예방접종은 주소지에 관계없이 전국 보건소, 보건진료소, 보건진료소, 위탁의료기관 21,930개소에서 국가지원 접종을 받을 수 있으며, 인플루엔자 3가 백신보다 B형 바이러스 항원을 하나 더 포함하고 있어 인플루엔자 유행주와의 불일치 가능성을 감소시켜 인플루엔자 예방 효과가 뛰어난 4가 백신을 지원하였다[3].

예방접종률은 질병관리청 질병보건통합관리시스템 내 예방접종통합관리시스템 등록자 중 해당 연도 출생자를 대상으로 하였으며, 예방접종 기록은 보건소 및 위탁의료기관에서 예방접종 실시 후 전산 등록된 예방접종 기록을 기준으로 산

표 1. 2022-2023절기 인플루엔자 국가예방접종 지원사업 대상자 및 사업기간

대상자	사업기간
어린이(2009.1.1.-2022.8.31. 출생아)	
2회 접종 대상 ^{a)}	2022.9.21.-2023.4.30.
1회 접종 대상(13세 이하)	2022.10.5.-2023.4.30.
임신부	2022.10.5.-2023.4.30.
어르신(1957.12.31. 이전 출생자)	
75세 이상	2022.10.12.-2022.12.31.
70-74세 이상	2022.10.17.-2022.12.31.
65-69세 이상	2022.10.20.-2022.12.31.

^{a)}9세 미만 인플루엔자 예방접종을 처음 받거나 2022년 6월 30일까지 총 2회 미만 접종한 대상.

출하였다. 어린이 접종률은 1회 접종 및 2회 접종 대상자 중 1차 접종 완료자에 대한 접종률로 산출하였고 임신부는 사업 대상자 수 확인이 어려워 공개된 2021년 출생아 수로 대체하여 산출하였다. 예방접종 건수 및 예방접종률 산출 시, 국가지원 및 자비 접종 건을 포함하였다.

2. 어르신 인플루엔자 예방접종 실적

어르신 인플루엔자 예방접종대상자 9,310,653명 중 7,629,522명이 접종하여, 접종률은 81.9%로 지난 절기 80.5% 대비 1.4%p 증가하였다.

접종 기관별로는 보건소에서 4.7% (357,603명), 위탁의료기관에서 95.3% (7,271,919명)가 접종하여 지난 절기 보건소 4.9%, 위탁의료기관 95.1%에 비해 위탁의료기관에서의

접종이 소폭 증가하였다(표 2). 어르신 지역별 접종률은 전남(84.6%), 전북(84.5%), 충북(83.9%) 순으로 높았으며, 접종 건수는 경기(1,630,188건), 서울(1,343,754건)이 많았다.

어르신 대상 지원사업의 경우 사업 초기에 접종이 집중되는 양상으로, 사업 시작 2주간 5,134,231명이 접종하여 대상자의 55.2%가 접종을 완료하였다(그림 1). 이전 절기와 같이 2022-2023절기에는 코로나19 유행으로 접종 기관 내 혼잡도 완화 및 안전한 접종을 위해 연령대별 세 구간으로 분산접종을 시행하였으며, 75세 이상 시작일(10.12.)에 978,101명, 70세 이상 시작일(10.17.)에 740,223명, 65세 이상 시작일(10.20.)에 711,325명이 접종하여 접종 시기를 구분한 것은 분산 접종에 효과가 있는 것으로 보인다.

표 2. 절기별, 접종기관별 어르신 및 임신부 인플루엔자 접종 건수

구분	대상자 수	접종 건수			예방접종률(%)
		계	보건소	위탁기관	
어르신					
2022-2023절기	9,310,653	7,629,522 (100)	357,603 (4.7)	7,271,919 (95.3)	81.9
2021-2022절기	8,866,005	7,133,922 (100)	346,062 (4.9)	6,787,860 (95.1)	80.5
임신부					
2022-2023절기	265,262	133,735 (100)	543 (0.4)	133,192 (99.6)	50.4
2021-2022절기	275,209	149,226 (100)	397 (0.3)	148,829 (99.7)	54.2

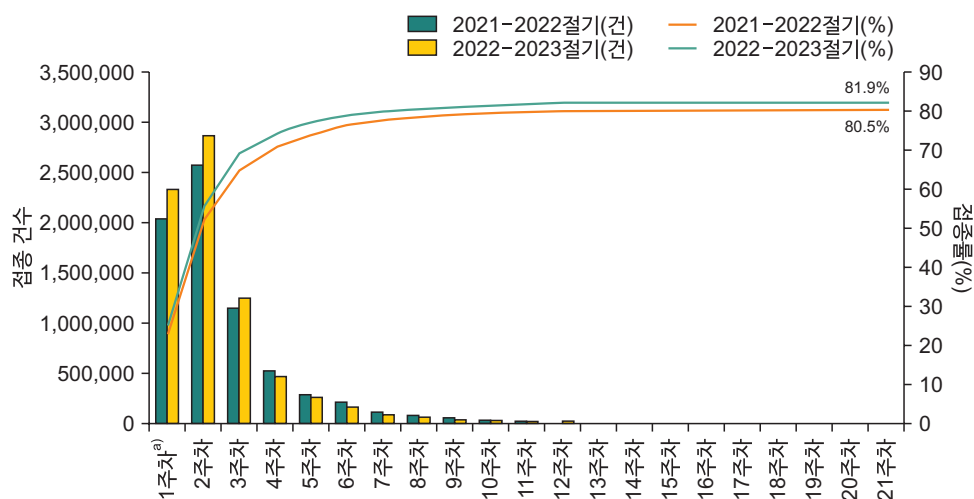


그림 1. 어르신 주차별 접종 건수 및 지난 절기 대비 접종률 비교

^{a)}1주차: 2022.10.12.-2022.10.16.

3. 임신부 인플루엔자 예방접종 실적

임신부는 2019년부터 인플루엔자 국가예방접종 사업대상자에 포함되어 예방접종을 지원하고 있다. 2022-2023절기에는 접종대상자 265,262명 중 133,735명이 접종하여, 예방접종률 50.4%로 지난 절기 54.2% 대비 3.8%p 감소하였다. 접종 기관별로는 보건소에서 0.4% (543명), 위탁의료기관에서 99.6% (133,192명)가 접종하여 지난 절기 보건소 0.3%, 위탁의료기관 99.7%와 유사하였다(표 2). 임신부 지역별 접종률은 강원(56.5%), 대전(54.1%), 서울(53.5%) 순으로 높았으며, 접종 건수는 경기(40,527건), 서울(23,228)이 많았다.

4. 어린이 인플루엔자 예방접종 실적

2022-2023절기 어린이 인플루엔자 예방접종률은 71.0%로 대상자 5,333,556명 중 3,785,738명(1회 접종, 2회 1차 접종 포함)이 접종하였다(표 3). 지난 절기 접종률(73.8%) 대비 2.8% 감소하였다(그림 2).

연령별 1회 접종자 기준 접종률은 생후 6-59개월 83.9%, 60-83개월 79.2%, 7-9세는 72.7%, 10-13세는 61.0%로 지난 절기와 동일하게 연령이 낮을수록 접종률이 높았다. 접종

기관별로는 전체 4,028,712건(1회 접종, 2회 1차 및 2차 접종 포함) 중 보건소에서 34,768건(0.9%), 위탁의료기관에서 3,993,944건(99.1%)이 접종하였다. 지역별 어린이 접종률은 인천 74.7%, 충남 73.7%, 경기 72.8% 순으로 높았으며, 연령대별로는 6-35개월 90.0%, 36-59개월 82.4%, 60-83개월 81.7%, 7-9세 75.7%, 10-13세 64.9%로 전 연령대가 인천 지역에서 가장 높았다.

5. 인플루엔자 예방접종 후 이상반응 신고현황

2022-2023절기 인플루엔자 예방접종 후 이상반응 신고는 118건(접종 10만 건당 신고건 1.0건)으로 예년 수준으로 유지되었다(2019-2020절기 105건, 2020-2021절기 1,626건, 2021-2022절기 108건). 어르신 이상반응 신고는 74건(작년 54건), 임신부 이상반응 신고는 0건(작년 20건), 어린이 이상반응 신고는 44건(작년 34건)이었다(표 4).

신고된 예방접종 후 이상반응 종류는 일반 이상반응 109건(92.4%), 중증 이상반응 9건 중 사망 6건(5.1%), 아나필락시스 의심 1건(0.8%), 중환자실 입원 등 2건(1.7%)이었다. 중증 이상반응 신고 사례의 역학조사 및 피해보상 심의 결과 아

표 3. 어린이 인플루엔자 접종 건수

구분	접종 대상자	접종 건수			예방접종률(%)		
		전체 ^{a)}	국가지원	자비 접종	전체 ^{a)}	국가지원	자비 접종
2022-2023절기							
계 ^{a)}	5,333,556	3,785,738	3,757,015	28,723	71.0	70.4	0.5
1회 접종(13세 이하)	4,908,767	3,513,320	3,485,534	30,261	71.6	71.0	0.6
2회 접종 ^{b)}	424,789						
1차		272,418	271,481	937	64.1	63.9	0.2
2차		242,974	242,230	744	57.2	57.0	0.2
2021-2022절기							
계 ^{a)}	5,544,747	4,091,520	4,048,741	42,779	73.8	73.0	0.8
1회 접종(13세 이하)	5,083,764	3,792,340	3,750,729	41,611	74.6	73.8	0.8
2회 접종 ^{b)}	460,983						
1차		299,180	298,012	1,168	64.9	64.6	0.3
2차		265,081	263,941	1,140	57.5	57.3	0.2

^{a)}1회 접종 및 2회 접종자의 1차 접종건 기준. ^{b)}과거 인플루엔자 접종을 2회 미만 접종한 대상자 수(예방접종통합관리시스템 등록기준). ^{c)}국가지원 접종 및 자비 접종 포함.

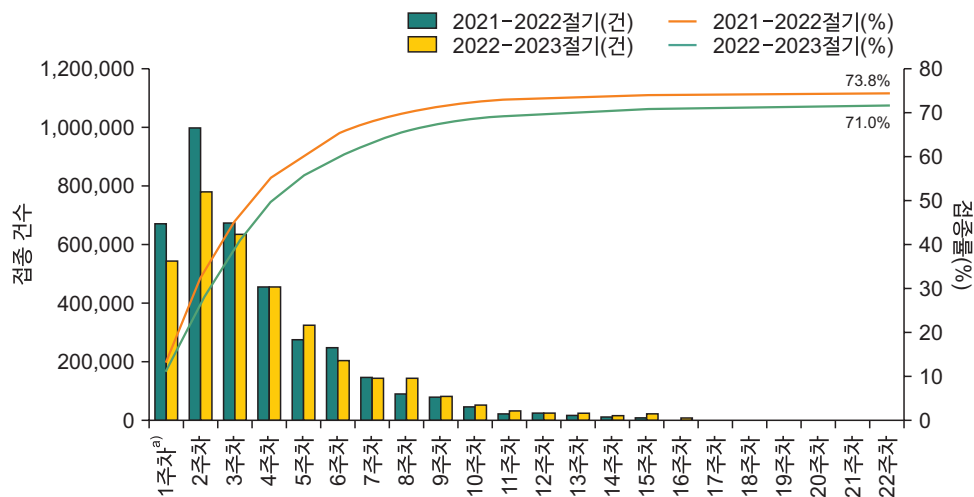


그림 2. 어린이 주차별 접종 건수 및 지난 절기 대비 접종률 비교

^{a)}1주차: 2022.9.21.-2022.9.25.

표 4. 2022-2023절기 인플루엔자 예방접종 후 신고된 이상반응 종류

구분	계 (A=B+C)	일반 이상반응(B)	중증 이상반응			예방접종 건수(D)	10만 건당 이상반응 신고율 (E=A/D)	
			소계 (C=C1+C2+C3)	사망(C1)	아나필락시스 의심(C2)			주요 이상반응 (C3)
총계	118	109	9	6 ^{a)}	1	2 ^{b)}	11,848,067	1.0
어르신	74	66	8	6	0	2		
임신부	0	0	0	0	0	0		
어린이	44	43	1	0	1	0		

A, 누계 기간: 2022.7.1.-2023.4.30. (예방접종 후 이상반응으로 의심되어 신고된 건으로 의료기관이나 보건소에서 신고한 정보를 기반으로 산출하였으며, 백신과 이상반응 간 인과성을 제시하는 것은 아님. 신고현황 분류는 새로운 정보 추가 시 변경될 수 있음). B, 일반 이상반응은 예방접종 후 접종부위 발적, 통증, 부기, 근육통, 발열, 두통, 오한 등 흔하게 발생하는 증상을 포함. C, 중증 이상반응은 다음의 사례 포함. ① 사망, ② 아나필락시스 의심(아나필락시스양 반응 포함), ③ 주요 이상반응: 중환자실 입원, 생명위중, 영구장애/후유증 등. ^{a)}사망: 호흡곤란(1), 길랑바레증후군(1), 급성 심장사(1), 패혈증 쇼크(2), 복강내 출혈(1), ^{b)}중환자실 입원: 패혈증 쇼크(2).

나필락시스 1건은 인과성 가능성이 있는 경우이며, 나머지 5건은 기저질환 등 다른 이유에 의한 가능성으로 백신과의 이상반응 발생 시기가 시간적 개연성은 있으나 백신보다는 다른 이유에 의한 가능성이 더 높은 경우로, 3건은 백신과의 인과성이 없으므로 판단되었다.

6. 인플루엔자-코로나19 백신 동시접종 후 이상반응 신고현황

2022-2023절기에는 인플루엔자와 코로나19 접종시기가 일부 맞물려 있었다. 인플루엔자 국가예방접종은 코로나19

동시접종이 가능하므로 코로나19 접종 이상반응 신고율과 인플루엔자-코로나19 백신을 같은 날 동시접종한 대상군의 이상반응 신고율을 비교해 보았다. 동시접종 인구는 질병보건통합관리시스템 내 코로나19 예방접종관리시스템과 예방접종통합관리시스템을 통해 확인하였으며 총 308,117명이 동시접종을 받았다(표 5). 이는 인플루엔자 전체 접종자의 2.60%에 해당하며, 동시접종 이상반응 신고는 108건이며, 이 중 3건이 인플루엔자 이상반응으로, 105건이 코로나19 이상반응으로 신고되었다. 동시접종자의 이상반응 신고율은 0.035%였으며 동시접종이 이상반응 신고 여부에 영향을 미친 것인지

표 5. 2022-2023절기 인플루엔자-코로나19 백신 동시접종 이상반응 신고현황

구분	이상반응 신고 건수(A)	예방접종 건수(B)	이상반응 신고율 (C=A/B×100)
코로나19	2,606	10,397,058	0.025
동시접종(코로나19+인플루엔자)	108	308,117	0.035
인플루엔자	118	11,848,067	0.001

코로나19=코로나바이러스감염증-19.

에 대해서는 추가적인 연구가 필요하다.

결 론

2022-2023절기 인플루엔자 국가예방접종 지원사업은 생 후 6개월부터 13세 어린이, 임신부, 65세 이상 어르신을 대상으로 시행하였다. 어르신 대상은 지난 절기 대비 접종률이 증가하였고 임신부와 어린이 대상의 접종률은 감소하였다. 2022-2023절기 직전 2개 절기 인플루엔자 의사환자 분율은 유행기준 이하로 유지되었고[4,5] 코로나19 대유행 기간 인플루엔자를 비롯한 급성호흡기감염증 발생이 모두 감소하였는데[5] 이는 코로나19 유행에 따른 마스크 착용, 거리두기 등 방역 조치의 영향으로 볼 수 있다.

그러나 2022년 하반기부터 인플루엔자 바이러스가 코로나19 대유행 이전과 유사한 발생을 보였고 방역정책 완화 등으로 대면접촉 기회가 많아졌기에 인플루엔자 감염에 취약한 대상에서 감염 예방이 필요한 상황이다[4,5]. 이에 인플루엔자 접종을 독려하기 위한 대상자별 홍보와 안전한 예방접종을 위한 관리를 강화하고, 코로나19와 동시접종 시 이상반응 감시 강화 등을 통해 2023-2024절기 인플루엔자 국가예방접종 지원사업을 준비할 필요가 있다.

Declarations

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Acknowledgments: None.

Conflict of Interest: The authors have no conflicts of interest to declare.

Author Contributions: Conceptualization: SHA, SLK. Data curation: SHA, MJS, SSJ, JYL, HAB, JEL. Methodology: SHA, MJS, SSJ, HAB. Supervision: SLK, HML, JHP. Writing-original draft: SHA, HAB, SLK. Writing-review & editing: SHA, SLK, HML.

Supplementary Materials

Supplementary data are available online.

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The Republic of Korea National Influenza Vaccination Project: Outcomes of the 2022–2023 Season

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ABSTRACT

The national influenza vaccinations program has implemented for the adults aged 65 years and older, pregnant women and children aged 6 months to 13 years. This article introduces the main results of the national influenza vaccination program for the 2022–2023 season. The vaccination rate of each target group was 81.9% for the older adults, an increase of 1.4%p from the previous year, and 50.4% and 71.0% for pregnant women and children, respectively (a decrease of 3.8%p and 2.8%p, respectively, from the previous year). A total of 118 reports of adverse reactions after influenza vaccination were reported, similar to the previous year. Based on the main results from the 2022–2023 season, it is expected to be used as baseline data for the development of national influenza vaccination in the future.

Key words: Influenza; Immunization; Vaccination coverage

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Introduction

Influenza is an infection caused by the influenza virus characterized by systemic symptoms, such as sudden fever ($\geq 38^{\circ}\text{C}$), muscle pain, headache, and respiratory symptoms such as sore throat and cough. The flu season generally persists from November to April of the following year, and older adults aged ≥ 65 years, children < 5 years, and individuals with chronic diseases are at an elevated risk for complications, hospitalization, and mortality [1].

In 1997, the Republic of Korea (ROK) launched a national influenza vaccination campaign for older adults aged ≥ 65

years through public health centers; the campaign expanded to include private designated healthcare facilities in 2015. In addition, the National Child Influenza Vaccination Campaign initially targeted infants aged 6–11 months in 2016 and was eventually expanded to include children aged 6–59 months in 2017, children aged 6 months to 12 years in 2018, and children aged 6 months to 13 years in 2020 [2]. As pregnant women are at high risk for complications, such as pneumonia, once they develop an influenza infection, they were included in the national campaign from 2019 to protect fetuses and infants < 6 months.

In the 2020–2021 season, the target population of

Key messages

① What is known previously?

The national influenza vaccinations program implemented for the adults aged 65 years and older, pregnant women and children aged 6 months to 13 years.

② What new information is presented?

The influenza vaccination rate for the 2022–2023 season was 81.9% for the older adults, an increase from the previous season, 50.4% for pregnant women and 71.0% for children, representing from the previous season, and 118 cases of adverse reactions after influenza vaccination were similar to the previous year’s level.

③ What are implications?

The influenza virus is recovering seasonally from the second half of 2022, so children and the older adults who are vulnerable to respiratory infections need to be careful about infection. The goal is to implement various measures to improve influenza vaccination rates for all targets group.

influenza vaccination temporarily extended to older adults aged 62–64 years, adolescents aged 14–18 years, and individuals receiving disability benefits or medical aid, accommodating the concurrent epidemic of influenza and coronavirus disease 2019(COVID-19).

This article reviews the major outcomes of the 2022–2023 season national influenza vaccination campaign in the ROK and presents valuable data for subsequent national influenza vaccination campaigns in the country.

Results

1. Outline of the 2022–2023 Season National Influenza Vaccination Campaign

The 2022–2023 season national influenza vaccination campaign targeted older adults aged ≥65 years, pregnant women, and children aged 6 months to 13 years. The campaign length was established considering the antibody production against the influenza virus from approximately 2 weeks after the vaccination, lasting approximately 6 months, and the timing of the flu epidemic in the previous season (Table 1). The National Child Influenza Vaccination Campaign was launched in September, as children require two doses to acquire immunity (two doses with a 4-week interval), and older adults are targeted early in the campaign. Thus, vaccination timing was determined by age group for ensuring safe vaccination.

Regardless of residence, free flu vaccines are provided at

Table 1. Vaccination target and period, 2022–2023 season

Vaccination target	Vaccination period
Children (born in Jan. 1, 2009–Aug. 31, 2022)	
Two doses of flu vaccine ^{a)}	2022.9.21.–2023.4.30.
One doses of flu vaccine (under 13 years of age)	2022.10.5.–2023.4.30.
Pregnant women	2022.10.5.–2023.4.30.
Older adults (born before Dec. 31, 1957)	
Over 75 yr	2022.10.12.–2022.12.31.
70–74 yr above	2022.10.17.–2022.12.31.
65–69 yr above	2022.10.20.–2022.12.31.

^{a)}Under the age of 9 who have received influenza vaccination for the first time or who have received a total of less than two doses by June 30, 2022.

21,930 public health centers, public health branches, public health clinics, and contracted healthcare facilities nationwide. Unlike the Influenza trivalent vaccine, the quadrivalent flu vaccine was chosen as it contains one more B-type virus antigen, reducing the possibility of mismatch with the prevailing influenza strain and providing excellent influenza prevention [3].

The vaccination rate was calculated based on birth year among those registered in the Comprehensive Vaccination Management System of the Integrated Disease Prevention and Health Promotion Management System of the Korea Disease Control and Prevention Agency. Electronic vaccination records were updated by public health centers or contracted healthcare facilities. The child vaccination rate was estimated among those who completed the first vaccination dose and were eligible for one or two doses. Owing to the difficulty confirming the target population in pregnant women, the vaccination rate based its calculation on the number of births in 2021 as a substitute. Nationally supported and voluntarily administered vaccinations were included when calculating vaccination counts and rates.

2. Influenza Vaccination Rates among Older Adults

Of 9,310,653 older adults eligible for the free flu vaccine,

7,629,522 received the vaccination (rate, 81.9%), a 1.4%p increase from the 80.5% in the previous season.

Regarding the vaccination facility, 4.7% (n=357,603) received the vaccination from a public health centers, while 95.3% (n=7,271,919) received it from a contracted healthcare facility, showing a slight increase in the percentage of individuals receiving the vaccine at a contracted healthcare facility compared to the previous season (4.9% and 95.1%, respectively; Table 2). By region, the vaccination rate among older adults was the highest in Jeonnam (84.6%), followed by Jeonbuk (84.5%) and Chungbuk (83.9%), and the number of vaccines administered was high in Gyeonggi (1,630,188 cases) and Seoul (1,343,754 cases).

Vaccination for older adults was concentrated early in the campaign, where 5,134,231 (55.2% of eligible individuals) older adults received the vaccine in the first 2 weeks (Figure 1). As with previous seasons, vaccinations in the 2022–2023 season were instituted by age groups in three phases to prevent overcrowding in vaccination clinics and to ensure patient safety accounting for the COVID-19 pandemic. This phased vaccination seems effective, as evidenced by the 978,101 aged ≥75 years receiving vaccines on the first day of vaccination (October 12), 740,223 aged ≥70 years on first day (October 17), and 711,325 aged ≥65 years on first day (October 20).

Table 2. Number of vaccinations of older adults and pregnant women, by health services

Characteristics	No. of population	No. of vaccinated			Vaccine coverage (%)
		Total	Public health center	Medical institution	
Older adults					
2022–2023 season	9,310,653	7,629,522 (100)	357,603 (4.7)	7,271,919 (95.3)	81.9
2021–2022 season	8,866,005	7,133,922 (100)	346,062 (4.9)	6,787,860 (95.1)	80.5
Pregnant women					
2022–2023 season	265,262	133,735 (100)	543 (0.4)	133,192 (99.6)	50.4
2021–2022 season	275,209	149,226 (100)	397 (0.3)	148,829 (99.7)	54.2

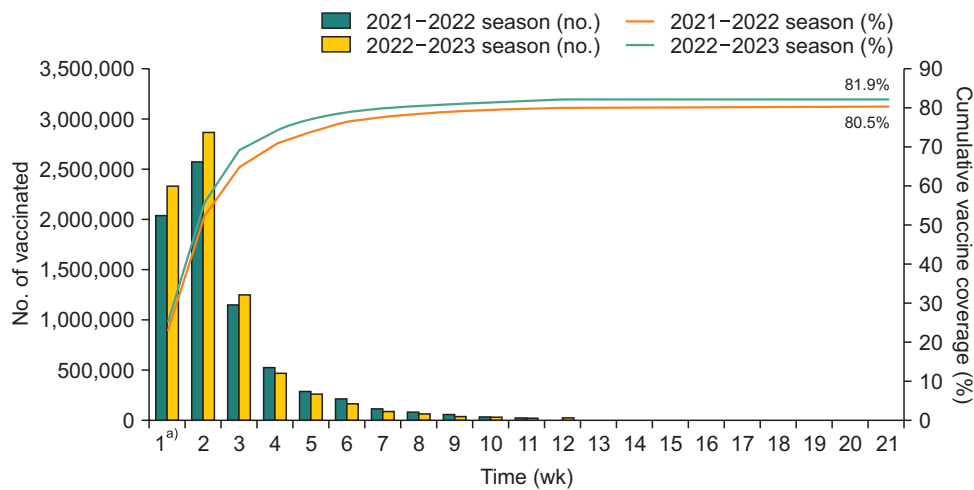


Figure 1. Number of vaccinations older adults by week and compared vaccination coverage to last season
^{a)}Week 1: 2022.10.12.–2022.10.16.

3. Influenza Vaccination Rates among Pregnant Women

Pregnant women were included in the national influenza vaccination campaign in 2019. In the 2022–2023 season, 133,735 of 265,262 eligible women received the vaccine (rate 50.4%), a 3.8%p decrease compared to 54.2% in the previous season. Concerning the vaccination facility, 0.4% (n=543) received the vaccination from a public health centers, while 99.6% (n=133,192) received the vaccination from a contracted healthcare facility, similar to the percentages in the previous season (0.3% and 99.7%, respectively; Table 2). Regarding the region, the vaccination rate among pregnant women was the highest in Gangwon (56.5%), followed by Daejeon (54.1%) and Seoul (53.5%), while the number of vaccines administered was high in Gyeonggi (40,527 cases) and Seoul (23,228 cases).

4. Influenza Vaccination Rates among Children

In the 2022–2023 season, the influenza vaccination rate among children was 71.0%; 3,785,738 of 5,333,556 eligible children received the vaccination (including single dose and first dose from a two-dose series) (Table 3), which is a 2.8%p

decrease from 73.8% in the previous season (Figure 2).

The single-dose vaccination rate was 83.9% in 6–59-month-olds, 79.2% in 60–83-month-olds, 72.7% in 7–9-year-olds, and 61.0% in 10–13-year-olds, showing an increasing vaccination rate with decreasing age, as observed in the previous season. In relation to the vaccination clinic, out of 4,028,712 total cases (including single dose and first dose from a two-dose series), 34,768 vaccines (0.9%) were received at a public health centers, while 3,993,944 vaccines (99.1%) were received at a contracted healthcare facility. Considering region, the vaccination rate among children was the highest in Incheon (74.7%), followed by Chungnam (73.7%) and Gyeonggi (72.8%). Furthermore, the vaccination rate was the highest in children aged 6–35 months (90.0%), followed by 36–59 months (82.4%), 60–83 months (81.7%), 7–9 years (75.7%), and 10–13 years (64.9%). The vaccination rate was the highest in Incheon among all age groups.

5. Reports of Adverse Reactions after Influenza Vaccination

Overall, 118 cases of adverse reactions were reported

Table 3. Vaccination coverage of children, 2022–2023 season

Characteristics	No. of population	No. of vaccinated			Vaccine coverage (%)		
		Total ^{c)}	Free	Paid	Total ^{c)}	Free	Paid
2022–2023 season							
Total ^{a)}	5,333,556	3,785,738	3,757,015	28,723	71.0	70.4	0.5
1 shot (younger 13 yr)	4,908,767	3,513,320	3,485,534	30,261	71.6	71.0	0.6
2 shot ^{b)}	424,789						
1st		272,418	271,481	937	64.1	63.9	0.2
2nd		242,974	242,230	744	57.2	57.0	0.2
2021–2022 season							
Total ^{a)}	5,544,747	4,091,520	4,048,741	42,779	73.8	73.0	0.8
1 dose (younger 13 yr)	5,083,764	3,792,340	3,750,729	41,611	74.6	73.8	0.8
2 dose ^{b)}	460,983						
1st		299,180	298,012	1,168	64.9	64.6	0.3
2nd		265,081	263,941	1,140	57.5	57.3	0.2

^{a)}1 shot and first vaccination of 2 shot. ^{b)}No. of people who have received less than two doses of influenza in previous season (vaccination registered in the Integrated Vaccination Management System). ^{c)}Including national vaccinations and paid vaccinations.

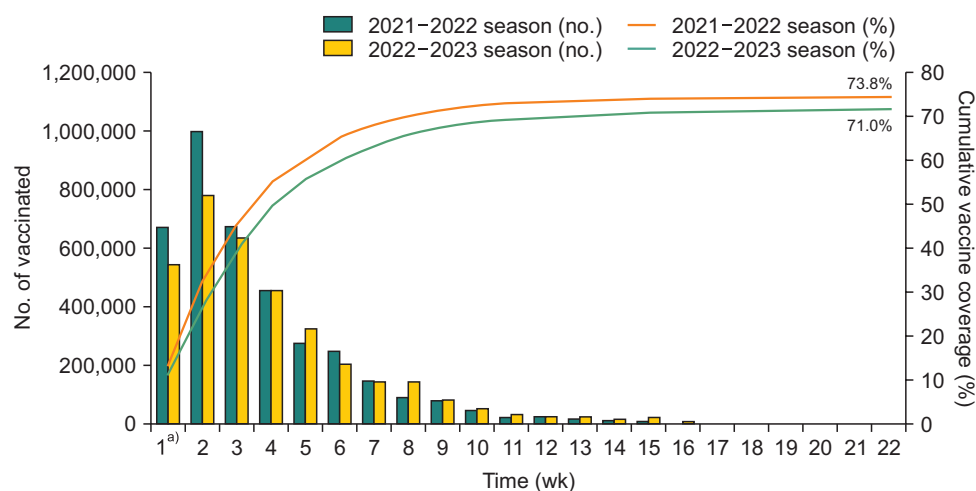


Figure 2. Number of vaccinations children by week and compared vaccination coverage to last season

^{a)}Week 1: 2022.9.21.–2022.9.25.

following influenza vaccination in the 2022–2023 season (1.0 cases per 100,000 vaccination cases), similar to the number reported in previous years (105 cases in the 2019–2020 season, 1,626 cases in the 2020–2021 season, and 108 cases in the 2021–2022 season). Adverse reactions were reported in 74 cases among older adults (54 in the previous year), 0 cases reported among pregnant women (20 in the previous year), and

44 cases reported among children (34 in the previous year; Table 4).

The types of adverse reactions included general adverse reactions (109 cases, 92.4%), six cases of death from nine serious adverse events (5.1%), suspected anaphylaxis (one case, 0.8%), and intensive care unit admission (two cases, 1.7%). After epidemiological investigations and injury compensation

Table 4. Types of adverse reactions, 2022–2023 season

Characteristics	Total (A=B+C)	General adverse reactions (B)	Severe adverse reactions				No. of vaccinated (D)	Adverse reactions rate per 100 thousand (E=A/D)
			Total (C=C1+C2+C3)	Death (C1)	Suspected anaphylaxis (C2)	Major adverse reactions (C3)		
Total	118	109	9	6 ^{a)}	1	2 ^{b)}	11,848,067	1.0
Older adults	74	66	8	6	0	2		
Pregnant women	0	0	0	0	0	0		
Children	44	43	1	0	1	0		

A, accumulated period: July 1, 2022 to April 30, 2023 (it was calculated based on information reported by medical institutions or public health centers as a suspected adverse reaction after vaccination, and does not suggest causality between vaccines and adverse reactions. Report status classification may be changed when new information is added). B, common adverse reactions include common symptoms such as redness, pain, swelling, myalgia, fever, headache, chills after vaccination. C, severe adverse reaction. ① death, ② suspected anaphylaxis (including anaphylaxis-like reaction), ③ major adverse reactions: intensive care unit (ICU) admission, critical life, permanent disability/aftermath etc. ^{a)}Death: dyspnea (1), Guillain-Barre syndrome (1), acute cardiac death (1), sepsis shock (2), intraperitoneal bleeding (1), ^{b)}ICU admission: sepsis shock (2).

Table 5. Coadministration of influenza and COVID-19 vaccines adverse reactions, 2022–2023 season

Characteristics	No. of adverse reactions (A)	No. of vaccinated (B)	Adverse reactions rate (C=A/B×100)
Total COVID-19	2,606	10,397,058	0.025
Coadministration (COVID-19+influenza)	108	308,117	0.035
Influenza	118	11,848,067	0.001

COVID-19=coronavirus disease 2019.

reviews of the serious adverse events, one case of anaphylaxis was deemed to have causal relevance to the vaccine, while the remaining five cases were determined to have some temporal relationship with the vaccine but were more likely to have been caused by other reasons, such as underlying disease; three of these cases were determined to have no causal relationship with the vaccine.

6. Reports of Adverse Reactions after Concurrent Influenza and COVID-19 Vaccination

In the 2022–2023 season, the national influenza vaccination campaign partially overlapped with the COVID-19 vaccination campaign. As co-administration of the flu vaccine and

COVID-19 vaccine is permitted, we compared the COVID-19 adverse reaction rate and adverse reaction rate among individuals who received both vaccines on the same day. Based on records from the COVID-19 vaccination management system and the comprehensive vaccination management system of the Integrated Disease Prevention and Health Promotion Management System, 308,117 individuals were found to have received both vaccines on the same day (Table 5). This accounts for 2.60% of all individuals who received the flu vaccine. Collectively, three cases of adverse reactions to the flu vaccine and 105 cases of adverse reactions to the COVID-19 vaccine were reported. The adverse reaction rate among individuals who received both vaccines on the same day was 0.035%.

Additional research is required to determine whether co-administration of the vaccines contributed to the adverse reaction reporting rate.

Conclusion

In the 2022–2023 season, the national influenza vaccination campaign targeted children aged 6 months to 13 years, pregnant women, and older adults aged ≥ 65 years. The vaccination rate increased compared to the previous season among older adults; contrarily, it decreased among pregnant women and children. In the two seasons preceding the 2022–2023 season, the proportion of influenza-like illness cases remained below the epidemic threshold [4,5], and the incidence of acute respiratory infections, including influenza, decreased during the COVID-19 pandemic [5]. This could be attributed to infection control measures implemented during the pandemic, such as mandatory face masks and social distancing.

However, it is imperative to prevent influenza infection among the vulnerable population since the incidence of influenza infection began a resurgence similar to the levels before the COVID-19 pandemic in the second half of 2022 with the increased in-person interactions because of relaxed infection control measures [4,5]. Therefore, target population-specific flu vaccine promotions and stricter management to ensure safe vaccinations are needed to encourage flu vaccination. Furthermore, increased surveillance of adverse reactions following co-administration of flu and COVID-19 vaccines is required to prepare for the national influenza vaccination campaign in the 2023–2024 season.

Declarations

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Supplementary Materials

Supplementary data are available online.

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